

Annex 6

Catalogue of Course Units



This table lists all the modules offered in the EMAE Masters Course study programme and gives the following informations: **Code**, **Title**, teaching language(s): en-fr-de-pt; **Schedule** and **Coordination** (i.e. where and when the course is delivered and who is convening the organisation (UP: Université de Poitiers – UC: Universidade de Coimbra – CAU: Christian-Albrechts University in Kiel – UEA: University of East Anglia in Norwich); if the module is **compulsory** (C) or **elective** (E); **teaching volume** and number of **ECTS**. Further details are available in the catalogue of units on the EMAE website: <http://www.master-emaë.org>.

UPO-001	Intensive course in French	UP	Elective	30 h.	ECTS: 0
<i>Contents</i>		Evaluation:		Horary:	
Intensive training in French language using a variety of multimedia tools and open conversation in groups.		50%	written exam	30	lecture
		50%	oral exam		seminary
<i>Teaching staff: CFLE-UP (Centre Français Langue Etrangère)</i>			exercises		practice
			project report presentation	Teaching FR	P0 Y1
UPO-100	Language training in German, Portuguese or French	UP	Compulsory	40 h.	ECTS: 2
<i>Contents</i>		Evaluation:		Horary:	
Weekly language training		50%	written exam	40	lecture
		50%	oral exam		seminary
<i>Teaching staff: UP - UFR Lettres & Langues - UP (Dept d'Allemand, Dept de Littérature et Civilisation Portugaise) ; Centre Français Langue Etrangère</i>			exercises		practice
			project report presentation	Teaching DE,PT, FR	P1 Y1
UPO-101	Multivariate Statistics & Data Analysis in Ecology	UP,UC	Compulsory	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Basic in Statistics: One way ANOVA and ANCOVA, Factorial experimental design, Correlation, Regression, Multifactorial analyses, Computer simulations		40%	written exam	15	lecture
		30%	oral exam	15	seminary
<i>Teaching staff (UP): D. Bouchon (coord), R. Raimond + External contributors</i>			exercises		practice
		30%	project report presentation		field course
				Teaching EN FR	P1 Y1
UPO-102	Population Genetics & Evolutionary Ecology	UP	Compulsory	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Micro-evolution: Hardy-Weinberg equilibrium, Natural selection, mutation and migration, Inbreeding, Random events in population genetics, Variation in natural populations		40%	written exam	14	lecture
		30%	oral exam	16	seminary
<i>Teaching staff: D. Bouchon (coord.), F. Grandjean, R. Raimond + External contributors</i>			exercises		practice
		20%	project report presentation	1 week	field course
		10%		Teaching EN FR	P1 Y1
UPO-103	Animal Strategies & Behavioural Ecology	UP	Compulsory	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Basics on Animal behaviour (learning processes, genetics of behaviour ...) – Social groups (Vertebrates & Invertebrates) – Behavioural ecology (adaptive behavioural strategies, games theory...) – Experimental training.		40%	written exam	12	lecture
		30%	oral exam	6	seminary
<i>Teaching staff (UP): Y. Caubet (coord.), M. Sicard + External contributors</i>			exercises	10	practice
		20%	project report presentation		field course
		10%		Teaching EN FR	P1 Y1
UPO-104	Basics of Ecosystem Analysis	CAU	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Basics of ecosystems analysis in their functional and dynamical approaches.		50%	written exam	16	lecture
			oral exam	4	seminary
<i>Teaching staff (CAU): W. Windhorst (coord)</i>			exercises	10	practice
		50%	project report presentation		field course
				Teaching EN	P1 Y1

UPO-105	Environmental Physiology and Toxicology	UC	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Stress ecology - Biological responses to different stress factors on different levels of biological organization (thermal stress, stress by hypoxia, osmotic stress, chemical stress)		30%	written exam	10	lecture
		40%	oral exam	4	seminary
		20%	exercises	16	practice
		10%	project		field course
<i>Teaching staff (UC): R. Ruibero (coord); J.P. Sousa</i>			report	Teaching	
			presentation	EN	P1 Y1
UEA-201	Ecological Modelling	UEA	Compulsory	20 h.	ECTS: 2
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam		lecture
			oral exam		seminary
			exercises		practice
			project		field course
<i>Teaching staff:</i>			report	Teaching	
			presentation	EN	P2 Y1
UEA-202	Ecological Consequences of Climate Changes	UEA	Compulsory	20 h.	ECTS: 2
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam		lecture
			oral exam		seminary
			exercises		practice
			project		field course
<i>Teaching staff:</i>			report	Teaching	
			presentation	EN	P2 Y1
UEA-203	Behavioural Ecology: From theory to practical analysis	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam		lecture
			oral exam		seminary
			exercises		practice
			project		field course
<i>Teaching staff:</i>			report	Teaching	
			presentation	EN	P2 Y1
UEA-204	Communities, Ecosystems and Macro-Ecology	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam		lecture
			oral exam		seminary
			exercises		practice
			project		field course
<i>Teaching staff:</i>			report	Teaching	
			presentation	EN	P2 Y1
UEA-205	Resource Development and Conservation	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam		lecture
			oral exam		seminary
			exercises		practice
			project		field course
<i>Teaching staff:</i>			report	Teaching	
			presentation	EN	P2 Y1
UEA-206	Evolutionary Biology	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam		lecture
			oral exam		seminary
			exercises		practice
			project		field course
<i>Teaching staff:</i>			report	Teaching	
			presentation	EN	P2 Y1

