

# Fachspezifische Studienordnung für den Masterstudiengang „Integrated Natural Resource Management“

Gemäß § 17 Abs. 1 Ziffer 3 der Verfassung der Humboldt-Universität zu Berlin in der Fassung vom 24. Oktober 2013 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 47/2013) hat der Fakultätsrat der Landwirtschaftlich-Gärtnerischen Fakultät am 13. November 2013 die folgende Studienordnung erlassen\*:

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## § 1 Anwendungsbereich

Diese Studienordnung enthält die fachspezifischen Regelungen für den Masterstudiengang Integrated Natural Resource Management. Sie gilt in Verbindung mit der fachspezifischen Prüfungsordnung für den Masterstudiengang Integrated Natural Resource Management und der Fächerübergreifenden Satzung zur Regelung von Zulassung, Studium und Prüfung (ZSP-HU) in der jeweils geltenden Fassung.

## § 2 Beginn des Studiums

Das Studium kann zum Wintersemester aufgenommen werden.

## § 3 Ziele des Studiums

(1) Ziel des Masterstudiums als zweitem berufsqualifizierenden Abschluss für das Gebiet Integrated Natural Resource Management ist es, auf eine berufliche Tätigkeit vorzubereiten bzw. die Basis für eine Promotion zu legen.

(2) Nach erfolgreichem Studienabschluss sind die Studierenden befähigt, einen gezielten Beitrag zur Lösung von Fragen der Nachhaltigkeit miteinander

verbundener natürlicher, technischer, ökonomischer und sozialer Systeme zu leisten. Sie sind in der Lage, naturwissenschaftliche und gesellschaftliche Zusammenhänge, insbesondere in Bezug auf die Interaktionen sozialer und ökologischer Systeme, zu analysieren und konkrete Maßnahmen zu entwickeln und umzusetzen, die auf eine nachhaltige Ressourcennutzung abzielen.

(3) Mit dem Masterstudium haben die Studierenden die fachlichen, theoretischen, methodischen und sozialen Kompetenzen erworben, die für wissenschaftliches Arbeiten unabdingbar sind. Sie haben Kreativität, Innovationsbereitschaft und Verantwortungsbewusstsein unter Beweis gestellt.

(4) Die Studierenden haben die für ein breites und sich ständig wandelndes Berufsfeld erforderlichen überfachlichen Schlüsselqualifikationen erworben. Berufliche Einsatzfelder sind leitende Positionen in der Agrar- und Umweltwirtschaft, in Behörden, Dienstleistungen und der Wissenschaft. Sie können das erworbene Wissen kritisch einordnen, bewerten und vermitteln. Zu lebenslangem Lernen und zur Teamarbeit sind sie befähigt.

(5) Die Module werden in englischer Sprache angeboten. Im Überfachlichen Wahlpflichtbereich können Module auch in deutscher Sprache gewählt werden. Die Studierenden haben die Möglichkeiten zu Erwerb und Anwendung fremdsprachiger Kenntnisse genutzt.

(6) Der Masterstudiengang Integrated Natural Resource Management eröffnet die Möglichkeit, an Forschungs- und Entwicklungsprojekten mitzuwirken.

## § 4 Lehrveranstaltungsarten

(1) Lehrveranstaltungsarten sind über die in der ZSP-HU benannten Lehrveranstaltungsarten hinaus auch Studienprojekte.

(2) Das Studienprojekt (SPJ) wird im zweiten oder dritten Semester individuell oder als Gruppenarbeit durchgeführt. Im Rahmen des Studienprojektes erproben die Studierenden anhand eines ausgewählten Themas die Methodik wissenschaftlichen Forschens. Sie erwerben zusätzliche Qualifikationen in der Darstellung wissenschaftlicher Erkenntnisse und in der interdisziplinären Zusammenarbeit.

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\* Die Universitätsleitung hat die Studienordnung am 02. September 2014 bestätigt.

## § 5 Module des Studiums

Der Masterstudiengang umfasst insgesamt 120 Leistungspunkte (LP):

### (a) Pflichtbereich (54 LP)

Der Pflichtbereich umfasst folgende vier Module im Gesamtumfang von 24 LP sowie die Masterarbeit im Umfang von 30 LP:

- CM 1: Agroecosystems, Environment and Sustainable Natural Resource Use (6 LP)
- CM 2: Environmental and Resource Economics II: Strategies and Policies (6 LP)
- CM 3: Soil and Water Protection (6 LP)
- CM 4: Institutional Economics and Political Economy I – Basic Concepts and Applications (6 LP)
- Masterarbeit/Master Thesis (30 LP).

### (b) Fachlicher Wahlpflichtbereich (54 LP)

(1) Der Fachliche Wahlpflichtbereich umfasst Module und das Studienprojekt. Die Module sind den nachstehend aufgeführten vier Wissensgebieten zugeordnet. Es sind Modulleistungen im Umfang von 54 LP (9 Module oder 7 Module und Studienprojekt) zu erbringen.

(2) Das Studienprojekt ist einem Wissensgebiet zuzuordnen. Die Zuordnung ist durch die Betreuerin/den Betreuer dem Prüfungsbüro mitzuteilen und dort aktenkundig zu machen. Aus mindestens drei der vier Wissensgebiete ist jeweils mindestens ein Modul oder das Studienprojekt nachzuweisen.

Wissensgebiet 1: "Natural Sciences Applied to the Use and Protection of Natural Resource Systems":

- FM 1: Biodiversity: Assessment, Function and Evolution (6 LP)
- FM 2: Agricultural Climatology and Ecophysiology (6 LP)
- FM 3: Irrigation and Drainage Systems (6 LP)
- FM 4: Plant Diseases in the Environment and Control Management (6 LP)
- FM 5: Practices and Organization of Organic Farming (6 LP)

Wissensgebiet 2: "Social Sciences Applied to the Use and Protection of Natural Resource Systems":

- FM 6: Environmental Sociology and Environmental Policy (6 LP)
- FM 7: Environmental and Resource Economics III: Environmental Institutions and Governance (6 LP)
- FM 8: Participatory Rural Innovation and Knowledge Systems (6 LP)
- FM 9: Economics of Human Development (6 LP)
- FM 10: Co-operation and Co-operative Organizations (6 LP)

Wissensgebiet 3: "Advanced Methodologies for Empirical Analysis of the Interaction of Social, Natural and Technical Systems":

- FM 11: Human-Environmental Systems Interaction (6 LP)
- FM 12: Advanced Empirical Methodology for Socio-Ecological Systems Analysis (6 LP)
- FM 13: Geographic Information Systems (GIS) and Landscape Analysis (6 LP)
- FM 14: Market and Policy Analysis (6 LP)
- FM 15: Risk and Uncertainty in Science and Policy (6 LP)

Wissensgebiet 4: "Management of Environmental and Natural Resource Systems":

- FM 16: Environmental Management and Information Systems (6 LP)
- FM 17: Land and Water Management (6 LP)
- FM 18: Biodiversity and Conservation Management (6 LP)
- FM 19: Climate and Energy Management (6 LP)
- FM 20: Integrative Fisheries Management (6 LP)
- FM 21: International Forest Use and Management (6 LP)
- FM 22: The Role of Gender for Sustainable Resource Management (6 LP)
- FM 23: Project Management – Applied to Natural Resource-based Sectors and Development Programmes (6 LP)

Alle Wissensgebiete:

- FWM/FM 24: Studienprojekt/Student Project (12 LP).

(3) Wissensgebietsübergreifend werden im Fachlichen Wahlpflichtbereich sechs Studienschwerpunkte angeboten, von denen die Studierenden zwei Schwerpunkte wählen. Die Studienschwerpunkte ermöglichen eine Fokussierung auf eine thematisch kohärente Fächergruppe und sind durch die Studierende/den Studierenden spätestens im 2. Semester im Prüfungsbüro schriftlich anzuzeigen.

(4) In jedem der beiden gewählten Studienschwerpunkte sind drei Module (18 LP) aus den unten aufgeführten Auswahllisten zu belegen.

(5) Das gleiche Modul kann jeweils nur in einem Schwerpunkt angerechnet werden.

1. Studienschwerpunkt "Methodology and Modeling of Sustainability":

- FM 11: Human-Environmental Systems Interaction (6 LP)
- FM 12: Advanced Empirical Methodology for Socio-Ecological Systems Analysis (6 LP)
- FM 13: Geographic Information Systems (GIS) and Landscape Analysis (6 LP)
- FM 15: Risk and Uncertainty in Science and Policy (6 LP)
- FM 9: Economics of Human Development (6 LP)

2. Studienschwerpunkt "Sustainable Production Processes":

- FM 5: Practices and Organization of Organic Farming (6 LP)
- FM 16: Environmental Management and Information Systems (6 LP)
- FM 4: Plant Diseases in the Environment and Control Management (6 LP)
- FM 10: Co-operation and Co-operative Organizations (6 LP)
- FM 14: Market and Policy Analysis (6 LP)

3. Studienschwerpunkt "Sustainability Institutions and Policies":

- FM 6: Environmental Sociology and Environmental Policy (6 LP)
- FM 7: Environmental and Resource Economics III: Environmental Institutions and Governance (6 LP)
- FM 10: Co-operation and Co-operative Organizations (6 LP)
- FM 11: Human-Environmental Systems Interaction (6 LP)
- FM 12: Advanced Empirical Methodology for Socio-Ecological Systems Analysis (6 LP)

4. Studienschwerpunkt "Land and Water":

- FM 3: Irrigation and Drainage Systems (6 LP)
- FM 17: Land and Water Management (6 LP)
- FM 13: Geographic Information Systems (GIS) and Landscape Analysis (6 LP)
- FM 23: Project Management – Applied to Natural Resource-based Sectors and Development Programmes (6 LP)
- FM 7: Environmental and Resource Economics III: Environmental Institutions and Governance (6 LP)

5. Studienschwerpunkt "Biodiversity and Nature Conservation":

- FM 1: Biodiversity: Assessment, Function and Evolution (6 LP)
- FM 18: Biodiversity and Conservation Management (6 LP)
- FM 12: Advanced Empirical Methodology for Socio-Ecological Systems Analysis (6 LP)
- FM 20: Integrative Fisheries Management (6 LP)
- FM 7: Environmental and Resource Economics III: Environmental Institutions and Governance (6 LP)

6. Studienschwerpunkt "Climate Change and Renewable Energy":

- FM 2: Agricultural Climatology and Ecophysiology (6 LP)
- FM 19: Climate and Energy Management (6 LP)
- FM 11: Human-Environmental Systems Interaction (6 LP)
- FM 21: International Forest Use and Management (6 LP)

- FM 7: Environmental and Resource Economics III: Environmental Institutions and Governance (6 LP)

(c) Überfachlicher Wahlpflichtbereich (12 LP)

Im überfachlichen Wahlpflichtbereich sind Master-Module anderer Studiengänge des Thae-Instituts für Agrar- und Gartenbauwissenschaften sowie entsprechend ausgewiesene Master-Module anderer Fächer und zentraler Einrichtungen der HU und anderer Hochschulen im Umfang von 12 LP zu belegen.

