

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 1	C	Maths applied to Life Sciences	3				28 (EN)	- exponential, logarithmic, trigonometric functions - derivation and analysis of functions - integrals and applications
	C	Chemistry applied to Life Sciences	4		30	10 (EN)		- Basics in chemistry - Energetics - Acid-base - Oxidoreduction
	C	Physics applied to Life Sciences	2			6	14	- Fluid statics. - Surface phenomena and surface tension. - Perfect fluid dynamics. - Viscous fluid dynamics.
	C	Cell Biology	6	31	10 (EN)	12 (EN)		<i>Courses:</i> Cell Concept: the use of the microscope and the discovery of the existence of cell to cell and modern molecular biology. Different cell types and structures: prokaryotic and eukaryotic, animal and plant cells. Concept of virus. essential biological molecules. plasma membrane and internal membranes. Endocytosis and exocytosis. Endoplasmic reticulum, Golgi apparatus, the cytosol, vacuole. Core and ultra-structure of chromatin. Energy Conversion organelles: mitochondria and chloroplasts. <i>Directed works:</i> light and electron microscopy techniques. The cell and its organization. cell fractionation. The use of radioactive precursors in cell biology. Plant cell: vacuole wall and plastid. <i>Practical works:</i> use the light microscope. Observation of animal and plant cells. Microscopic study of mitosis. Cytochemistry.

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 1	C	Molecular and Formal Genetics 1	3	14	18 (EN)			Historical introduction; General principles; Mono- and poly-hybridism (phenotype, genotype, allele, pure lineage, relations between alleles, particular crosses, pedigree analysis), Interactions between genes (epistasis, Beadle and Tatum experiments, reconstitution of metabolic pathways), chromosomal theory of heredity, sex-linkage, sexual determinism, Inter- and intra-chromosomal recombinations (meiosis, recombination between linked genes, genetic map), Chi-square test.
	C	Biology of Organisms	9	67.5	7.5 (EN)	25 (EN)		Animal Biology (50%) Animal body organization : Spongiaria, Cnidaria, Plathelminths, Annelids, Molluscs, Arthropods, Echinoderms, Vertebrates <i>Practicals</i> : microscope, binocular magnifier, dissections Plant Biology (50%) Major morphological and anatomical characteristics of the Fungi, Algae and Embryophytes (Moss, ferns, gymnosperms and angiosperms) Evolution of the vegetative and reproductive apparatus. Plant-environment relationships. Main food and non-food uses. <i>Practicals</i> : thin cuts. Anatomy of Angiosperms. Floral analysis. Using the microscope and binocular magnifier.
	C	Student's Project	3		10			Discovering the University
	Totals for semester 1			30 ECTS				

(EN) : taught in English. Otherwise, in French

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 2	C	Organic Chemistry	4	16	20 (EN)	4 (EN)		1) Nomenclature 2) Bonding and structures in organic chemistry 3) Stereochemistry 4) Electronic effects 5) Reactions in organic chemistry <ul style="list-style-type: none"> • General • Nucleophilic substitutions • Electrophilic Additions • Aromatic electrophilic substitutions
	C	Physics applied to Life Sciences, 2	2			6(EN)	14 (EN)	Electric charges: electric field and potential. Resistance, capacity, battery. Electric current: Ohm's law, conventions. Electrical circuit: Kirchoff's law, RC circuit. Study of electrical networks in continuous and sinusoidal steady state. Electrical circuits in biology: transmembrane potential, nerve fibers.
	C	Biochemistry 1	6	31	14 (EN)	8 (EN)		Courses: Introduction to biochemistry, notions of distance, time and energy in biochemistry, major dates in its evolution. Structure and main properties of molecules of living organisms (nucleic acids, proteins, carbohydrates, lipids). Assembly in macro- and supramolecular buildings, importance of strong and weak bonds elaborating and stabilizing them, and biological importance. Enzymology. Bioenergetics. Carbohydrate and lipid cellular metabolism, notion of compartmentalization, sealing and membrane fluidity. Complementarity of the animal and plant kingdoms. Tutorials: writing formulas and assembling constituents for nucleic acids, proteins, carbohydrates and lipids. Use of molecular models for carbohydrates. Application of physicochemical properties for the separation of amino acids and proteins. Colorimetric assay methods. Determination of enzymatic parameters (Michaelian enzymes). Exercises (molarity, concentration-dilution...). Introduction to molecular biology. Practical work: Experimental discovery of biochemistry.