UEA-207	Pollution, Toxicology and Chemistry	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Content will be specified later			written exam oral exam exercises project report presentation		lecture seminary practice field course
<i>Teaching staff:</i>				Teaching EN	P2 Y1
UEA-X01	Conservation genetics	UEA	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Applications of molecular genetic markers to the fields of population biology, evolution and phylogeny, molecular ecology and conservation biology.		30%	written exam oral exam exercises	15 5 15	lecture seminary practice field course
		70%	project report presentation		field course
<i>Teaching staff: B. Emerson</i>				Teaching EN	P2 & P4c Y1
UEA-X02	Climate Change: Impact and Policy	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Up-to-date and authoritative overview of the subject of natural and anthropogenic climate change, including research techniques as well as current understanding: Fundamentals of the changing climate (Earth's energy balance, general circulation of the atmosphere, causes of climate change and the greenhouse effect); Climate reconstruction (tree-ring analysis), data preparation and data analysis, theoretical or model-based approaches; History of climate change and potential causal mechanisms from 1000 AD to the present.		25%	written exam oral exam	40 10	lecture seminary
		75%	exercises project report presentation	10	practice field course
<i>Teaching staff: D. Viner</i>				Teaching EN	P2 & P4c Y1
UEA-X03	Restoration Ecology	UEA	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Introduction to the principles and practice of the emergent discipline of restoration ecology and its role in countering the global loss of biodiversity.		10%	written exam oral exam exercises	10 10 10	lecture seminary practice field course
		90%	project report presentation	Yes	field course
<i>Teaching staff: T. Davy (Coord.) + External contributors</i>				Teaching EN	P2 & P4c Y1
UEA-X04	Introduction to GIS	UEA	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Introduction to the principles and practice of the Geographical Information Systems.		10%	written exam oral exam exercises		lecture seminary practice field course
		90%	project report presentation		field course
<i>Teaching staff:</i>				Teaching EN	P2 & P4c Y1
UCO-301	Environmental Quality Assessment	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Concepts of environmental integrity of ecosystems and its applications; Changes in environmental integrity; disturbances; Indicators of environmental integrity; Development of integrated management strategies for ecosystems; Sustainable development and ecological economics		30%	written exam oral exam	20 5	lecture seminary
		20%	exercises	30	practice
		20%	project	5	field course
		10%	report		
<i>Teaching staff: João Carlos Marques (coord.) + external contributors</i>		20%	presentation	Teaching EN	P3a Y1
UCO-302	Laboratory & Fields Studies in Ecology - Practical	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Acquisition of skills in several laboratory techniques (sample processing and measurement of several indicator parameters, e.g., microbial indicators) and field methodologies (sampling) regarding the use of several bioindicators of environmental quality and ecotoxicological experiments (lab and field tests)		100%	written exam oral exam exercises project report presentation	60 yes	lecture seminary practice field course
<i>Teaching staff: José Paulo Sousa (Coord.) + Internal staff.</i>				Teaching EN	P3a Y1