**§ 6 Module für den überfachlichen Wahlpflichtbereich anderer Masterstudiengänge**

Für den überfachlichen Wahlpflichtbereich anderer Masterstudiengänge wird folgendes Modul angeboten:

FM 9 (ÜF): Economics of Human Development (10 LP)

**§ 7 In-Kraft-Treten**

(1) Diese Studienordnung tritt am Tage nach ihrer Veröffentlichung im *Amtlichen Mitteilungsblatt der Humboldt-Universität zu Berlin* in Kraft.

(2) Diese Studienordnung gilt für die Studierenden, die ihr Studium nach dem In-Kraft-Treten dieser Studienordnung aufnehmen oder nach einem Hochschul-, Studiengangs- oder Studienfachwechsel fortsetzen.

(3) Für Studierende, die ihr Studium vor dem In-Kraft-Treten dieser Studienordnung aufgenommen haben, gilt die Studienordnung vom 06. Februar 2006 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 09/2006). Alternativ können sie diese Studienordnung inklusive der zugehörigen Prüfungsordnung wählen. Die Wahl muss schriftlich gegenüber dem Prüfungsbüro erklärt werden und ist unwiderruflich. Alle bereits erbrachten Studienleistungen werden auf die gemäß dieser Studienordnung zu erbringenden Studienleistungen angerechnet, sofern sie äquivalent sind. Mit Ablauf des Wintersemesters 2016/17 tritt die Studienordnung vom 06. Februar 2006 außer Kraft. Das Studium wird dann auch von den in Satz 1 benannten Studierenden nach dieser Studienordnung fortgeführt. Bisherige Leistungen werden entsprechend § 110 ZSP-HU berücksichtigt.

**Anlage 1: Modulbeschreibungen**

Abkürzungen:

FWM: Fachliches Wahlpflichtmodul; SWS: Semesterwochenstunde; SE: Seminar; TU: Tutorium; KGP: Kleingruppenprojekt; SPJ: Studienprojekt; ZoL: Zeichen ohne Leerzeichen

Abbreviations:

CM: Compulsory Module; FM: Focal Module; SWS: contact hour per week; L: Lecture; SE: Seminar; E: Exercise; FT: Field Trip; TU: Tutorial; KGP: work in small groups; SPJ: Student Project

**Pflichtbereich**

<b>CM 1: Agroecosystems, Environment and Sustainable Natural Resource Use</b>			Credits: 6
<u>Learning objectives:</u>			
The students			
<ul style="list-style-type: none"> <li>• have learned about the interdependencies between the principles and practices of agricultural land use and environmental conditions,</li> <li>• have got knowledge about the organization and constraints of plant production and animal husbandry and relations to sustainability concepts,</li> <li>• learned about how these systems relate to landscapes, regional land use systems and their ecology as well as into rural development,</li> <li>• have developed a notion of the respective implementation problems by means of concrete projects and practical examples.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>3 SWS</u> <u>60 hours</u> 35 hours presence in class, 25 hours preparation and learning	3 credits, participation	<ul style="list-style-type: none"> <li>• The Eco-geography of domestic livestock and plant production</li> <li>• Biological processes as bases for plant and animal productivity</li> <li>• The relationship of nature conservation and landscape maintenance with agricultural production systems</li> <li>• Different approaches to land use and their implications for the environment</li> <li>• Productivity of agricultural systems in relation to environmental factors</li> <li>• Concepts, technologies and measures to minimize unwanted impacts and to integrate ecosystem services into land use</li> <li>• The relationship between bio-diversity and agricultural production</li> <li>• Recent research and projects focussing on sustainable land use and actual problems</li> </ul>
E	<u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Selected problems in land use and options of solutions by adapted systems</li> <li>• Selected technical papers on recent research and projects of high relevance</li> </ul>
Final exam	<u>30 hours</u> Oral Exam, 30 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <span style="margin-left: 200px;"><input type="checkbox"/> 2 semesters</span>		
Start of module	<input checked="" type="checkbox"/> winter semester <span style="margin-left: 200px;"><input type="checkbox"/> summer semester</span>		

CM 2: Environmental and Resource Economics II: Strategies and Policies			Credits: 6
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• have learned the terminology and concepts of environmental and resource economics,</li> <li>• are familiar with the paradigms and analytical frameworks in environmental and resource economics,</li> <li>• understand economic properties of environmental goods and natural resources,</li> <li>• are able to apply valuation methods and to analyse environmental policy instruments,</li> <li>• know methodologies for valuation of environmental goods and decision making and</li> <li>• are familiar with political and institutional strategies regarding resource use and environmental protection.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>3 SWS</u></p> <p><u>90 hours</u></p> <p>35 hours presence in class, 55 hours preparation and learning</p>	3 credits, participation	<ul style="list-style-type: none"> <li>• Leading notions and basic concepts of environmental and resource economics</li> <li>• Meaning and definitions of sustainability The environment as a public good, market failure and external effects</li> <li>• Economics of natural resources and models of resource extraction</li> <li>• Non-renewable natural resources</li> <li>• Renewable natural resources</li> <li>• Environmental valuation and assessment</li> <li>• Valuation in environmental economics</li> <li>• Environmental cost-benefit analysis</li> <li>• Economics of pollution and optimal control</li> <li>• Economics of pollution: defining environmental policy objectives</li> <li>• Instruments of environmental policies:               <ul style="list-style-type: none"> <li>◦ Pollution control policy</li> <li>◦ Institutions and governance in resource and environmental coordination</li> <li>◦ instruments and institutions of resource management and environmental policy (group work)</li> </ul> </li> </ul>
KGP	<p><u>1 SWS</u></p> <p><u>60 hours</u></p> <p>15 hours presence in class, 45 hours preparation and learning</p>	2 credits, Written group report, ca. 15,000 characters per student	<ul style="list-style-type: none"> <li>• Group work for organizational skills by developing a joint paper and presentation</li> <li>• Commitment to collective action, generation of trust</li> <li>• Practice of interaction required for sustainable cooperation</li> </ul>
Final exam	<p><u>30 hours</u></p> <p>Written exam, 90 minutes, and preparation</p>	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

CM 3: Soil and Water Protection		Credits: 6	
<p><u>Learning objectives:</u></p> <p>The students</p> <ul style="list-style-type: none"> <li>• have learned the basics of pressures on soil and waters,</li> <li>• are able to propose and evaluate preventive and remediation measures and to supervise their implementation,</li> <li>• have knowledge of legal principles on soil and water protection and</li> <li>• have knowledge of the EU Water Framework Directive.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>3 SWS</u> <u>90 hours</u> 35 hours presence in class, 55 hours preparation and learning	3 credits, participation	<ul style="list-style-type: none"> <li>• Basic principles of selected negative impacts on soils and waters (each with causes, effects, extent, identification, preventive protection, avoidance, remediation, legal regulations)</li> <li>• Common hydrological terms</li> <li>• Land use and its impact on ground and surface waters</li> <li>• Drinking water protection zones</li> <li>• Sewage and sewage treatment</li> <li>• Floods and flood management</li> </ul>
E	<u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning	2 credits, participation	Further discussion of lecture topics
Final exam	<u>30 hours</u> Oral exam, 30 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

<b>CM 4: Institutional Economics and Political Economy I –Basic Concepts and Applications</b> Credits: 6			
Learning objectives: The students <ul style="list-style-type: none"> <li>• have a good knowledge of the basic terms institutional economics and political economy,</li> <li>• know theories to conceptualize and analyse the role of institutions in the economy and society,</li> <li>• understand main drivers and processes of institutional change and political reform,</li> <li>• are able to contrast different strands of institutional economics and their background,</li> <li>• are familiar with theories concerning political economy and governance and their change,</li> <li>• know cases and examples that illustrate the relevance of institutional and political analysis and</li> <li>• are able to apply the concepts learned in their field of study and decision making.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, participation	<ul style="list-style-type: none"> <li>• Basic coordination problems</li> <li>• Frameworks for institutional analysis</li> <li>• Transactions and transaction cost</li> <li>• Governance of economic transactions</li> <li>• Game Theory and behaviour</li> <li>• Property Rights Theory</li> <li>• Collective Action Theory</li> <li>• Commons and cooperatives</li> <li>• Transaction Costs Theory</li> <li>• Principal-agent Theory</li> <li>• Theory of the Firm</li> <li>• Labour contracts</li> <li>• Public Choice Theory</li> <li>• Theory of Constitutions</li> <li>• Theory of Democracy</li> <li>• Interpretative Politics</li> <li>• Theory of Interest Groups</li> <li>• Theory of Bureaucracy</li> <li>• Theories of Institutional Change</li> <li>• Political reform and advocacy coalitions</li> <li>• Theories of Public Policy making</li> <li>• Theories of multi-level governance</li> </ul>
SE	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Reading and discussion of articles demonstrating on core approaches</li> <li>• Application of conceptual ideas for introduced in analytical practice</li> <li>• Group work on review questions</li> </ul>
Final exam	<u>30 hours</u> Written exam, 90 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

