

Module Description

Minor in Biology

2018-01-25

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Title:	Fundamentals in Biology				
Symbol:	BIO-LANF-01				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	none				
Executive professor	Dr. Oliver Hallas, Tel.: 42838 3928, oliver.hallas(at)uni-hamburg.de				
Lecturer	Prof. Dr. Norbert Jürgens, Dr. Oliver Hallas,				
Language	German				
Educational concept	<p>The students are familiar with the general and essential concepts of the modern key science Biology. The lectures acquire knowledge of basic scientific principles and mechanisms associated with biological processes (e.g., photosynthesis, osmoregulation). Within the practical course with an eLearning component, the lecture contents are consolidated in exemplary learning and basic techniques (including microscopy, histology, preparation of experiments, but also bio scientific research, logging and analysis of observations) are acquired. The students acquire basic knowledge and skills and the necessary specialist terminology for the following modules.</p>				
Contents	<p>Repetition and transfer of basic chemical and physical principles (for example, principles of thermodynamics, reaction kinetics) to biological conditions; Basics of the following subject areas: Biomolecules, cell biology, organelles, construction and function of plant and animal tissues and organs, differentiation processes, building and energy metabolism, water and nutrient salt balance, generation change, principles of evolution, systematics and ecology; basic examination methods (including microscopy, tissue sections, staining). On the learning platform and in the tutorial, the contextual relationships between central concepts and exemplary details as well as the targeted independent deepening and processing of individual subject areas (lifelong learning) are discussed and practiced.</p>				
Courses:	<ul style="list-style-type: none"> • L: Safety instruction • L: Fundamentals in Biology • L: Fundamentals in Evolutionary Biology • P: Practical Course 				1 SEM./HRS 2,5 SEM./HRS 1 SEM./HRS 1,5 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Safety instruction • L: Fundamentals in Biology • L: Fundamentals in Evolutionary Biology • P: Practical Course 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
			7	5	3
			41	83	10
			21	20	4
			35	35	5
	Total Workload	9	105	143	22
Grading framework (possibly including examinations)	<p><i>Formal requirements for examinations:</i> Attendance at the safety instruction is obligatory. Successful participation in the lab course (drawing and protocols)</p> <p><i>Examinations:</i> Written examination (graded; 100%)</p>				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Purves W. K., et al. (2006): Biologie. – 7. Aufl., Spektrum Akademischer Verlag, München. Campbell, N. A., et al. (2009): Biologie. – 8 th ed., Pearson Studium, München. In der jeweils aktuellen Auflage				

Title:	Biodiversity of Plants				
Symbol:	BIO-LANF-02				
Semester:	Summer				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	Recommend is the successful participation in BIO-LANF-01.				
Executive professor	Prof. Jens G. Rohwer, Tel. 42816 397, jens.rohwer(at)uni-hamburg.de				
Lecturer	Dr. Ingeborg Niesler, Prof. Jens G. Rohwer, Stefan Rust, Dr. Carsten Schirarend, Angela Niebel-Lohmann, Dr. Matthias Schultz				
Language	German				
Educational concept	The students are able to assign plant organisms to a large group. They have learned the botanical terminology and its application and can address selected domestic vascular plants directly. They know how to determine native plant species.				
Contents	Overview of a part of the variety of organisms that are traditionally the subject of botany (plants plus fungi, see above). Brief introduction to tribal-historical contexts, morphological terms, relation to the environment and physiological peculiarities, references to useful applications. Fundamentals of the determination of native vascular plants.				
Courses:	<ul style="list-style-type: none"> • L: Classification of Higher Plants • L: Morphology and Systematics of Native Higher Plants • P: Determination exercises on Higher Plants 			1 SEM./HRS	
				1 SEM./HRS	
				3 SEM./HRS	
Workload		<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	<ul style="list-style-type: none"> • L: Classification of Higher Plants • L: Morphology and Systematics of Native Higher Plants • P: Determination exercises on Higher Plants 		21	14	10
			21	14	10
			42	38	10
	Total Workload	6	84	66	30
Grading framework (possibly including examinations)	<p><i>Formal requirements for examinations:</i></p> <p>Active participation in the determination course.</p> <p><i>Examinations:</i></p> <p>Written examination (75% of the module grade), in which at least sufficient knowledge of the content of each of the courses has to be proven and the practical exam of the determination exercises (25% of the module grade).</p>				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	<p>Strasburger, E., (2008): Lehrbuch der Botanik. 36. Aufl.: Spektrum, Akad. Verl., Heidelberg.</p> <p>Braune et al., (2007): Pflanzenanatomisches Praktikum 1: Zur Einführung in die Anatomie der Samenpflanzen. 9., durchges. Aufl., Spektrum, Akad. Verl, Heidelberg.</p> <p>Schmeil-Fitschen,(2009): Flora von Deutschland und angrenzender Länder: ein Buch zum Bestimmen der wildwachsenden und häufig kultivierten Gefäßpflanzen. unveränd. Aufl., Quelle & Meyer, Wiebelsheim.</p>				