UCO-303	Bio-monitoring & Biodiversity Management	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Use of bioindicators in biodiversity monitoring; Selection criteria for the use of bioindicators; Biomonitoring in practice (field course + data analysis of case studies)		35%	written exam	20	lecture
		60%	oral exam	5	seminary
			exercises	30	practice
			project	5	field course
<i>Teaching staff: Jaime Ramos (Coord.) + External contributors</i>		5%	report	Teaching	
			presentation	EN	P3a Y1
UCO-304	Stream Ecology and Monitoring	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Keynote concepts on stream ecology; Identification of major disturbances to freshwater ecosystems; Monitoring approaches to evaluate river water quality using bioindicators; Restoration approaches for streams		75%	written exam	20	lecture
		15%	oral exam	40	seminary
		10%	exercises	10	practice
			project		field course
<i>Teaching staff: Cristina Canhoto (coord.) & Manuel Graça + External contributors</i>			report	Teaching	
			presentation	EN	P3a Y1
UCO-305	Ecotoxicology & Ecological Risk Assessment	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Ecotoxicological effects at different levels of biological organization; advanced laboratory and field methods in ecotoxicology; ecological risk assessment approaches for substances and integrated ERA schemes for contaminated sites.		40%	written exam	15	lecture
		60%	oral exam	5	seminary
			exercises	30	practice
			project	10	field course
<i>Teaching staff: Rui Ribeiro (Coord.) & Paulo Sousa + External contributors</i>			report	Teaching	
			presentation	EN	P3a Y1
CAU-301	Terrestrial Ecosystems – Field Studies	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
This module focuses on population-ecological and physical and energy processes in terrestrial ecosystems. Measures used are: Mapping techniques, measurements to acquire plant physiological processes, population dynamics of Flora and Fauna and structure and dynamics of living communities. Special attention will be given to measurable anthropological influences due to the use of natural resources.		80%	written exam		lecture
		20%	oral exam		seminary
			exercises	60	practice
			project	Yes	field course
<i>Teaching staff:</i>			report		
			presentation	Teaching	
				EN	P3b Y1
CAU-302	Coastal & Marine Ecosystems – Field Studies	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
This module focuses on habitats in the surrounding area of the island of Sylt and includes the ecology of primary producers, invertebrates, fish and Sea mammals. An important topic of the field studies is the reaction of the biozosis to man-made environmental changes. Students conduct laboratory-based projects and participate in field trips (on land as well as at sea).		80%	written exam		lecture
		20%	oral exam		seminary
			exercises	60	practice
			project	Yes	field course
<i>Teaching staff: K. Reise, F. Colijn, K. Hesse, U. Siebert, S. Garthe</i>			report		
			presentation	Teaching	
				EN	P3b Y1
CAU-303	Freshwater & Wetland Systems – Field Studies	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
The field studies analyse the structure and function of water ecosystems and wetlands. A special focus is the analysis of direct interaction of both ecosystem types that are important to nature and environmental protection. An important topic of the field studies is the reaction of the biozosis to man-made environmental changes. Students realize projects in the laboratory and participate in field trips (on land as well as at sea).		80%	written exam		lecture
		20%	oral exam		seminary
			exercises	60	practice
			project	Yes	field course
<i>Teaching staff: K. Dierßen, H. Brendelberger</i>			report		
			presentation	Teaching	
				EN	P3b Y1
CAU-304	Long-Term Development of Landscapes – Field Studies	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Principles of landscape development (processes, structures); method of four dimensional landscape change analysis; meaning social, economic and natural circumstances of land-use with examples of the effects of agronomic land use on the water and nutrient budgets, to soil building and soil erosion as well as the biological processes and structures of the studied area. Students are organized in teams to work on a project		80%	written exam		lecture
		20%	oral exam		seminary
			exercises	60	practice
			project	Yes	field course
<i>Teaching staff: H.-R. Bork</i>			report		
			presentation	Teaching	
				EN	P3b Y1