**Fachlicher Wahlpflichtbereich**

**Wissensgebiet 1: "Natural Sciences Applied to the Use and Protection of Natural Resource Systems"**

<b>FM 1: Biodiversity: Assessment, Function and Evolution</b>			Credits: 6
<u>Learning objectives:</u>			
The students			
<ul style="list-style-type: none"> <li>• have learned to apply different methodological approaches for assessing biodiversity,</li> <li>• acquire skills to design and assess monitoring programmes and test hypotheses rigorously and cost-effectively,</li> <li>• got insights into modern taxonomy to understand evolutionary scenarios and relationships among and between taxa,</li> <li>• have learned to apply to the results to nature conservation strategies and management systems for sustainable use of natural resources and</li> <li>• know how to establish, develop, maintain, and redistribute information in biological reference and research collections.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>30 hours</u> 25 hours presence in class, 5 hours preparation and learning	1 credit, participation	<ul style="list-style-type: none"> <li>• History of biodiversity research</li> <li>• Introduction to phylogeny and ecology</li> <li>• Generation of hypotheses – designing and need for adaptation of monitoring programs to obtain relevant data for nature</li> <li>• Conservation and sustainable development</li> <li>• Methods in taxonomy, comparative morphology and ecophysiology</li> <li>• Purpose of collections: introduction, definition of collections, ethics, operational planning</li> </ul>
SE	<u>1 SWS</u> <u>30 hours</u> 15 hours presence in class, 15 hours preparation and learning	1 credit, participation	Deepening lecture contents by study of original literature: presentations and discussions of selected aspects with emphasis on applied biodiversity research, ecology and nature conservation
E	<u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Takes place at the research station 'Linde', Brandenburg state, and in the laboratory</li> <li>• Methods to assess patterns of vertebrate and invertebrate diversity and ecology (e.g. field-observations, capture-mark-recapture, radio telemetry, bio-acoustic methods, camera trapping)</li> </ul>
FT	<u>30 hours</u>	1 credit, participation	Visit to field sites and/or Berlin Zoo & Tierpark Berlin-Friedrichsfelde
Final exam	<u>30 hours</u> Written exam, 90 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		



<b>FM 2: Agricultural Climatology and Ecophysiology</b>		Credits: 6	
<p><u>Learning objectives:</u></p> <p>The students</p> <ul style="list-style-type: none"> <li>• have acquired the ability to describe worldwide climatic situations and to interpret climate diagrams based on the understanding of the general circulation of the atmosphere (climatogenesis) and of the microclimates of different sites,</li> <li>• have got a profound understanding of the differentiated performance of crop plants on relevant environmental growth factors and</li> <li>• have learned to comprehend and judge the site-dependent microclimates, their multiple effects on plant production and their modification due to agronomic measures.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, participation	Climatic needs of crop plants, climatic factors and elements, general circulation of the atmosphere, global distribution of radiation, temperature, precipitation and evaporation; classification of climates, regional climates of the continents
L	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	Introduction into yield formation of crops, impacts of environmental factors on the growth and development of the shoot (radiation, temperature, CO <sub>2</sub> , rel. humidity, wind) and of the root (compaction O <sub>2</sub> , CO <sub>2</sub> , water, temperature and nitrogen)
Final exam	<u>30 hours</u> Written exam, 90 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <span style="margin-left: 150px;"><input type="checkbox"/> 2 semesters</span>		
Start of module	<input checked="" type="checkbox"/> winter semester <span style="margin-left: 100px;"><input type="checkbox"/> summer semester</span>		

FM 3: Irrigation and Drainage Systems		Credits: 6	
<p>Learning objectives: The students</p> <ul style="list-style-type: none"> <li>• have learned about basics of water management in the field of irrigation, drainage and soil melioration under different climate conditions and</li> <li>• have acquired knowledge of the techniques and technologies of irrigation, drainage systems and soil melioration.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>3 SWS</u> <u>90 hours</u> 35 hours presence in class, 55 hours preparation and learning	3 credits, participation	<ul style="list-style-type: none"> <li>• Water as resource worldwide for agriculture</li> <li>• Water quality parameter for different utilization, inclusive water reuse</li> <li>• Basics and parameters for irrigation, drainage and soil defects (salinity, compaction and other)</li> <li>• Irrigation techniques and technologies</li> <li>• Drainage systems</li> <li>• Methods and techniques of soil melioration</li> </ul>
SE	<u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning	2 credits, participation	Further discussion of lecture topics
Final exam	<u>30 hours</u> Oral exam, 30 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 4: Plant Diseases in the Environment and Control Management			Credits: 6
<p><u>Learning objectives:</u></p> <p>The students</p> <ul style="list-style-type: none"> <li>• have a clear understanding of impact of diseases in the environment,</li> <li>• got knowledge on isolation and purification of specific pathogens alternatively isolation and preparation of pests,</li> <li>• have a clear understanding of pathogenicity and the impact of selected pathogens/pests,</li> <li>• are able to apply specific methods using different kinds of samples,</li> <li>• are able to reflect the relevance of the investigated pathogens/pests in agriculture and horticulture as well as the quality rating of the applied methods,</li> <li>• have the capability to evaluate the results of diverse methods applied in diagnosis/identification and</li> <li>• are familiar with plant protection tools (prophylactic procedures, biological and chemical measures).</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>1 SWS</u> <u>30 hours</u> 15 hours presence in class, 15 hours preparation and learning	1 credit, participation	<ul style="list-style-type: none"> <li>• Isolation and purification of specific pathogens alternatively isolation and preparation of pests from water, soil and plants</li> <li>• Pathogenicity and virulence</li> <li>• Relevance of selected pathogens/pests in agriculture and horticulture</li> <li>• Plant protection measures</li> <li>• Eco-chemistry and ecotoxicology in regard to chemical plant protection</li> <li>• Storage protection or herbology</li> </ul>
SE	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	Further discussion of lecture topics
E	<u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning	2 credits, oral presentation, 15 minutes	
Final exam	<u>30 hours</u> Written exam, 90 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester (block) <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 5: Practices and Organization of Organic Farming			Credits: 6
<p><u>Learning objectives:</u></p> <p>The students</p> <ul style="list-style-type: none"> <li>• are familiar with the potential of organic farming for resource protection worldwide,</li> <li>• can apply problem oriented solutions for organising resource protection by using the concept of organic farming and</li> <li>• are familiar with the business organisation and performance of organic agriculture, in the context of the regulatory and policy environment within which it operates as well as broader sustainability considerations.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>3 SWS</u></p> <p><u>60 hours</u></p> <p>35 hours presence in class, 25 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Philosophy, principles, history and development of the organic farming movement</li> <li>• Principles of organic crop production: biodiversity, diversity and integration of enterprise, sustainability, natural pest management, natural soil fertility, and integrity</li> <li>• Description of farming practices required for successful organic farming illustrating these practices by international case studies</li> <li>• Recent research, projects and debates related to relevant issues of organic farming</li> <li>•</li> <li>• Factors influencing the financial and physical productivity of organic crop and livestock enterprises</li> <li>• General policy, regulatory and market environment of organic farming</li> <li>• Organic support schemes and their influence on the financial performance of the whole farm system</li> </ul>
SE	<p><u>1 SWS</u></p> <p><u>90 hours</u></p> <p>15 hours presence in class, 75 hours preparation and learning</p>	3 credits, written assignment, ca. 30,000 characters	Further discussion of lecture topics
Final exam	<p><u>30 hours</u></p> <p>oral presentation and discussion in the form of a group work (4 students), 15 minutes per student, based on assignment, and preparation</p>	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

**Wissensgebiet 2: "Social Sciences Applied to the Use and Protection of Natural Resource Systems"**

<b>FM 6: Environmental Sociology and Environmental Policy</b>			Credits: 6
<p><u>Learning objectives:</u></p> <p>The students know</p> <ul style="list-style-type: none"> <li>• the role of lifestyles and consumption patterns for natural resource use and concepts and approaches dealing with nature-society interactions,</li> <li>• the framework of the Common Agricultural Policy (CAP) of the European Union (EU) in the light of agri-environmental policies and services,</li> <li>• the historical development of the European Union (EU) and its decision-making processes,</li> <li>• the nature of current climate change adaptation projects in Europe, India, Africa and Latin America including how climate change can be deciphered as a complex socio-natural process,</li> <li>• sensitizing the special responsibility of urban areas for climate policy and</li> <li>• the view on sustainable development as a social transformation process and current modelling approaches for sustainability impact analysis in the frame of policy advice.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>3 SWS</u> <u>60 hours</u> 35 hours presence in class, 25 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Basic concepts and approaches of environmental sociology</li> <li>• Lifestyles, consumption patterns and environmental impacts</li> <li>• Environmental awareness and behaviour</li> <li>• Climate change from a sociological point of view (climate discourse analysis)</li> <li>• The role of cities in climate policy (adaptation, mitigation)</li> <li>• Sustainable Development from a sociological point of view</li> <li>• Decision making processes within the European Union (EU) and the related Common Agricultural Policy (CAP)</li> <li>• EU Agri-environmental policy, multifunctionality in agriculture and theory on ecosystem services</li> <li>• World-wide examples on climate change adaptation and ecosystem service projects</li> <li>• Modelling approaches for sustainability impact analysis related to land-use change and land use policies</li> </ul>
SE	<u>1 SWS</u> <u>90 hours</u> 15 hours presence in class, 75 hours preparation and learning	3 credits, seminar paper, ca. 30,000 characters	Further discussion of lecture topics
Final exam	<u>30 hours</u> Oral exam, 20 minutes, based on seminar paper	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