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 2	C	Animal Physiology	5	30	10+2 (EN)	6 (EN)		
				This module answers the central question of the living: "How does it work? " by studying:				
	- homeostasis, the maintenance by the organism of the direct cellular environment, the internal environment, etc.							
	- the functions of communication with the internal and external environment via the endocrine and nervous systems							
	- the nutritional functions that enable the body to meet its needs by providing nutrients and oxygen and by eliminating waste products through the circulatory, respiratory, digestive and excretory systems.							
	C	Plant Physiology	4	15	14 +2 (EN)	3 (EN)		
<ul style="list-style-type: none"> - Importance of plants. - Water and the plant: physico-chemical properties of water, osmosis, water potential. - Water absorption. Root adaptations. - Transit of water in the plant. - Emission of water into the atmosphere. Mechanisms of opening and closing of stomata. - The role of water in cell growth. Role of the wall. - Quantitative and qualitative importance of mineral elements on plant physiology. - Fertilizers in agriculture. - Autotrophy: generalities - Some physiological and metabolic peculiarities of plants. 								
C	Scientific Ecology 1	3	16,5	10+2 (EN)				
			1) Introduction to Scientific Ecology 2) Functional ecology : (a) Matter and energy fluxes in the ecosystem; (b) Trophic networks, c(c) Biomes 3) Anthropogenic impacts: (a) Man & Biodiversity; (b) Climate change 4) Introduction to Ethology					

Semester 2	C	Professional Project 2	3	27				<ul style="list-style-type: none"> - Identify reliable and up-to-date sources of post-Bac level information on training pathways. - Prospecting tools on possible paths at the University of Lille (individual work based on the L2 of interest) - The different levels of graduation: pro or generalist (BSc, MSc, and doctorate, engineering school etc.). - Acceptance and/or selection/recruitment criteria: prerequisites, application, competition, internship, job... - Work on professional and academic vocabulary, GLP or TPP - Introduction to the PEC (Portfolio of Experiences and Skills) - Discovery of job opportunities in the chosen sector.
	C	English	2+1	18 (EN)			Distance : 6 (EN)	<ul style="list-style-type: none"> - Work in collaboration with scientific colleagues for the choice of topics. - Revision of the basics for A and B1 level students. - Deepening for B2 and C1. - Emphasis on expression and communication skills in order to bring students to a level that will make them operational and autonomous in a company. - 1 ECTS : scientific communication in English (attached to previous modules)
Totals for semester 2			30 ECTS	274.5 hours (141 taught in English = 51%)				

(EN) : taught in English. Otherwise, in French

Bachelor's degree in Life Sciences – 2nd year

Students oriented towards Biology of Organisms and Populations

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 3 Towards BOP specialization	C	Microbiology 1	4	26	10	4		<ul style="list-style-type: none"> - A-Bacteriology - Historics. The bacteria: size and organization; variety of envelope; the three domains of the tree of life. The metabolism of bacteria and specific metabolic pathways of some bacteria: anaerobic respiration, fermentation, methanogenesis, sulfate reduction. Interspecific relationships: commensalism symbiosis, pathogenesis. Bacterial roles and uses: the intestinal flora, detoxification, food uses, water purification. <i>Practicals</i>: bacterial growth in sterile conditions. - B- Celled Eukaryotes and parasites, viruses - Yeasts and filamentous fungi. Endosymbiosis in unicellular eukaryotes. Unicellular eukaryotes. Virology: history, definitions, structures, methods, classification. Viruses that infect animal cells. Bacteriophages. Viroids and prions.
	C	Biostatistics 1	3	12	12 (EN)	6 (EN)		<ul style="list-style-type: none"> - Measures in biology - Graphical Information Processing - Parameters of a distribution: mean, variance, ... - Basic Distributions (Normal, Binomial, Poisson) - Hypothesis testing: comparing proportions, Chi-square
	C	Formal and Molecular Genetics 2	2	14	8 (EN)			<p><i>Lectures:</i></p> <ul style="list-style-type: none"> - 1) Structure of nucleotides, DNA and chromosomes - 2) DNA replication - 3) The origins of allelic diversity: At the chromosomal scale: variation in the number of chromosomes, in the configuration and size of chromosomes. At the gene level: gene mutations, spontaneous mutations, induced mutations and mutagens. - 4) Genetic analysis of tetrads of eukaryotic microorganisms: linear tetrads (<i>Neurospora crassa</i>) and centromere mapping; disordered tetrads (<i>Saccharomyces cerevisiae</i> and <i>Chlamydomonas reinhardtii</i>) <p><i>Tutorials:</i></p> <ul style="list-style-type: none"> - Exercises on tetrad analysis and the origins of allelic diversity