CAU-305	Digital Spatial Analysis – Practical Exercises	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Work with the data of research centres, monitoring projects, satellite and aerial pictures, open positions depending on setting of tasks. Work with a wide variety of technology to gain spatial data, including own measurements and data procurement, e.g. aerial photos, GPS, mapping. Introduction into theory and practice of analysis of satellite pictures, software and hardware of spatial analysis.		50%	written exam oral exam exercises project report presentation	60 Yes	lecture seminary practice field course
<i>Teaching staff:</i> G. Hörmann, R. Doerffer		25%			Teaching EN P3b Y1
CAU-306	Modelling of Aquatic Ecosystems – Practical Exercises	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
In this module, the methods of system analysis are used for aquatic ecosystems, with conceptual models as well as - mathematical methods to represent with the aim to translate these with the help of runnable simulations from suitable software products. The models developed by the students in the group work help to dynamically illustrate the consequences of environmental changes. The practice comprises of statistical procedures (EXCEL), classification and ordination procedures (MATLAB), neural networks and generative algorithms (NEUROSOLUTIONS) as well as differential equation model approaches (STELLA). With these the complex ecosystem model ERSEM is used as a tool for calculating the eutrophication dynamics in the North Sea.		50%	written exam oral exam exercises project report presentation	20 40	lecture seminary practice field course
<i>Teaching staff:</i> K. Wirtz, A. Oschlies		50%			Teaching EN P3b Y1
CAU-307	Economics Aspects of Environmental Management	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Principals of the inter-temporal allocation of resources, public and private goods, externalities, property rights, assessment procedures in price, mathematical and statistical modelling of the use and grading of resources, economic incentives, taxes and state regulation as instruments for the influence of the efficiency of management measures. The contents of the modules are discussed with different national and international examples.		50%	written exam oral exam exercises project report presentation	40 20	lecture seminary practice field course
<i>Teaching staff:</i> F. Foders		50%			Teaching EN P3b Y1
CAU-308	Integrated Management of Rural & Woodland Regions	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Evaluation of given data, biotope mapping, interviews with land users, local groups and decision makers, understanding of assessments measurements and planning advices, ecological basics of foresting, hunting aspects; forestal mapping and certification		50%	written exam oral exam exercises project report presentation	60 Yes	lecture seminary practice field course
<i>Teaching staff:</i> H. Reck, Ch. Dolnik, L. Fähser, H. Roweck		50%			Teaching EN P3b Y1
CAU-309	Ecology of Soils – Practical Exercises	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Soil physics: soil water-, soil air and soil temperature regimens of typical soils and their affective meaning for soil biology. Soil chemistry: sorption, desorption, kinetics of reactions, soil distribution, influence of agriculture on chemical filter and buffer functions Soil microbiology: functions of soil organisms		100%	written exam oral exam exercises project report presentation	60	lecture seminary practice field course
<i>Teaching staff:</i> R. Horn, M. Bölter					Teaching EN P3b Y1
CAU-310	Current Research Topics in Marine Ecology I	CAU	Elective	40 h.	ECTS: 4
<i>Contents</i>		Evaluation:		Horary:	
Current research topics, according to the most recent publications in marine biological journals		100%	written exam oral exam exercises project report presentation	20 20	lecture seminary practice field course
<i>Teaching staff:</i> U. Sommer (IFM-GEOMAR/CAU)					Teaching EN P3b Y1
CAU-311	Environmental Chemistry	CAU	Elective	40 h.	ECTS: 4
<i>Contents</i>		Evaluation:		Horary:	
Chemicals in the environment; chemical composition of animals and plants; macro- and micronutrients, attractants, deterrents, repellents, toxicants, pollutants; nutrient cycles and turnover; bio-degradation of pollutants		100%	written exam oral exam exercises project report presentation	40	lecture seminary practice field course
<i>Teaching staff:</i> M. Frank (CAU)					Teaching EN P3b Y1

CAU-312	Applied aquatic ecology	CAU	Elective	90 h.	ECTS: 9
<i>Contents</i>		Evaluation:		Horary:	
Evaluation of habitat quality in lentic (trophy) and lotic (saprobey) aquatic ecosystems; conservation; restoration and renaturation.			written exam oral exam exercises project	20 45 25	lecture seminary practice field course
<i>Teaching staff: H. Brendelberger (CAU)</i>		50% 50%	report presentation	Teaching EN	P3b Y1
CAU-X01	Aquatic ecology	CAU	Elective	90 h.	ECTS: 9
<i>Contents</i>		Evaluation:		Horary:	
Literature search; experimental design; capture and maintenance of aquatic invertebrates; measurement of parameters of respiration, motility, nutrition, growth, reproduction			written exam oral exam exercises project	20 45 25	lecture seminary practice field course
<i>Teaching staff: H. Brendelberger (CAU)</i>		80% 20%	report presentation	Teaching EN	P3b P4d Y1
CAU-X02	Methods in ecology	CAU	Elective	90 h.	ECTS: 9
<i>Contents</i>		Evaluation:		Horary:	
Hypothesis – experiment – theory; experimental design; literature search; statistics; presentation and analysis of results			written exam oral exam exercises project	20 70	lecture seminary practice field course
<i>Teaching staff: W. Bilger, H. Brendelberger, K. Dierssen, G. Hartl (all CAU))</i>		10% 50% 40%	report presentation	Teaching EN	P3b P4d Y1
CAU-X03	Evolution of plant diversity	CAU	Elective	90 h.	ECTS: 9
<i>Contents</i>		Evaluation:		Horary:	
Introduction into plant diversity; basics of evolutionary biology; systematics; morphology; functional morphology; adaptation to biotic and abiotic environmental factors			written exam oral exam exercises project	20 70	lecture seminary practice field course
<i>Teaching staff: D. Ober (CAU)</i>		50 50	report presentation	Teaching EN	P3b P4d Y1
CAU-X04	Ecotoxicology	CAU	Elective	40 h.	ECTS: 4
<i>Contents</i>		Evaluation:		Horary:	
Basics of toxicology; environmental toxicants; pollution and pollutant cycles; accumulation; critical levels; toxic effects on ecosystems.		100%	written exam oral exam exercises project	20 20	lecture seminary practice field course
<i>Teaching staff: E. Maser, W. Scharenberg (all CAU)</i>			report presentation	Teaching EN	P3b P4d Y1
UCO-401	Advanced Data Analysis in Ecology	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Advanced tools on multivariate analysis (CCA, DCA, PRC, Discriminant) and Multiple Regression and Generalized Linear Models			written exam oral exam exercises project	10 5 45	lecture seminary practice field course
<i>Teaching staff: José Paulo Sousa (Coord.) + External contributors</i>		40% 50% 10%	report presentation	Teaching EN	P4a Y2
UCO-402	Biochemical & Molecular Techniques n Ecology	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Practical course focused on the acquisition of skills in biochemical and molecular techniques used in ecological research. Biochemical techniques: protein assays, gel quantification and interpretation ; Molecular techniques : PCR based techniques, DNA sequencing, Microarrays ; Immunologic techniques: Mono and poli-clonal antibodies, Phage display antibodies technique; Advantages and disadvantages of these techniques as indicators in ecology.			written exam oral exam exercises project	10 5 45	lecture seminary practice field course
<i>Teaching staff: Isabel Abrantes (coord.) & Isabel Luci + External contributors</i>			report presentation	Teaching EN	P4a Y2