<b>FM 7: Environmental and Resource Economics III: Environmental Institutions and Governance</b>			Credits: 6
<u>Learning objectives:</u>			
Students			
<ul style="list-style-type: none"> <li>• understand ecological economics and conceptualisations of social-ecological issues,</li> <li>• have acquired knowledge about the role of institutions for environmental and natural resource problems,</li> <li>• are able to analyse relevant institutions for environmental and natural resource problems,</li> <li>• are familiar with frameworks for organising empirical material for institutional analysis,</li> <li>• know core theories of relevance to institutional analysis of resource use and the environment,</li> <li>• have basic skills regarding data gathering and analysis for empirical institutional analysis (both qualitative and quantitative methods and their combination and interpretation of results),</li> <li>• see the linkages between research design, theories, frameworks and methods when analysing specific environmental and natural resource problems in their own work and</li> <li>• apply their knowledge to structure the analysis of an empirical and a conceptual problem.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>3 SWS</u> <u>60 hours</u> 35 hours presence in class, 25 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Theories and frameworks in institutional, environmental and resource economics</li> <li>• Methodology of institutional and policy analysis applied to natural resources</li> <li>• Illustration of methodological approaches by using selected studies as examples</li> <li>• Group work and in-depth discussions</li> </ul>
SE	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, assignment: Option 1: Literature discussions (ca. 10,000 characters), Option 2: Preparation of seminars (ca. 10,000 characters)	Sequence of topics: (a) conventional and ecological economics, (b) social-ecological systems, (c) frameworks, (d) theories, (e) research methods, (f) examples. Teaching methods: <ul style="list-style-type: none"> <li>• preparation of the contents by participants through reading the relevant literature</li> <li>• explanation of main subjects and the "chain of thought" by the lecturers</li> <li>• issues for seminar/literature discussion in the group prepared by students</li> <li>• feedback on individual and group work</li> </ul>
Final exam	<u>60 hours</u> Written assignment: proposal for a Master thesis, ca. 30,000 characters, and preparation	2 credits, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 8: Participatory Rural Innovation and Knowledge Systems			Credits: 6
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• have knowledge in theory and practice of rural knowledge and innovation systems,</li> <li>• are able to analyse research and extension processes, with regard to its participatory design,</li> <li>• know how to organise transdisciplinary R&amp;D projects in a systematic way and</li> <li>• are able to prepare, conduct and evaluate clientele-centred extension.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Theoretical foundations concerning organization and functions of PRIKS</li> <li>• Forms of organisation in agricultural research and extension services (international)</li> <li>• Planning of participatory advisory and learning processes</li> <li>• Implementation of knowledge exchange activities</li> </ul>
E	<p><u>1 SWS</u></p> <p><u>30 hours</u></p> <p>15 hours presence in class, 15 hours preparation and learning</p>	1 credit, preparation of a case study (ca. 10,000 characters), presentation in the class (15 minutes)	Case study
Training course	<p><u>1 SWS</u></p> <p><u>30 hours</u></p> <p>15 hours presence in class, 15 hours preparation and learning</p>	1 credit, participation	Intensive training course on communication and advisory skills
Final exam	<p><u>60 hours</u></p> <p>Written exam, 90 minutes, or assignment (research paper), ca. 30,000 characters, and preparation</p>	2 credits, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 9: Economics of Human Development			Credits: 6
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• know the main development theories,</li> <li>• compare and contrast development experiences of different countries and regions,</li> <li>• critically discuss past and possible policy interventions and</li> <li>• can identify development problems and develop strategies.</li> </ul>			
<p>Preconditions: none, recommended: prior background/ basic knowledge of economics is an advantage</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>2 SWS</u></p> <p><u>90 hours</u></p> <p>25 hours presence in class, 65 hours preparation and learning</p>	3 credits, participation	<ul style="list-style-type: none"> <li>• Population &amp; Demography</li> <li>• Education</li> <li>• Health &amp; Development</li> <li>• Poverty &amp; Inequality</li> </ul>
L	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Trade &amp; Development</li> <li>• Migration &amp; Remittances</li> <li>• Vulnerability &amp; Coping Strategies</li> <li>• Microfinance</li> <li>• Climate Change &amp; Poverty</li> </ul>
Final exam	<p><u>30 hours</u></p> <p>Written exam, 90 minutes, and preparation</p>	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		



FM 9 (ÜF): Economics of Human Development			Credits: 10
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• know the main development theories,</li> <li>• compare and contrast development experiences of different countries and regions,</li> <li>• critically discuss past and possible policy interventions and</li> <li>• can identify development problems and develop strategies.</li> </ul>			
<p>Preconditions: none, recommended: prior background/ basic knowledge of economics is an advantage</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>2 SWS</u></p> <p><u>210 hours</u></p> <p>25 hours presence in class, 185 hours preparation and learning</p>	<p>7 credits, Homework, ca 60,000 characters</p>	<ul style="list-style-type: none"> <li>• Population &amp; Demography</li> <li>• Education</li> <li>• Health &amp; Development</li> <li>• Poverty &amp; Inequality</li> </ul>
L	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	<p>2 credits, participation</p>	<ul style="list-style-type: none"> <li>• Trade &amp; Development</li> <li>• Migration &amp; Remittances</li> <li>• Vulnerability &amp; Coping Strategies</li> <li>• Microfinance</li> <li>• Climate Change &amp; Poverty</li> </ul>
Final exam	<p><u>30 hours</u></p> <p>Written exam, 90 minutes, and preparation</p>	<p>1 credit, pass</p>	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

FM 10: Co-operation and Co-operative Organizations			Credits: 6
<p><u>Learning objectives:</u> Students</p> <ul style="list-style-type: none"> <li>• have received an introduction into problems of cooperative organizations,</li> <li>• have learned about different theoretical perspectives: collective action, organizational and development economics, public choice, games and behaviour,</li> <li>• have discussed about the development of co-operatives getting the empirical background for understanding concepts and ideas and</li> <li>• know how to analyse the Co-operative law, strategies towards poverty alleviation and rural development, management and business practices as well as self-help initiatives.</li> </ul>			
Preconditions: none, recommended: methodological competence, social competence, theory building skills, academic writing skills			
Teaching formats	Hours per week, workload in hours	Credits and preconditions for granting	Topics, contents
L	<u>3 SWS</u> 60 hours 35 hours presence in class, 25 hours preparation and learning	2 credit, participation	<ul style="list-style-type: none"> <li>• Cooperatives and Democratic Membership Organizations (DMOs) worldwide: Historical development, facts and typologies</li> <li>• Basics of economic theory: types of goods, behavioural models, the logic of cooperation and self-help organizations</li> <li>• Cooperatives as business associations: principles, ownership and agents</li> <li>• Governing the cooperative: decision-making, corporate vs cooperative governance</li> <li>• Position and impact of cooperatives in agribusiness cases: Dairy, wine, fruit and vegetable</li> <li>• Producer organizations in the international development debate: Poverty alleviation, microfinance and gender</li> <li>• Cooperatives and communities: Rural development challenges in the EU, cooperation and the future of municipal infrastructure</li> <li>• Cooperatives in other sectors: Housing cooperatives, civil society and urbanization; energy cooperatives and the transformation of the energy sector</li> </ul>
SE	<u>1 SWS</u> 30 hours 10 hours presence in class, 20 hours preparation and learning	1 credit Participation and presentation in class, 10 minutes	Students present and discuss their ideas and paper proposals in a students' colloquium
Final exam	<u>90 hours</u> Written assignment, ca. 45,000 characters	3 credits, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

**Wissensgebiet 3: "Advanced Methodologies for Empirical Analysis of the Interaction of Social, Natural and Technical Systems"**

<b>FM 11: Human-Environmental Systems Interaction</b>			Credits: 6
<u>Learning objectives:</u>			
The students			
<ul style="list-style-type: none"> <li>• have obtained basic knowledge of concepts, frameworks, theories and methods for conceptualizing and modelling human environmental systems (also called social-ecological systems),</li> <li>• got acquainted with institutions of sustainability,</li> <li>• have learned about land use modelling at different spatial scales and</li> <li>• got a profound understanding of climate impact analysis and adaptation options in agriculture.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• What is conceptualization? What is modelling?</li> <li>• Analysis of ecological systems (theories, models)</li> <li>• Resource economic approaches (theories, models)</li> <li>• Social-ecological systems (SES)</li> <li>• Framework for the analysis of sustainability of SES</li> <li>• Vulnerability/Resilience</li> <li>• The SES framework</li> <li>• Institutions of sustainability</li> <li>• Further methodological approaches to the study of SES (empirical field research, system dynamics, agent-based modelling, etc.)</li> <li>• Land use modelling approaches at different spatial scales</li> <li>• Linking economic models and biophysical models</li> <li>• Technological change, land expansion and international trade</li> <li>• Climate impacts and adaptation options in agriculture</li> <li>• Agricultural greenhouse gas emissions and mitigation options</li> <li>• The interaction between agriculture and the energy sector</li> <li>• Water and nutrients</li> </ul>
SE	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, presentation in class, 20 minutes	<ul style="list-style-type: none"> <li>• Presentations of students on selected topics</li> <li>• Practical exercises about the application of different frameworks and methods for the analysis of SES</li> <li>• Practical exercises in mathematical programming with GAMS</li> </ul>
Final exam	<u>30 hours</u> Oral exam, 30 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester (Block seminar) <input type="checkbox"/> summer semester		