Title:	History of Biology				
Symbol:	GdN-LA Bio 3				
Semester:	Summer				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	none				
Executive professor	Prof. Dr. Stefan Kirschner, Phone: 42838-2785, stefan.kirschner (at) uni-hamburg.de				
Lecturer	Prof. Dr. Stefan Kirschner				
Language	German				
Educational concept	Students are able to recognize the dependence of biological thought and the progress of science on societal, philosophical, religious, economic, political and other factors. They are capable of chronologically classifying important biological theories, models and insights into the history of ideas.				
Contents	The subject of the lecture is the historical development of biological concepts, theories and research from early civilizations to the 20th century. In general, also problem-historical and time-spanning aspects are treated, such as the transformation of the attitudes of man towards the living environment.				
Courses:	<ul style="list-style-type: none"> • L: History of Biology 				2 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: History of Biology 				
		<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	3	28	52	10
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Participation in the lecture is strongly recommended <i>Examinations:</i> Presentation (100%).				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Höxtermann, E.; Hilger, H. H. (Hrsg.) (2007): Lebenswissen. Eine Einführung in die Geschichte der Biologie. Rangsorf. Jahn, I. (Hrsg.) (2004): Geschichte der Biologie. 3. Aufl. Hamburg: Nikol,(Als CD-ROM erschienen bei Directmedia Publishing, ISBN: 3-89853-538-X.)				

Title:	Biodiversity of Animals				
Symbol:	BIO-LANF-04				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> Compulsory module 				
Formal requirements for participation	none				
Executive professor	Dr. Oliver Hallas, Tel.: 42838 3928, Oliver.Hallas(at)uni-hamburg.de				
Lecturer	Dr. Oliver Hallas, Dr. Jakob Hallermann				
Language	German				
Educational concept	Students possess basic knowledge of the species, in particular the construction, characteristics and biology; They have the ability to classify animal species taxonomically correct and can safely deal with zoological terms. They are capable of dealing with zoological keys of determination. They have basic preparation techniques.				
Contents	Introduction to species of the animal kingdom, their taxonomy, their phylogenetic relationships, their construction and basic features of their biology. Own preparations, interpretation of histological specimens, and application of determination keys.				
Courses:	<ul style="list-style-type: none"> P: Function and Diversity in the Animal Kingdom 				6 SEM./HRS
Workload	<ul style="list-style-type: none"> P: Function and Diversity in the Animal Kingdom 	<i>credits</i>	P (hrs) 84	S(hrs) 70	EP (hrs) 26
	Total Workload	6	84	70	26
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation in practical course, review of minutes and drawings, ungraded exams requiring at least 50% of the possible credits). <i>Examinations:</i> Written examination (graded; 100%)				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Wehner, R., Gehring, W.: Zoologie. Thieme, Stuttgart. In der jeweils aktuellen Auflage Storch, V., Welsch, U.: Kurzes Lehrbuch der Zoologie. Elsevier, Spektrum Akad. Verl., München. In der jeweils aktuellen Auflage Storch, V., Welsch, U.: Kükenthal zoologisches Praktikum. Spektrum Akad. Verl., Heidelberg. In der jeweils aktuellen Auflage Schäfer, M.: Brohmer -Fauna von Deutschland : ein Bestimmungsbuch unserer heimischen Tierwelt. Quelle & Meyer, Wiebelsheim. In der jeweils aktuellen Auflage				