UCO-403	Laboratory & Field Studies in Ecology II	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Students will integrate one research team to whom they wish to develop their master project and start to acquire specific skills on laboratory and field techniques related to their project. By the end of the course students will present their research project to be developed in period P4a		40%	written exam oral exam exercises	10 50	lecture seminary practice field course
<i>Teaching staff: José Paulo Sousa (Coord.) + Internal staff</i>		50%	project report		
		10%	presentation	Teaching EN	P4a Y2
UCO-404	Population ecology	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
			written exam oral exam exercises project report presentation		lecture seminary practice field course
<i>Teaching staff:</i>				Teaching EN	P4a Y2
UCO-405	Remote Sensing and GIS Techniques: Applications in Environmental Sciences	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Remote sensing and Earth environmental monitoring; Technological systems of image acquisition and different earth observation programmes; Basic techniques for image processing and classification; GIS as an integrated information environment; Information manipulation and extraction techniques in GIS; Spatial and temporal monitoring of ecological systems-working on case studies.		50%	written exam oral exam exercises	15 45	lecture seminary practice field course
<i>Teaching staff: Alcides Pereira (coord.)</i>		50%	project report presentation		
				Teaching PT	P4a Y2
UCO-501	Project Management	UC	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
The development of the Research Project will be done under close collaboration with his/her supervisors. This will be done by performing regular meetings to discuss the workplan and to discuss the progress of the work. The management of the research project will be closely linked to the course "Laboratory & Field Studies in Ecology II" where the student will make a first presentation of his/her project. The student will make another presentation in the middle of the semester to report the progress of the work.		20%	written exam oral exam exercises project report presentation	60	lecture tutorial practice field course
<i>Teaching staff: Internal staff + External contributors</i>		80%			
				Teaching EN	P5a Y2
UCO-502	Master's Thesis: Research Project & Dissertation	UC	Compulsory	500*	ECTS: 24
<i>Contents</i>		Evaluation:		Horary:	
Each student should develop and present an original and innovative Research Project in Ecological Sciences under the co-supervision of a staff member of the UC and an external supervisor (preferably another colleague from the EMAE consortium) applying the knowledge and skills acquired during the previous semesters			written exam oral exam exercises project report presentation	500	lecture seminary practice field course
		100%		Teaching EN	P5a Y2
UPO-400	Miscellaneous Skills	UP	Elective	30 h.	ECTS: 0
<i>Contents</i>		Evaluation:		Horary:	
Series of interdisciplinary seminaries given by professionals (Enterprise creation and leading, working areas, basics on existing kind of enterprises, funding resources...). This module is shared for all the Masters Courses in UP.			written exam oral exam exercises project report presentation	30	lecture seminary practice field course
<i>Teaching staff: External contributors (managed by UP)</i>				Teaching FR	P4b Y2
UPO-401	Advanced research seminaries	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Series of focused seminaries given by professionals on their running projects. The contributors are working in administrations, enterprises, associations, laboratories,... A visit <i>in situ</i> is organized for each contribution.			written exam oral exam exercises project report presentation	54 Yes	lecture seminary practice field course
<i>Teaching staff: External contributors</i>		100%		Teaching EN FR	P4b Y2