<b>FM 12: Advanced Empirical Methodology for Socio-Ecological Systems Analysis</b>			Credits: 6
<p><u>Learning objectives:</u></p> <p>The students know</p> <ul style="list-style-type: none"> <li>• the leverage interrelationships between ecological, economic, social and institutional systems leading to unsustainable trends in natural resource use,</li> <li>• collective action problems among users in an increasingly globalised arena,</li> <li>• the potential of multiple-methods to provide valuable insights and to contribute to collaborative strategies and conflict-resolution mechanisms,</li> <li>• the stock of experiences based on pertinent research employing multiple methods with the aim to study the complexity of human behaviour and the complex interactions with socio-ecological systems,</li> <li>• experimental economics and game theory and</li> <li>• how to employ experimental techniques to provide insights on the role of institutions and of behavioural aspects in solving problems of group externalities or social dilemmas where the individual optimum clashes with the group optimum.</li> </ul>			
<p>Preconditions: none, recommended: basic knowledge of qualitative and quantitative research methods, basics of economics and social sciences, basic statistics, basic econometrics</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>3 SWS</u> <u>90 hours</u> 35 hours presence in class, 55 hours preparation and learning	3 credits, participation	<ul style="list-style-type: none"> <li>• Introduction of general research methodologies applied in social sciences and economics</li> <li>• Theoretical discussion and practical testing of relevant methods</li> <li>• Role playing games stressing social interaction and collaboration instead of competition</li> <li>• Agent-based models as computational models for simulating the actions and interactions of individuals or collectives</li> <li>• Crafting Rules by Discourse as an innovative urban rule-making development-promoting planning and consensus-building tool</li> <li>• Introducing Simulations, Vision Development, Mediated Modelling, Systemic Constellations, Social Metabolism, etc.</li> <li>• Empirical studies drawing also on Game theory and its relevance to Institutional, Experimental and Behavioural Economics focusing on applications in Natural Resource Management.</li> <li>• Discussing types of games, game design concepts and interpretation of results.</li> </ul>
SE	<u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning	2 credits, participation	Practical training in multiple-methods, exercise, gaming
Final exam	<u>30 hours</u> Oral exam (group of 4, 40 minutes per group) and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <span style="margin-left: 150px;"><input type="checkbox"/> 2 semesters</span>		
Start of module	<input type="checkbox"/> winter semester <span style="margin-left: 150px;"><input checked="" type="checkbox"/> summer semester</span>		

FM 13: Geographic Information Systems (GIS) and Landscape Analysis		Credits: 6	
<p><u>Learning objectives:</u></p> <p>The students</p> <ul style="list-style-type: none"> <li>• have got basic knowledge about the structure and the methods of GIS and abilities to use GIS as an instrument of storage, processing and analysis of spatial information,</li> <li>• are able to design, construct und use digital maps and spatial database management systems,</li> <li>• are able to use the GIS software, particularly ArcGIS,</li> <li>• have basic knowledge on quantitative methods and the interpretation of analytical results and</li> <li>• are able to use GIS and quantitative methods for solving analytical problems in the areas agricultural production, environment, economy and society.</li> </ul>			
<p>Preconditions for participation: none, recommended: knowledge in statistics</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Creation and application of digital maps</li> <li>• Vector and raster data in digital maps</li> <li>• Construction and management of data bases and database management systems (DBMS)</li> <li>• GIS software products, particularly the ArcGIS family</li> <li>• Methods for analysis and visualisation for spatial information</li> </ul>
SE	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	Further discussion of lecture topics
Final exam	<p><u>60 hours</u></p> <p>Multimedia-based exam (at PC), 90 minutes, and preparation</p>	2 credits, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 14: Market and Policy Analysis		Credits: 6	
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• know the theoretical aspects of market and policy analysis and</li> <li>• are able to formulate respective models and use spread sheet programmes.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Theory of market and policy analysis</li> <li>• Analysis of price policies</li> <li>• Analysis of structural policies</li> <li>• Budget policy and priority setting</li> </ul>
E	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, participation	Exercise at PC
Final exam	<u>30 hours</u> Multimedia-based exam (at PC), 30 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

FM 15: Risk and Uncertainty in Science and Policy			Credits: 6
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• have understood the nature and sources of uncertainty in science and policy,</li> <li>• have experienced and understood the key assumptions of the main quantitative uncertainty theories and the differences between those,</li> <li>• have acquired the skills to apply them appropriately,</li> <li>• have examined the various dimensions of uncertainty in the science-policy process and</li> <li>• have acquired the skills to reflect critically on the relationship between science and policy.</li> </ul>			
<p>Preconditions: none, recommended: basic knowledge of mathematics and statistics</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Conceptions of risk and uncertainty</li> <li>• Sources of uncertainty</li> <li>• Interval Arithmetic</li> <li>• Fuzzy Logic/Possibility Theory</li> <li>• Probability Theory</li> <li>• Classic vs. Bayesian probability</li> <li>• Comparative discussion of uncertainty theories: assumptions and applicability</li> <li>• Outlook: Imprecise probabilities, Info-gap models</li> <li>• Limits of quantitative theories</li> <li>• Conceptions of science-policy interrelations</li> <li>• Wicked Problems and Post-normal Science</li> <li>• Conceptions of expertise</li> <li>• Instrumental vs. collaborative rationality</li> <li>• Processing of uncertainty in politics</li> <li>• Precautionary Principle</li> <li>• Framing effects and reflexivity</li> </ul>
E	<p><u>1 SWS</u></p> <p><u>30 hours</u></p> <p>15 hours presence in class, 15 hours preparation and learning</p>	1 credit, participation	Practicing of quantitative uncertainty methods, largely using spreadsheets (as 2 SWS block during 1st part of semester)
SE	<p><u>1 SWS</u></p> <p><u>30 hours</u></p> <p>15 hours presence in class, 15 hours preparation and learning</p>	1 credit, participation	Study and discussion of original literature on uncertainty in the science-policy process (as 2 SWS block during 2nd part of semester)
Final exam	<p><u>60 hours</u></p> <p>Written assignment, ca. 30,000 characters</p>	2 credits, pass	Choosing one of the following: (a) quantitative study (e.g. write-up of exercise, case study applying uncertainty method); (b) argumentative study (e.g. critique of uncertainty method, discussion of science-policy aspect)
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

**Wissensgebiet 4: "Management of Environmental and Natural Resource Systems"**

<b>FM 16: Environmental Management and Information Systems</b>		Credits: 6	
<p><u>Learning objectives:</u> The students</p> <ul style="list-style-type: none"> <li>• have learned to name driving forces for the introduction of QM/EM systems,</li> <li>• know basic concepts and theory approaches of the quality/environmental management,</li> <li>• can describe and judge basic concepts and data basis of environmental information systems and</li> <li>• are familiar with principles and problems of assessment.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>3 SWS</u></p> <p><u>60 hours</u> 35 hours presence in class, 25 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Introduction                             <ul style="list-style-type: none"> <li>◦ Motives for the introduction QM/EM</li> <li>◦ Approaches (systems approach, stakeholder concept)</li> <li>◦ Basic ethical arguments</li> </ul> </li> <li>• Options of politics, authorities and enterprise                             <ul style="list-style-type: none"> <li>◦ Legal restrictions; market mechanisms, negotiation solutions</li> <li>◦ Integrated Management Systems</li> </ul> </li> <li>• Information and Assessment Systems                             <ul style="list-style-type: none"> <li>◦ Data basis</li> <li>◦ Methods, Modelling</li> <li>◦ Approaches for assessment and related problems</li> </ul> </li> <li>• Environmental marketing/environmental and risk communication</li> <li>• Sustainable Value Chains and CSR</li> </ul>
SE	<p><u>1 SWS</u></p> <p><u>30 hours</u> 15 hours presence in class, 15 hours preparation and learning</p>	1 credit	Reading articles, teamwork
Final exam	<p><u>90 hours</u> Oral group presentation group of 4; 10 minutes per student and seminar paper, ca. 45,000 characters</p>	3 credits, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		



FM 17: Land and Water Management			Credits: 6
<p><u>Learning objectives:</u></p> <p>The students have gained</p> <ul style="list-style-type: none"> <li>• intensive knowledge on theories and concepts for land and water management,</li> <li>• insights into methods to analyse land and water property rights systems,</li> <li>• knowledge of the social, cultural and institutional factors of land and water use,</li> <li>• understanding of the challenges to integrate bio-physical systems with social systems,</li> <li>• basic knowledge of policy design and measures and</li> <li>• knowledge in assessing the influence of land and water management on sustainable resource use.</li> </ul>			
<p>Preconditions: none, recommended: knowledge in economic policies, agricultural, institutional and resource economics</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>2 SWS</u></p> <p><u>60 hours</u></p> <p>25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Basics of scientific writing and presentation techniques, teamwork</li> <li>• Characteristics of resource, resource system and infrastructure for land and water</li> <li>• Public, private and common property regimes and tragedy of open-access</li> <li>• Property rights and governance structures</li> <li>• Tenancy systems</li> <li>• Social-ecological system approach</li> <li>• Land registration systems</li> <li>• Hands-on experience with experts from organizations such as GIZ and BVVG</li> <li>• Rural development and land and water management</li> <li>• Impact of technology on governance and management of land and water</li> <li>• Worldwide irrigation and drainage systems</li> <li>• Irrigation and drainage service provision in large-scale public irrigation systems</li> <li>• Service provision in small-scale farmer-governed and managed schemes</li> <li>• Environmental issues associated with land and water management</li> <li>• Politics of irrigation and land reform</li> <li>• EU Water Framework Directive and IWRM</li> </ul>
SE	<p><u>2 SWS</u></p> <p><u>90 hours</u></p> <p>25 hours presence in class, 65 hours preparation and learning</p>	3 credits, poster and paper (ca. 30,000 characters) presentations in groups	<ul style="list-style-type: none"> <li>• case studies on land and water management</li> <li>• water game</li> </ul>
Final exam	<p><u>30 hours</u></p> <p>Written exam, 90 minutes, and preparation</p>	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