Title:	General Genetics and Molecular Biology				
Symbol:	BIO-LANF-05				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	none				
Executive professor	Prof. Dr. Wilhelm Schäfer, Tel.: 42816 266, wilhelm.schaefer(at)uni-hamburg.de				
Lecturer	Prof. Dr. Wilhelm Schäfer				
Language	German				
Educational concept	Students understand the basic principles of genetics and molecular biology and know the main methods of genetics and molecular biology.				
Contents	Classical and formal genetics (Mendel, population genetics); Cytogenetics (cell cycle, mitosis, meiosis); Human genetics; Structure and function of nucleic acids (replication, transcription, translation, mutation, recombination); Gene regulation, Developmental Genetics; Overview of methods of molecular biology and genetic engineering.				
Courses:	<ul style="list-style-type: none"> • L: General Genetics and Molecular Biology • 				2 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: General Genetics and Molecular Biology 	<i>credits</i>	P (hrs) 28	S(hrs) 40	EP (hrs) 12
	Total Workload	3	28	40	12
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation in the lecture. <i>Examinations:</i> Written examination (graded; 100%)				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Graw, J., Hennig, W. (2006): Genetik. 4., vollst. überarb. Aufl. Springer, Berlin Knippers, R (2006): Molekulare Genetik. 9., komplett überarb. Aufl., Thieme-Verlag, Stuttgart. Seyffert, W. (2006): Lehrbuch der Genetik. - 2. Aufl., Spektrum Akad. Verl., Heidelberg.				

Title:	Native Flora and Fauna				
Symbol:	BIO-MLANF-03				
Semester:	Summer				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	The successful completion of the module "Cell Biology and Biochemistry" is recommended.				
Executive professor	Dr. Oliver Hallas, Tel.: 42838 3928, oliver.hallas(at)uni-hamburg.de				
Lecturer	Dr. Matthias Schultz, Dr. Oliver Hallas,				
Language	German				
Educational concept	After successfully completing the module, the students have acquired the professional basis for a lively and natural education on the topic of native plant life. They have gained a comprehensive overview of the native plant world and have learned to work independently on ecological issues in the school-related environment and on excursions and to convey the results vividly.				
Contents	<ul style="list-style-type: none"> • Overview of the biology of native flora and fauna • Introduction History and development of the native habitats including their nature conservation problem (Hamburg as an example) 				
Courses:	<ul style="list-style-type: none"> • L: Native Fauna • L: Native Flora • P: Native Flora 				1 SEM./HRS 1 SEM./HRS 2 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Native Fauna • L: Native Flora • P: Native Flora 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	5	56	54	40
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation in the lecture. <i>Examinations:</i> Written examination (graded; 100%)				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Announced at the start beginning of the course.				

Title:	Structure and Function of the Human Body				
Symbol:	BIO-MLANF-05				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	The successful completion of the module "Cell Biology and Biochemistry" is recommended.				
Executive professor	Dr. Oliver Hallas, Tel.: 42838 3928, oliver.hallas(at)uni-hamburg.de				
Lecturer	Dr. Oliver Hallas,				
Language	German				
Educational concept	The students get an overview of the morphology and physiology of humans. The connections between structure and function are in the foreground. The aim is to clarify the interplay between physiological processes at the level of cells, tissues and organs / organ systems.				
Contents	<ul style="list-style-type: none"> • Structure and function of human cells, tissues and organs • Presentation of selected organ systems, such as B. integument, musculoskeletal system, nervous system, digestive system, cardiovascular and respiratory system, genitourinary system, immune system. 				
Courses:	<ul style="list-style-type: none"> • L: Structure and Function of the Human Body 				3 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Structure and Function of the Human Body 	<i>credits</i>	P (hrs) 42	S(hrs) 42	EP (hrs) 66
	Total Workload	5	42	42	66
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation in the lecture. <i>Examinations:</i> Written examination (graded; 100%)				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Tortora, G. J. & Derrickson, B. H. (2008): Anatomie und Physiologie. Wiley Verlag Silverthorn, D. U.(2009): Physiologie. Pearson Verlag. Faller, A. & Schünke, M. (2008): Der Körper des Menschen. Thieme Verlag. Schwegler, J. (2006): Der Mensch: Anatomie, Physiologie. Thieme Verlag.				