UPO-402	Statistics & GIS tools	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
Spatial data processing applications – Handling spatial data - Geospatial statistics - Ecological analysis - Disease mapping and areal data analysis			written exam oral exam exercises project	54	lecture seminary practice field course
<i>Teaching staff: R. Raimond (coord.), D. Bouchon, Y. Caubet + Contributors</i>		50% 50%	report presentation	Teaching EN FR	P4b Y2
UPO-403	Natural resources & Natural areas	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
Biodiversity and conservation - Introduced species - Animal and plant systematics – Population biology, Metapopulation, Landscape connectivity.		50% 20%	written exam oral exam exercises project	30 24 Yes	lecture seminary practice field course
<i>Teaching staff: R. Raimond (coord.), F. Grandjean, C. Souty-Grosset, D. Olivier</i>		30%	report presentation	Teaching EN FR	P4b Y2
UPO-404	Ecosystems management	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
The current management paradigm for public lands: Overview of the ecological, social and economic principles that provide the basis for ecosystem management and implementation plans for ecological systems.		50% 20%	written exam oral exam exercises project	30 24 Yes	lecture seminary practice field course
<i>Teaching staff: F. Grandjean (coord.) R. Raimond, C. Huyghes (INRA), M. Perrinet (ESIP)</i>		30%	report presentation	Teaching EN FR	P4b Y2
UPO-405	Environmental Policies & Economics	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
Overview of selected regional, national and international policies - Endangered species, national parks and conservation and targeting – Build financial project for environmental causes.		50% 20%	written exam oral exam exercises project	30 24	lecture seminary practice field course
<i>Teaching staff: C. Roche, F. Lambert (UP, Faculty of Human Sciences)</i>		30%	report presentation	Teaching EN FR	P4b Y2
UPO-406	Symbiotic systems	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
Endosymbiotic theory; Long term associations; Evolutionary parasitology; Bacterial obligate endosymbionts in arthropods; Functional analyses of host-symbiont interactions.		50% 20%	written exam oral exam exercises project	30 24	lecture seminary practice field course
<i>Teaching staff: M.Sicard (Coord.), D. Bouchon, C. Braquart-Varnier, Y. Caubet, P. Grève + External contributors</i>		30%	report presentation	Teaching EN FR	P4b Y2
UPO-407	Evolutionary Strategies	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
Evolution and the theory of games; Life history strategies; The evolution of cooperation; Evolutionary Stable Strategy; Reproductive strategies in vertebrates, in invertebrates.		50% 20%	written exam oral exam exercises project	30 24 Yes	lecture seminary practice field course
<i>Teaching staff: Y. Caubet, V. Bretagnolle, X. Bonnet, O. Lourdaïs (CNRS-Chizé) + External contributors</i>		30%	report presentation	Teaching EN FR	P4b Y2
UPO-408	Evolutionary Genetics	UP	Compulsory	54 h.	ECTS: 6
<i>Contents</i>		<i>Evaluation:</i>		<i>Horary:</i>	
Prokaryotic and eukaryotic genome evolution; Comparative genomics; Evolution of genomic parasites; Evolutionary novelty; Genetic conflicts; Genome projects.		50% 20%	written exam oral exam exercises project	30 24	lecture seminary practice field course
<i>Teaching staff: D. Bouchon (Coord.), R. Cordeaux, P. Grève, F. Grandjean, I. Marcadé, C. Souty-Grosset + External contributors</i>		30%	report presentation	Teaching EN FR	P4b Y2