FM 18: Biodiversity and Conservation Management		Credits: 6	
<p><u>Learning objectives:</u> Students</p> <ul style="list-style-type: none"> <li>got knowledge of categories, types and socio-political developments of protected areas,</li> <li>have learned about international agreements and organisations relevant for protected areas,</li> <li>got an overview of policy instruments and governance approaches in protected areas,</li> <li>got insights into typical cases of protected area management worldwide ,</li> <li>clarified the relevance of biodiversity economics: biodiversity loss; climate change; population growth,</li> <li>have learned about institutional drivers and values behind the shift towards economics of biodiversity,</li> <li>developed an understanding of how economics of biodiversity can influence policies and actions,</li> <li>familiarized with historical and new currents in economic thought related to biodiversity,</li> <li>have learned about different and partly conflicting perspectives in biodiversity economics,</li> <li>got to know creative, innovative and collective responses to unsolved problems and</li> <li>got a toolkit of value articulating institutions (methods).</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>30 hours</u> 25 hours presence in class, 5 hours preparation and learning	1 credit, participation	<ul style="list-style-type: none"> <li>Global history, trends and role of Protected Areas (PA) in modern nature conservation</li> <li>Values, benefits; threats and conflicts in PA</li> <li>National and international agreements and organisations</li> <li>Categories and types of PA</li> <li>Policies, governance types and planning procedures of PA</li> <li>Issues of governance and management</li> <li>Case studies, different approaches to and experiences with management of PA; guest speakers</li> </ul>
SE	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, Oral presentation (ca. 20 min) of drafts of group or individually written assignments in class	<ul style="list-style-type: none"> <li>New economic compass for guiding the conservation and use of biodiversity</li> <li>Values and institutions of biodiversity and ecosystems</li> <li>Information: accounting for biodiversity; valuing and making values explicit</li> <li>Incentives: rewarding conservation; reducing harmful subsidies; taking cost into account</li> <li>Institutions: regulating the use of biodiversity; protected areas; investments</li> <li>Case: conservation and use of wild Coffee Arabica, genetic diversity in Ethiopia; in- and ex-situ conservation; guest speakers</li> </ul>
FT	<u>30 hours</u>	1 credit, participation	Visit of a protected area close to Berlin
Final exam	<u>60 hours</u> group (max. 3 students per group) or individual written assignment, ca. 45,000 characters	2 credits, pass:	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 19: Climate and Energy Management			Credits: 6
<p><u>Learning objectives:</u> The students</p> <ul style="list-style-type: none"> <li>• have learned about the sources and impacts of global climatic changes,</li> <li>• became familiar with theoretical and methodological approaches applied in climate research,</li> <li>• have learned about the development and meanders of international and national climate policies,</li> <li>• have learned about the development and impact of energy provision,</li> <li>• understand the interdependencies between (renewable) energy provision and other ecosystem services,</li> <li>• became familiar with the characteristics of transactions, actors and institutions in energy provision,</li> <li>• understood theoretical concepts of governance structures and property rights for (renewable) energy resource regimes,</li> <li>• developed a notion of the implementation problems by means of concrete projects and practical examples and</li> <li>• discussed practical approaches for dealing with nature related problems in (renewable) energy provision.</li> </ul>			
Preconditions: none, recommended: Political and Institutional Economics (CM4)			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<p><u>3 SWS</u> <u>90 hours</u> 35 hours presence in class, 55 hours preparation and learning</p>	3 credits, participation	<ul style="list-style-type: none"> <li>• Overview of the science of climate change</li> <li>• The economics of climate change</li> <li>• Climate change mitigation</li> <li>• Climate change adaptation</li> <li>• Insurance and other financial instruments</li> <li>• International climate negotiations</li> <li>• North/South perspective, impacts on the developing world</li> <li>• Selected case studies on adaptation to floods and impacts of climate change on agricultural production</li> <li>• Climate change and sustainability</li> <li>• Energy demand and supply</li> <li>• Characteristics of energy resources and energy provision systems</li> <li>• Concepts of governance and property rights systems for selected renewable energy provisions</li> <li>• Management of (renewable) energy provision at a global, national and local level (selected case studies and approaches)</li> </ul>
SE	<p><u>1 SWS</u> <u>60 hours</u> 15 hours presence in class, 45 hours preparation and learning</p>	2 credits, written assignment (group of 4), ca. 30,000 characters	<ul style="list-style-type: none"> <li>• Integrated evaluation of (renewable) energy projects</li> <li>• Energy management: concepts, methods and tools (Analysis of Strengths, Weaknesses/Limitations, Opportunities, and Threats (SWOT), Life Cycle Assessment, Regional Energy Concept, Land Use Planning and Management)</li> </ul>
Final exam	<p><u>30 hours</u> Oral exam, based on the written assignment, 30 minutes per group of 4</p>	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

FM 20: Integrative Fisheries Management		Credits: 6	
<p><u>Learning objectives:</u></p> <p>Students</p> <ul style="list-style-type: none"> <li>• have learned the principles of the global overfishing crisis and know the status of world fisheries,</li> <li>• understand the multiple social, economic and ecological factors within capture fisheries,</li> <li>• are empowered to perceive fisheries as coupled social-ecological system and to analyse it accordingly from an interdisciplinary perspective,</li> <li>• know the specifics of the management of commercial and recreational fisheries,</li> <li>• know the methods to calculate maximum sustainable yield and other production metrics of fish stocks,</li> <li>• know the major social and institutional approaches to derive sustainable solutions and</li> <li>• are able to derive solutions to management problems in fisheries and to think critically.</li> </ul>			
<p>Prerequisites: none, recommended: knowledge in Fish Ecology and Commercial River and Lake Fisheries</p>			
Teaching format	Semester week hours (SWS) with presence in class, Workload (in hours)	Credits and conditions	Content
L	<p><u>3 SWS</u></p> <p><u>120 hours</u></p> <p>35 hours presence in class, 85 hours preparation and learning</p>	4 credits, participation	<ul style="list-style-type: none"> <li>• Status of world fisheries</li> <li>• Maximum sustainable yield and other management objectives</li> <li>• Principles of fisheries biology</li> <li>• Fisheries evolution</li> <li>• Socio-economic drivers</li> <li>• Integrative analysis of fisheries</li> <li>• Institutions for the sustainable management of the commons</li> <li>• Fisheries management and its limitations</li> </ul>
SE	<p><u>1 SWS</u></p> <p><u>30 hours</u></p> <p>15 hours presence in class, 15 hours preparation and learning</p>	1 credit, Giving a seminar, 45 minutes	<ul style="list-style-type: none"> <li>• Reading scientific literature</li> <li>• Presenting scientific information</li> <li>• Moderating the discussion</li> <li>• Providing a hand-out of the seminar</li> </ul>
Final Exam	<p><u>30 hours</u></p> <p>oral exam, 30 minutes, and preparation</p>	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester (four semester rotation)		

FM 21: International Forest Use and Management			Credits: 6
<p><u>Learning objectives:</u> Students have to</p> <ul style="list-style-type: none"> <li>• compare boreal, temperate and tropical forest ecosystems by explaining differences in climate, vegetation, and nutrient cycling,</li> <li>• describe the general physiology of woody plants and basic ecophysiological processes</li> <li>• distinguish between various types of forest land use and silvicultural practices by illustrating their main characteristics, objectives, and outcomes,</li> <li>• know about the economic role, policies and regulations of the forestry sector in Germany, Europe and on a global scale,</li> <li>• summarize basic methodological approaches of forest mensuration and forest inventories, including their limitations, and apply them to given examples,</li> <li>• calculate the basal area and the volume of a tree and a stand by conducting basic measurements such as height and diameter,</li> <li>• participate in discussions to analyze and evaluate examples of: conflicts between socio-economic needs and sustainable forest management/conservation; deficits in forest legislation and implementation of regulations; strengths and weaknesses of mechanisms aimed at reducing deforestation and forest degradation,</li> <li>• critically evaluate different sources of information,</li> <li>• develop and improve their communication and cooperation skills by working in student groups.</li> </ul>			
Preconditions: none, recommended: knowledge in ecology, biology, or sustainable land-use			
Teaching formats	Hours per week, workload in hours	Credits and preconditions for granting	Topics, contents
L	<u>3 SWS</u>  <u>60 hours</u> 35 hours presence in class, 25 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Overview of the forestry science and the forestry sector</li> <li>• Short historical outline</li> <li>• Forest terminology</li> <li>• Global forest ecosystems</li> <li>• Forest physiology and ecology</li> <li>• Economic role of the forestry sector</li> <li>• Forest products and services</li> <li>• Sustainable forest management</li> <li>• Silvicultural practices</li> <li>• Forests and people</li> <li>• Forest law and forest policy</li> <li>• Concepts of forest governance</li> <li>• Forest certification</li> <li>• Forest mensuration and inventory</li> <li>• Forests and climate change</li> </ul>
SE	<u>1 SWS</u>  <u>90 hours</u> 15 hours presence in class, 75 hours preparation and learning	3 credits, participation, presentation, 30 minutes per group, written assignments, ca. 30,000 characters	<ul style="list-style-type: none"> <li>• Field trips</li> <li>• Forest mensuration exercise</li> <li>• Written exercises</li> <li>• Group activities</li> <li>• Literature study</li> <li>• Research tasks</li> </ul>
Final exam	<u>30 hours</u> Oral exam, 30 minutes, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

FM 22: The Role of Gender for Sustainable Resource Management			Credits: 6
<p><u>Learning objectives:</u> The students</p> <ul style="list-style-type: none"> <li>• have learned about the relationship between social and cultural gender norms and the access to and the use of natural resources (land, water, biodiversity),</li> <li>• understand the link between gender equality and sustainability and</li> <li>• are able to analyse climate and energy management from a gender perspective.</li> </ul>			
<p>Preconditions: participation and presentation, recommended: knowledge in land use and environmental management</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
SE	<p><u>2 SWS</u></p> <p><u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	<ul style="list-style-type: none"> <li>• Access to and use of natural resources by men and women in different local contexts</li> <li>• Water and land rights related to gendered property rights</li> <li>• Concepts of sustainability: Sustainable development, sustainable livelihoods</li> <li>• Gender and climate change: mitigation and adaptation strategies from a gender perspective</li> </ul>
TU	<p><u>2 SWS</u></p> <p><u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning</p>	2 credits, participation	Empirical research methods in gender analyses
Final exam	<p><u>60 hours</u> Written assignment, ca. 30,000 characters, and preparation</p>	2 credits, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