Title:	Ecology				
Symbol:	BIO-NF-05				
Semester:	Summer				
Module type	<ul style="list-style-type: none"> • Compulsory module 				
Formal requirements for participation	none				
Executive professor	Prof. Dr. Kai Jensen, Tel.: 42816 576, kai.jensen(at)uni-hamburg(dot)de				
Lecturer	Prof. Dr. Kai Jensen				
Language	German				
Educational concept	Students have basic knowledge of general ecology, the biomes of the earth and the Central European habitats. Furthermore, they have experience in the application of selected ecological methods. They possess basic knowledge on species in the animal and plant kingdom. The students have developed the ability to discuss ecological issues in their spatial context and in connection with other natural and social science disciplines.				
Contents	Introduction to general ecology including behavioural ecology: functions, principles and methods; Introduction to the biomes of the earth and into habitats of Central European; Relation between occurrences of species or communities with abiotic site conditions; Applications of ecological and behavioural-ecological knowledge to specific problems.				
Courses:	<ul style="list-style-type: none"> • L: Ecology 				3 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Ecology 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	5	42	42	66
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation in the lecture. <i>Examinations:</i> Written examination (graded, 100%)				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Smith & Smith: Ökologie. Pearson Studium. In der jeweils aktuellen Auflage Begon, Howarth, Townsend (2014). Ökologie. Springer Spektrum.				

Title:	Introduction to Plant Physiology				
Symbol:	BIO-LANF-07				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> • Compulsory elective module 				
Formal requirements for participation	none				
Executive professor	PD Dr. Dirk Warnecke, Tel.: 42816 574, dirk.warnecke(at)uni-hamburg.de				
Lecturer	PD Dr. Dirk Warnecke				
Language	German				
Educational concept	The students have extensive knowledge of the most important metabolic pathways, the regulations in the development, knowledge of the effect of environmental conditions on the plants.				
Contents	Water Resources; Importance of mineral salts for the plant; Location adjustments of plants; Function and occurrence of proteins, nucleic acids, lipids and carbohydrates in the plant; Membrane transport processes; Enzyme kinetics; dissimilation; Photosynthesis; Signal transduction pathways to regulate the growth and development of plants.				
Courses:	<ul style="list-style-type: none"> • L: Introduction to Plant Physiology 				2 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Introduction to Plant Physiology 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	3	28	42	20
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation in the lecture. <i>Examinations:</i> Oral examination (graded; 100%)				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Taiz L., Zeiger E. (2000): Physiologie der Pflanzen. Spektrum Akad. Verl., Heidelberg. Strasburger, E., (2008): Lehrbuch der Botanik. 36. Aufl.: Spektrum, Akad. Verl., Heidelberg. Raven P.H., et al. (2006): Biologie der Pflanzen. 4. Aufl., Gruyter-Verlag, Berlin. Richter, G. (1998): Stoffwechselphysiologie der Pflanzen. 6., völlig Neubearb. Aufl. Thieme-Verlag, Stuttgart.				