UPO-501	Project Management	UP	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Basics of project design and project management, Scientific production and project report; Team working; Communication skills			written exam oral exam exercises project report	20 40	lecture seminary practice field course
<i>Teaching staff: UP and External contributors</i>		50% 50%	presentation	Teaching FR	P5b Y2
UPO-502	Master's Thesis: Research Project & Dissertation	UP	Compulsory	500*	ECTS: 24
<i>Contents</i>		Evaluation:		Horary:	
Each student should develop and present an original and innovative Research Project in Ecological Sciences under the co-supervision of a staff member of the UC and an external supervisor (preferably another colleague from the EMAE consortium) applying the knowledge and skills acquired during the previous semesters			written exam oral exam exercises project report presentation	500	lecture seminary practice field course
		100%		Teaching EN FR	P5b Y2
UEA-401	Issues in Conservation	UEA	Elective	30 h.	ECTS: 3
<i>Objectives:</i>		Evaluation:		Horary:	
To critically examine current issues in conservation biology. To develop an in-depth understanding of a range of approaches to the study and practice of conservation. To understand, assess and report on scientific presentations given by high-profile scientists.			written exam oral exam exercises project report presentation	15 15	lecture seminary practice field course
<i>Teaching staff: D. Bell (Coord.) + Faculty and External contributors</i>		70% 30%		Teaching EN	P4c Y2
UEA-402	Ecological Survey Methods	UEA	Elective	30 h.	ECTS: 3
<i>Objectives</i>		Evaluation:		Horary:	
The objectives are to gain knowledge of a range of census and survey techniques available, to understand how to sample, to gain practical knowledge of estimating population sizes of certain taxa, to understand how to measure habitat variable, to gain experience in using some of the analytical methods, to understand the sources of error and bias and how to reduce the impacts of these.			written exam oral exam exercises project report presentation	10 10 10 Yes	lecture seminary practice field course
<i>Teaching staff: D. Wilkinson (Coord.), P. Dolman, A. Wainson, A. Pernetta, R. Coleman, S. Gillings (British Trust for Ornithology), J. Greenwood (BTO)</i>		50% 50%		Teaching EN	P4c Y2
UEA-403	Biodiversity and Human Society	UEA	Elective	60 h.	ECTS: 6
<i>Objectives</i>		Evaluation:		Horary:	
The objectives are to examine critically different motivations for conserving biodiversity, to consider local and global issues in biodiversity conservation, to develop knowledge of strategic and practical approaches to biodiversity conservation.			written exam oral exam exercises project report presentation		lecture seminary practice field course
<i>Teaching staff: P. Dolman</i>		40% 30% 30%		Teaching EN	P4c Y2
UEA-404	Practical Conservation	UEA	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
Importance of biodiversity and the range of strategies developed to conserve it, as well as to impart an understanding of the ecological principles underpinning modern conservation science.			written exam oral exam exercises project report presentation	15 15	lecture seminary practice field course
<i>Teaching staff: D. Bell (Coord.), D. Yu, A. Watkinson + External contributors</i>		60% 40%		Teaching EN	P4c Y2
UEA-405	Statistics for Research	UEA	Elective	30 h.	ECTS: 3
<i>Contents</i>		Evaluation:		Horary:	
General Linear Modelling (GLM), combining linear regression, ANOVA, ANCOVA. Review issues in experimental and sampling design and the assumptions underlying GLMs and the principles of model simplification. Binary logistic regression, contingency table analysis, principal Components Analysis (PCA). How to run these tests on computers using a standard package (SPSS) and to interpret and present the results.			written exam oral exam exercises project report presentation	15 15	lecture seminary practice field course
<i>Teaching staff: D. Yu</i>		100%		Teaching EN	P4c Y2

UEA-406	Introduction to the Economics of the Environment	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Fundamentals of economic analysis and their application to a range of environmental issues. Microeconomics project appraisal approach with wider policy related issues being introduced selectively as the course progresses.			written exam oral exam exercises project report presentation		lecture seminary practice field course
<i>Teaching staff:</i>				Teaching EN	P4c Y2
UEA-407	Atmospheric Chemistry Change	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
			written exam oral exam exercises project report presentation		lecture seminary practice field course
<i>Teaching staff:</i>				Teaching EN	P4c Y2
UEA-408	The Science of Climate Change	UEA	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Up-to-date and authoritative overview of the subject of natural and anthropogenic climate change, including research techniques as well as current understanding: Fundamentals of the changing climate (Earth's energy balance, general circulation of the atmosphere, causes of climate change and the greenhouse effect); Climate reconstruction (tree-ring analysis), data preparation and data analysis, theoretical or model-based approaches; History of climate change and potential causal mechanisms from 1000 AD to the present.		25% 75%	written exam oral exam exercises project report presentation	50 20 10	lecture seminary practice field course
<i>Teaching staff: D. Viner</i>				Teaching EN	P4c Y2
UEA-501	Research Skills for Ecologists	UEA	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Presentation skills, giving seminars, preparing posters, dealing with the media and scientific writing. Acquisition of information gathering skills. Organisational skills such as team working and project management.			written exam oral exam exercises project report presentation		lecture seminary practice field course
<i>Teaching staff: D. Wilkinson (Coord.), D. Bell, P. Anstey, M. Gage, S. Gillings (BTO) + External contributors</i>				Teaching EN	P5c Y2
UEA-502	Master's Thesis: Research Project & Dissertation	UEA	Compulsory	500*	ECTS: 24
<i>Contents</i>		Evaluation:		Horary:	
Each student should develop and present an original and innovative Research Project in Ecological Sciences under the co-supervision of a staff member of the UC and an external supervisor (preferably another colleague from the EMAE consortium) applying the knowledge and skills acquired during the previous semesters			written exam oral exam exercises project report presentation	500	lecture seminary practice field course
		100%		Teaching EN	P5c Y2
CAU-401	Theory of ecosystem dynamics and decomposing systems	CAU	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Interaction of production and decomposition in ecosystems, relevance of decomposition for the functioning and resilience of ecosystems, indication of indirect effects of ecosystem uses, comparative analysis of decomposing networks from different ecosystems.		100%	written exam oral exam exercises project report presentation	60	lecture seminary practice field course
<i>Teaching staff: M. Zimmer, W. Windhorst</i>				Teaching EN	P4d Y2
CAU-402	Soil ecology - microbial and invertebrate decomposing systems	CAU	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Soil zoology: lifeforms and the activity of soil organisms; decomposition processes; the influence of agriculture on the function of soil organisms and food chains in soil. Soilmicrobiology: Functions of soil organisms, e.g. decomposition and enzyme activity		100%	written exam oral exam exercises paper protocol presentation	30 30	lecture seminary practice field course
<i>Teaching staff: U. Irmeler, M. Bötter</i>				Teaching EN	P4d Y2