<b>FM 23: Project Management – Applied to Natural Resource-based Sectors and Development Programmes</b>			Credits: 6
<u>Learning objectives:</u>			
The students			
<ul style="list-style-type: none"> <li>• are able to classify development and project planning in the context of current development concepts,</li> <li>• have learned to prepare a project planning matrix (PPM),</li> <li>• can conduct a system oriented project analysis,</li> <li>• can generate strategic project alternatives from a situation analysis,</li> <li>• are able to use methods for structuring, planning and steering of projects,</li> <li>• are able to use several methods for planning workshops and activity planning and</li> <li>• can develop indicators for monitoring and evaluation of environmental projects.</li> </ul>			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
L	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> <li>• Project Cycle Management (PCM)</li> <li>• Capacity Works</li> <li>• Logical Framework-Approach (LFA)</li> <li>• Situation Analysis/Target Group Analysis/SWOT-Analysis</li> <li>• Project Monitoring &amp; Evaluation</li> <li>• Micro level impact assessment methods</li> <li>• Value Chain Management</li> <li>• Sustainable Livelihoods Approach (SLA)</li> <li>• Farming Systems Approach (FSA)</li> </ul>
SE	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, paper, ca. 30,000 characters	<ul style="list-style-type: none"> <li>• Situation Analysis</li> <li>• Logical Framework Approach (LFA)</li> <li>• Strategy Development</li> <li>• Economic project appraisal (project costs, benefits and worth measurement)</li> <li>• Project M&amp;E</li> </ul>
Final exam	<u>30 hours</u> Oral exam, 15 minutes, based on seminar paper, and preparation	1 credit, pass	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester (Block Seminar)		

**Alle Wissensgebiete**

<b>FWM 24: Studienprojekt</b>		Leistungspunkte: 12	
<p><u>Lern- und Qualifikationsziele:</u></p> <p>Die Studierenden</p> <ul style="list-style-type: none"> <li>• können ein selbst ausgewähltes oder von den Lehrenden ausgegebenes wissenschaftliches Thema beschreiben und beurteilen,</li> <li>• können grundlegende Schlussfolgerungen und Lösungsansätze entwickeln und anwenden und</li> <li>• sind in der Lage, die ermittelten Ergebnisse darzustellen und zu erläutern.</li> </ul>			
<p>Fachliche Voraussetzungen für die Teilnahme am Modul bzw. bestimmten Lehrveranstaltungen des Moduls: keine, empfohlen: Absolvierte Pflichtmodule CM 1–4</p>			
Lehrveranstaltungsart	Präsenzzeit, Workload in Stunden	Leistungspunkte und Voraussetzung für deren Erteilung	Themen, Inhalte
SPJ	<p><u>8 SWS</u></p> <p><u>180 Stunden</u></p> <p>90 Stunden Präsenzzeit, 90 Stunden Vor- und Nachbereitung der Lehrveranstaltung</p>	6 LP, Teilnahme	Selbstständige wissenschaftliche Bearbeitung eines Themas aus dem Modulspektrum des Studiengangs, einzeln oder in der Gruppe. Bearbeitungszeit: 15 Wochen.
Modulabschlussprüfung	<p><u>180 Stunden</u></p> <p>Teilprüfung 1: Schriftlicher Projektbericht ca. ca. 45.000 ZoL , Wichtigung 2/3,</p> <p>Teilprüfung 2: mündliche Verteidigung des Projektberichtes, 30 Minuten je Studierenden/ Studierender, und Vorbereitung, Wichtigung 1/3</p>	<p>Teilprüfung 1: 4 LP, Bestehen</p> <p>Teilprüfung 2: 2 LP, Bestehen</p>	
Dauer des Moduls	<input checked="" type="checkbox"/> 1 Semester <span style="margin-left: 150px;"><input type="checkbox"/> 2 Semester</span>		
Beginn des Moduls	<input checked="" type="checkbox"/> Wintersemester <span style="margin-left: 100px;"><input checked="" type="checkbox"/> Sommersemester</span>		



FM 24: Student Project		Credits: 12	
<p><u>Learning objectives:</u></p> <p>The students</p> <ul style="list-style-type: none"> <li>• are able to describe a scientific problem, either self-chosen or handed out by the instructor,</li> <li>• are able to draw basic conclusions and develop an approach to the solution of the problem and</li> <li>• are able to present and discuss the obtained results.</li> </ul>			
<p>Preconditions: none; recommended passing of the compulsory modules CM 1–4</p>			
Teaching formats	Hours per week, workload in hours	Credits and pre-conditions for granting	Topics, contents
SPJ	<p><u>8 SWS</u></p> <p><u>180 hours</u></p> <p>90 hours presence in class, 90 hours preparation and learning</p>	6 credits, participation	<p>Individual or group work on a scientific topic, related to the spectrum of modules of this programme</p> <p>Editing time: 15 weeks</p>
Final exam	<p><u>180 hours</u></p> <p>Exam 1: Written report, ca. 45,000 characters, weighting 2/3, Exam 2: oral exam, based on the report, 30 minutes per student, and preparation, weighting 1/3</p>	<p>Exam 1: 4 credits, pass</p> <p>Exam 2: 2 credits, pass</p>	
Duration of the module	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of the module	<input checked="" type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

**Anlage 2: Idealtypischer Studienverlaufsplan ohne Auslandssemester**

Hier finden Sie eine Aufteilung der Module mit den jeweiligen Lehrveranstaltungen, SWS und LP auf die Semester, die einem idealtypischen, aber nicht verpflichtenden Studienverlauf entspricht.

Nr. d. Moduls	Name des Moduls	1. Semester	2. Semester	3. Semester	4. Semester
<b>Pflichtbereich</b> (insgesamt 54 LP)					
CM 1	Agroecosystems, Environment and Sustainable Natural Resource Use	L/SE 4 SWS 6 LP			
CM 2	Environmental and Resource Economics II: Strategies and Policies		L/KGP 4 SWS 6 LP		
CM 3	Soil and Water Protection	L/E 4 SWS 6 LP			
CM 4	Institutional Economics and Political Economy I – Basic Concepts and Applications	L/SE 4 SWS 6 LP			
	Masterarbeit/Master Thesis			30 LP	
<b>Fachlicher Wahlpflichtbereich:</b> (insgesamt 54 LP)					
FM	9 Module des fachlichen Wahlpflichtbereichs bzw. 7 Module und Studienprojekt	36 SWS/54 LP			
<b>Überfachlicher Wahlpflichtbereich</b> (12 LP)					
	Master-Module anderer Studiengänge der Fakultät, entsprechend ausgewiesene Master-Module anderer Fächer und zentraler Einrichtungen der HU sowie Master-Module anderer Hochschulen			Entsprechend Modulbeschreibung 12 LP	
SWS und LP je Semester		20 SWS 30 LP	20 SWS 30 LP	30 LP	30 LP

**Anlage 3: Idealtypischer Studienverlaufsplan mit Auslandssemester**

Hier finden Sie eine Aufteilung der Module mit den jeweiligen Lehrveranstaltungen, SWS und LP auf die Semester, die einem idealtypischen, aber nicht verpflichtenden Studienverlauf entspricht.

Nr. d. Moduls	Name des Moduls	1. Semester	2. Semester	3. Semester	4. Semester
<b>Pflichtbereich</b> (insgesamt 54 LP)					
CM 1	Agroecosystems, Environment and Sustainable Natural Resource Use	L/SE 4 SWS 6 LP			
CM 2	Environmental and Resource Economics II: Strategies and Policies		L/KGP 4 SWS 6 LP		
CM 3	Soil and Water Protection	L/E 4 SWS 6 LP			
CM 4	Institutional Economics and Political Economy I: Basic Concepts and Applications	L/SE 4 SWS 6 LP			
	Masterarbeit/Master Thesis			30 LP	
<b>Fachlicher Wahlpflichtbereich:</b> (insgesamt 36 LP)					
FM	Module des fachlichen Wahlpflichtbereichs, Studienprojekt (optional)	insgesamt 36 LP			
<b>Auslandssemester</b> (insgesamt 30 LP)					
	Module gemäß Learning Agreement		30 LP		
SWS und LP je Semester		20 SWS 30 LP	20 SWS 30 LP	30 LP	30 LP

# Fachspezifische Prüfungsordnung für den Masterstudiengang "Integrated Natural Resource Management"

Gemäß § 17 Abs. 1 Ziffer 3 der Verfassung der Humboldt-Universität zu Berlin in der Fassung vom 24. Oktober 2013 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 47/2013) hat der Fakultätsrat der Landwirtschaftlich-Gärtnerischen Fakultät am 13. November 2013 die folgende Prüfungsordnung erlassen\*:

- § 1 Anwendungsbereich
- § 2 Regelstudienzeit
- § 3 Prüfungsausschuss
- § 4 Modulabschlussprüfungen
- § 5 Freiversuche
- § 6 Masterarbeit
- § 7 Abschlussnote
- § 8 Akademischer Grad
- § 9 In-Kraft-Treten

**Anlage:** Übersicht über die Prüfungen

## § 1 Anwendungsbereich

Diese Prüfungsordnung enthält die fachspezifischen Regelungen für den Masterstudiengang Integrated Natural Resource Management. Sie gilt in Verbindung mit der fachspezifischen Studienordnung für den Masterstudiengang Integrated Natural Resource Management und der Fächerübergreifenden Satzung zur Regelung von Zulassung, Studium und Prüfung (ZSP-HU) in der jeweils geltenden Fassung.

## § 2 Regelstudienzeit

Der Masterstudiengang Integrated Natural Resource Management hat eine Regelstudienzeit von 4 Semestern.

## § 3 Prüfungsausschuss

Für die Prüfungsangelegenheiten des Masterstudienganges Integrated Natural Resource Management ist der Prüfungsausschuss des Studienganges zuständig.