Title:	Introduction to Human Biology				
Symbol:	BBIO-WPW-30				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> Compulsory elective module 				
Formal requirements for participation	none				
Executive professor	Prof. Dr. Esther Diekhof, Phone: 42838 3931, esther.diekhof(at)uni-hamburg(dot)de				
Lecturer	Prof. Esther Diekhof				
Language	German				
Educational concept	The students have basic knowledge about the growth and development process (ontogenesis) of humans as well as environmental influences and the influence of genetic mechanisms on human behaviour. They also have a basic understanding of the evolution of man. Knowing the fossil record can classify it temporally and geographically and are up to date on the key innovations of hominization. They also know the basic working methods of palaeoanthropology, palaeogenetics and paleoecology and their influence on the knowledge of knowledge.				
Contents	Gender differentiation, behavioural biology of humans, evolution of humans and their ecological and geographical parameters. Interpretation of the fossil record.				
Courses:	<ul style="list-style-type: none"> L: Introduction to Human Biology 				2 SEM./HRS
Workload	<ul style="list-style-type: none"> L: Introduction to Human Biology 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	3	28	30	32
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Participation in the lecture is strongly recommended <i>Examinations:</i> Written examination (100%).				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Grupe, G., et al.: Anthropologie. Springer, Berlin. In der jeweils aktuellen Auflage Jurmain, R., et al.: Introduction to Physical Anthropology. Thomson Wadsworth, Belmont/CA. In der jeweils aktuellen Auflage Roberts, A.: Die Anfänge der Menschheit, Dorling Kindersley. In der jeweils aktuellen Auflage				

Title:	Introduction to Plant Geography				
Symbol:	BBIO-WPW-63				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> • Compulsory elective module 				
Formal requirements for participation	none				
Executive professor	Prof. Dr. Jens G. Rohwer, Phone: 42816 397, jens.rohwer (at) uni-hamburg (dot) de				
Lecturer	Prof. Dr. Jens G. Rohwer				
Language	German				
Educational concept	The students have an overview of the most important Florence zones, vegetation types and plant formations of the earth. They know the conditions under which certain vegetation types occur. They are able to understand and use the terminology of plant geography and to name a few characteristic representatives of certain floral kingdoms or vegetation types.				
Contents	Area information, flora zones, flora regions, flora elements, vegetation types, plant formations and the ecological conditions of their occurrence, altitude levels, diversity centers, endemics, disjunctions, growth and life forms, succession and climax vegetation.				
Courses:	<ul style="list-style-type: none"> • L: Introduction to Plant Geography 				2 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Introduction to Plant Geography 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	3	28	46	16
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Participation in the lecture is strongly recommended <i>Examinations:</i> Written examination (100%).				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Schröder: Lehrbuch der Pflanzengeographie. Quelle & Meyer, Wiesbaden. In der jeweils aktuellen Auflage				

Title:	Basics of Behavioural Ecology				
Symbol:	BBIO-WPW-22a				
Semester:	Winter				
Module type	<ul style="list-style-type: none"> • Compulsory elective module 				
Formal requirements for participation	none				
Executive professor	Prof. Dr. Jutta Schneider, Phone: 42838 3878, jutta.schneider (at) uni-hamburg (dot) de				
Lecturer	Prof. Dr. Jutta Schneider				
Language	German				
Educational concept	The students have deepened their understanding of evolutionary hypotheses and their verification through experimentation and are familiar with the application of the economics principle in behavioural science. They have gained knowledge of the most important subareas and selected model studies in behavioural ecology.				
Contents	Testing behavioural ecology hypotheses; proximate & ultimate issues; Basics of decision in animals; Occam; evolutionary races; Predator and prey strategies; signals; Choice of partner; Social behaviour.				
Courses:	<ul style="list-style-type: none"> • L: Introduction to Behavioural Ecology • 				1 SEM./HRS
Workload	<ul style="list-style-type: none"> • L: Introduction to Behavioural Ecology 	<i>credits</i>	P (hrs)	S(hrs)	EP (hrs)
	Total Workload	3	14	50	26
Grading framework (possibly including Examinations)	<i>Formal requirements for Examinations:</i> Active participation. <i>Examinations:</i> Written examination (graded, 100%).				
Duration	one semester				
Frequency of occurrence	annual				
Literature:	Kappeler P.: Verhaltensbiologie. Springer, Berlin. In der jeweils aktuellen Auflage Dugatkin L.E.: Model Systems in Behavioral Ecology. Princeton University Press. In der jeweils aktuellen Auflage				