CAU-403	Identifying Chemical Key Processes in Ecosystems	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
The compilation of data from environmental monitoring and models allow the study of the key processes relevant to environmental changes; critical value concepts in environmental protection, landscape management and critical load concepts in environmental politics.		70%	written exam oral exam exercises	30 30	lecture seminary practice field course
<i>Teaching staff: C.-G. Schimming</i>		30%	project report presentation	Teaching EN	P4d Y2
CAU-404	Principles of Environmental Economics & Environmental Planning	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Environmental economics: instruments of agronomic environmental politics; measures of nature protection treaties; effects of requirements in protected areas and compensation claims; economic aspects of ecological agriculture; multifunctionality as economic environmental assessment. Environmental planning: basic planning methods; environmental planning instruments (landscape planning, environmental compatibility check, FFH-directive; intervention, regulation and landscape maintenance settlements. Interfaces for spatial planning, EU-Water frame directive)		100%	written exam oral exam exercises project report presentation	60	lecture seminary practice field course
<i>Teaching staff: U. Latacz-Lohmann, H. Reck</i>				Teaching EN	P4d Y2
CAU-405	Basics of Aquatic Ecology	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Comparison of aquatic and terrestrial ecosystems; parameters of lotic and lentic aquatic habitats; biology and adaptations of characteristic plant and animal species; trophic interactions.		50%	written exam oral exam exercises project report presentation	20 40 Yes	lecture seminary practice field course
<i>Teaching staff: H. Brendelberger</i>		50%		Teaching EN	P4d Y2
CAU-406	Evolution, Biodiversity and Conservation	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Theoretical basics of evolution; theories and factors, adaptation, species concepts, speciation, phylogeny; anthropogenic impact as evolutionary factor; evolution in man-made landscapes; island ecology; national parks; metapopulations; demographics; computer simulation		70%	written exam oral exam exercises project report presentation	12 12 36	lecture seminary practice field course
<i>Teaching staff: G.B. Hartl</i>		30%		Teaching EN	P4d Y2
CAU-407	Current topics in marine ecology II	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Current research topics, according to the most recent publications in marine biological journals		40%	written exam oral exam exercises project report presentation	20 10 50	lecture seminary practice field course
<i>Teaching staff: U. Sommer (IFM-GEOMAR)</i>		60%		Teaching EN	P4d Y2
CAU-408	Current topics in benthic ecology II	CAU	Elective	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Current research topics, according to the most recent publications in marine biological journals		40%	written exam oral exam exercises project report presentation	20 10 50	lecture seminary practice field course
<i>Teaching staff: M. Wahl (IFM-GEOMAR)</i>		60%		Teaching EN	P4d Y2
CAU-409	Advanced modelling	CAU	Elective	40 h.	ECTS: 4
<i>Contents</i>		Evaluation:		Horary:	
Advanced techniques and approaches for modelling ecological processes and ecosystem dynamics & interactions		50%	written exam oral exam exercises project report presentation	30 20	lecture seminary practice field course
<i>Teaching staff: A. Oschlies (IFM-GEOMAR)</i>		50%		Teaching EN	P4d 2

CAU-501	Project Management	CAU	Compulsory	60 h.	ECTS: 6
<i>Contents</i>		Evaluation:		Horary:	
Basics of project management, use of project management software, use of content-management systems, context of public, governmental and private projects		80%	written exam oral exam exercises	40 20	lecture seminary practice field course
<i>Teaching staff: W. Windhorst, C. Eschemnbach, F. Hosenfeld</i>		20%	project report presentation	Teaching EN	P5d Y2
CAU-502	Master's Thesis: Research Project & Dissertation	CAU	Compulsory	500*	ECTS: 24
<i>Contents</i>		Evaluation:		Horary:	
Each student should develop and present an original and innovative Research Project in Ecological Sciences under the co-supervision of a staff member of the UC and an external supervisor (preferably another colleague from the EMAE consortium) applying the knowledge and skills acquired during the previous semesters			written exam oral exam exercises project report presentation	500 Teaching EN	lecture seminary practice field course P5d Y2
		100%			