## § 4 Modulabschlussprüfungen

(1) Mündliche und praktische Modulabschlussprüfungen werden in Anwesenheit einer sachkundigen Beisitzerin oder eines sachkundigen Beisitzers abgenommen, soweit nicht nach Maßgabe der ZSP-HU zwei Prüferinnen und Prüfer bestellt werden. Die

Beisitzerin oder der Beisitzer beobachtet und protokolliert die Prüfung. Sie oder er beteiligt sich nicht am Prüfungsgespräch und der Bewertung.

(2) Modulabschlussprüfungen können in deutscher oder englischer Sprache abgelegt werden.

## § 5 Freiversuche

(1) Bestandene Modulabschlussprüfungen, die innerhalb der Regelstudienzeit angemeldet werden, können zum Zwecke der Notenverbesserung einmal wiederholt werden.

(2) Die Möglichkeit nach Abs. 1 ist auf drei Module begrenzt.

## § 6 Masterarbeit

(1) Bestandene Masterarbeiten sind zu verteidigen. Die mündliche Verteidigung erfolgt spätestens acht Wochen nach Abgabe der Masterarbeit.

(2) Bei der Berechnung der Note der Masterarbeit werden die Note für den schriftlichen Teil und die Note für die Verteidigung im Verhältnis 2: 1 gewichtet.

## § 7 Abschlussnote

(1) Die Abschlussnote des Masterstudienganges Integrated Natural Resource Management wird aus den Noten der Modulabschlussprüfungen und der Masterarbeit, gewichtet nach den gemäß Anlage für die Module und die Masterarbeit ausgewiesenen Leistungspunkten, berechnet.

(2) Modulabschlussprüfungen, die nicht benotet werden oder im Rahmen einer Anrechnung mangels vergleichbarer Notensysteme lediglich als „bestanden“ ausgewiesen werden, sowie die für die entsprechenden Module ausgewiesenen Leistungspunkte werden bei der Berechnung der Abschlussnote nicht berücksichtigt.

## § 8 Akademischer Grad

Wer den Masterstudiengang Integrated Natural Resource Management erfolgreich abgeschlossen hat, erlangt den akademischen Grad „Master of Science“ (abgekürzt „M. Sc.“).

## § 9 In-Kraft-Treten

\* Die Universitätsleitung hat die Prüfungsordnung am 02. September 2014 bestätigt.

(1) Diese Prüfungsordnung tritt am Tage nach ihrer Veröffentlichung im *Amtlichen Mitteilungsblatt der Humboldt-Universität zu Berlin* in Kraft.

(2) Diese Prüfungsordnung gilt für alle Studierenden, die ihr Studium nach dem In-Kraft-Treten dieser Prüfungsordnung aufnehmen oder nach einem Hochschul-, Studiengangs- oder Studienfachwechsel fortsetzen.

(3) Für Studierende, die ihr Studium vor dem In-Kraft-Treten dieser Prüfungsordnung aufgenommen oder nach einem Hochschul-, Studiengangs- oder Studienfachwechsel fortgesetzt haben, gilt die Prüfungsordnung vom 6. Februar 2006 (Amtliches Mitteilungsblatt der Humboldt-Universität zu Berlin Nr. 9/2006) übergangsweise fort. Alternativ können sie diese Prüfungsordnung einschließlich der zugehörigen Studienordnung wählen. Die Wahl muss schriftlich gegenüber dem Prüfungsbüro erklärt werden und ist unwiderruflich. Mit Ablauf des Wintersemesters 2016/17 tritt die Prüfungsordnung vom 6. Februar 2006 außer Kraft. Das Studium wird dann auch von den in Satz 1 benannten Studierenden nach dieser Prüfungsordnung fortgeführt. Bisherige Leistungen werden entsprechend § 110 ZSP-HU berücksichtigt.

**Anlage: Übersicht über die Prüfungen**

Abkürzungen:

FWM: Fachliches Wahlpflichtmodul; ZoL: Zeichen ohne Leerzeichen

Abbreviations:

CM: Compulsory Module; FM: Focal Module

**Masterstudiengang Integrated Natural Resource Management**

Nr. d. Moduls	Name des Moduls	LP des Moduls	Fachspezifische Zulassungsvoraussetzungen für die Prüfung	Form, Dauer/Bearbeitungszeit/Umfang, ggf. Sprache der Prüfung	Benotung
<b>Pflichtbereich (54 LP)</b>					
CM 1	Agroecosystems, Environment and Sustainable Natural Resource Use	6	keine	Oral exam, 30 minutes	ja
CM 2	Environmental and Resource Economics II: Strategies and Policies	6	keine	Written exam, 90 minutes	ja
CM 3	Soil and Water Protection	6	keine	Oral exam, 30 minutes	ja
CM 4	Institutional Economics and Political Economy I – Basic Concepts and Applications	6	keine	Written exam, 90 Minutes	ja
	Masterarbeit/Master Thesis	30	Nachweis über den Abschluss der Pflichtmodule 1–4 Passing of the compulsory modules 1–4	Die Bearbeitungszeit beträgt 24 Wochen. Umfang der schriftlichen Arbeit: ca. 150.000 bis 300.000 ZoL (entspricht etwa 50 bis 100 Seiten), Wichtung 2/3, und mündliche Verteidigung in einem Kolloquium, 60 Minuten, einschließlich Diskussion, Wichtung 1/3.  Editing time: 24 weeks; Written thesis, ca. 150,000 to 300,000 characters (approx. 50–100 pages), weighting 2/3 and oral defense in a colloquium, 60 minutes, including discussion, weighting 1/3.	ja

<b>Fachlicher Wahlpflichtbereich</b> (54 LP); 2 Studienschwerpunkte (à 18 LP) sind zu wählen; die Noten eines der beiden Studienschwerpunkte gehen nicht in die Berechnung der Abschlussnote ein.					
Nr. d. Moduls	Name des Moduls	LP des Moduls	Fachspezifische Zulassungsvoraussetzungen für die Prüfung	Form, Dauer/Bearbeitungszeit/Umfang, ggf. Sprache der Prüfung	Benotung
FM 1	Biodiversity: Assessment, Function and Evolution	6	keine	Written exam, 90 minutes	ja
FM 2	Agricultural Climatology and Ecophysiology	6	keine	Written exam, 90 minutes	ja
FM 3	Irrigation and Drainage Systems	6	keine	Oral exam, 30 minutes	ja
FM 4	Plant Pathogens in the Environment and Control Management	6	keine	Written exam, 90 minutes	ja
FM 5	Practices and Organization of Organic Farming	6	keine	Oral exam, 15 minutes, based on assignment	ja
FM 6	Environmental Sociology and Environmental Policy	6	keine	Oral exam, 20 minutes, based on seminar paper	ja
FM 7	Environmental and Resource Economics III: Environmental Institutions and Governance,	6	keine	Written assignment: proposal for a Master thesis, ca. 30,000 characters	ja
FM 8	Participatory Rural Innovation and Knowledge Systems	6	Keine	Written exam, 90 minutes, or assignment (research paper), ca. 30,000 characters	ja
FM 9	Economics of Human Development	6	Keine	Written exam, 90 minutes	ja
FM 10	Co-operation and Co-operative Organizations	6	Keine	Written assignment, ca. 45,000 characters	ja
FM 11	Human-Environmental Systems Interaction	6	Keine	Oral exam, 30 minutes	ja
FM 12	Advanced Empirical Methodology for Socio-Ecological Systems Analysis	6	keine	Oral exam (group of 4; 40 minutes per group)	ja
FM 13	Geographic Information Systems (GIS) and Landscape Analysis	6	Keine	Multimedia-based exam (at PC), 90 minutes	ja
FM 14	Market and Policy Analysis	6	Keine	Multimedia-based exam (at PC), 30 minutes	ja
FM 15	Risk and Uncertainty in Science and Policy	6	Keine	Written assignment ca. 30,000 characters	ja
FM 16	Environmental Management and Information Systems	6	Keine	Oral group presentation group of 4 (10 min. per student and seminar paper, ca. 45,000 characters)	ja
FM 17	Land and Water Management	6	Keine	Written exam, 90 minutes	ja

FM 18	Biodiversity and Conservation Management	6	Keine	group (max. 3 students per group) or individual written assignment, ca. 45,000 characters	ja
FM 19	Climate and Energy Management	6	Keine	Oral exam, based on the written assignment, 30 minutes per group of 4	ja
FM 20	Integrative Fisheries Management	6	keine	Oral exam, 30 minutes	ja
FM 21	International Forest Use and Management	6	keine	Oral exam, 30 minutes	ja
FM 22	The Role of Gender for Sustainable Resource Management	6	keine	Written assignment; ca. 30,000 characters	ja
FM 23	Project Management – Applied to Natural Resource-based Sectors and Development Programmes	6	keine	Oral exam, 15 minutes, based on seminar paper	ja
FW/FM 24	Studienprojekt/Student Projekt	12	Keine/none	Schriftlicher Bericht, Bearbeitungszeit 15 Wochen, ca. 45.000 ZoL (2/3), Projektverteidigung, 30 Minuten (1/3) je Studierenden/Studierender; paper, editing time: 15 weeks, ca. 45,000 characters (2/3) and oral defence, 30 minutes per student (1/3)	ja
<b>Überfachlicher Wahlpflichtbereich (12 LP)</b>					
	Master-Module anderer Studiengänge der Fakultät, entsprechend ausgewiesene Master-Module anderer Fächer und zentraler Einrichtungen der HU sowie Master-Module anderer Hochschulen	insgesamt 12	Die Module werden nach den Bestimmungen der anderen Fächer bzw. zentralen Einrichtungen abgeschlossen.		Die Module werden ohne Note berücksichtigt

**Überfachlicher Wahlpflichtbereich für andere Masterstudiengänge**

Nr. d. Moduls	Name des Moduls	LP des Moduls	Fachspezifische Zulassungsvoraussetzungen für die Prüfung	Form, Dauer/Bearbeitungszeit/Umfang, ggf. Sprache der Prüfung	Benotung
FM 9 (ÜF)	Economics of Human Development	10	keine	Written exam, 90 minutes	nein