Bachelor's degree in Life Sciences – 2nd year

Students oriented towards Biology of Organisms and Populations

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 3 Towards BOP specialization	C	Animal Embryology - Fundamentals	3	9	18 (EN)	3 (EN)		<p><i>Lectures and tutorial works:</i> Gametogenesis, early stages of development from the oocyte, fecundation. Early development: segmentation, gastrulation, neurulation), embryonic maps, using urchin, amphibian, birds, and mammals. Fate of embryonic structures. Experimental methods.</p> <p><i>Lab works:</i> analysis of amphibian and bird embryos at various stages, histological cuts.</p>
	C	Plant Physiology - Fundamentals	3	12	7 (EN)	8 (EN)		<ul style="list-style-type: none"> The photosynthesis process: light phase (photoreceptors, the 3 main pigment classes, essential pigment, accessory pigment, electron transfer and Z scheme, energy balance of the light phase) dark phase (C3 plant, C4 plants, CAM, photorespiration, energy balance), shade plants, light plants, environmental factors limiting biomass production Nitrogen metabolism Basics of Plant Growth and Development
	C	Integrative Biology - Fundamentals	3	16	10 (EN)	4 (EN)		<ul style="list-style-type: none"> Characteristics of living beings, physiological functions, elements of cell biology Unicellular Prokaryotes/Eukaryotes - an overview of their organization, functioning and biodiversity Complexification of organisms Communication and regulatory pathways in a multi-cellular organism Types of durable interactions
	C	Scientific Ecology 2 - Fundamentals	3	16.5	10 (EN)	2 (EN)		<ul style="list-style-type: none"> Evolutionary ecology; biotic interactions. Theoretical concepts related to the environmental factors that govern evolution, through examples related to the different types of interspecific interactions. This will allow, among other things, to explain behaviours or traits related to reproduction in different animal groups. Ethology: studied through two current problems (techniques and mode of reasoning). Reference is made to evolutionary processes and environmental constraints. Anthropic impacts: pollution and its impacts (ecotoxicology). Panorama of the main pollutants and toxins, typology of pollution sources. Effects of toxic chemicals on ecosystems at different levels of organization: molecular to landscape. Notion of ecological indicators and biomarkers of toxicity.

Bachelor's degree in Life Sciences – 2nd year

Students oriented towards Biology of Organisms and Populations

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 3 Towards BOP specialization	C	Integrative Biology - Deepenings	3	7.5	6 (EN)			- Environmental constraints, physiological responses and consequences on community assembly: the example of responses to elevated temperatures • - Human Health Ecology
	C	Scientific Ecology 2 - Deepenings		7.5	6 (EN)			• Biological invasions • Extinctions • Eutrophication • Bioindicators • Ocean acidification
	C	Student project	3		30 (EN)			<i>Compulsory :</i> - English <i>Optional (1 out of 3):</i> - Scientific English - Scientific edition - Professional project
	Totals for semester 3			30 ECTS	274 hours (87 taught in English = 31%)			

(EN) : taught in English. Otherwise, in French

Bachelor's degree in Life Sciences – 2nd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics	
Semester 4 BOP	C	Microbial Ecology	1	4		6			
	<p><i>Lectures:</i></p> <ul style="list-style-type: none"> - Place of Micro-organisms in the living world: involvement in biogeochemical cycles (carbon, nitrogen, sulfur) - Adaptations of microorganisms to their biotopes (biofilms and quorum sensing) <p><i>Tutorials:</i></p> <ul style="list-style-type: none"> - Microorganisms in various ecosystems - Microbial biofilms: positive and negative effects - Microbial processes implemented in some environmental disturbances 								
	C	Ecosystem Ecology	2	10	12				
<p><i>Lectures :</i></p> <ul style="list-style-type: none"> - What is an ecosystem? - Energy and matter flows in ecosystems - Biogeochemical cycles: C, N, P - Organization of biocenoses - Evolution of ecosystems <p><i>Tutorials:</i></p> <p>The concepts covered in the course are put into practice during sessions of Directed Works through the calculation of balances and ecological indices as well as the analysis of data from scientific publications, and the production of a poster on a current environmental theme related to the society.</p>									
C	Population genetics	3	16	16 (EN)					
<p><i>Lectures:</i></p> <ul style="list-style-type: none"> • Introduction: What is population genetics? • Genetic diversity and its evaluation in populations • Hardy-Weinberg's law and its applications • Deviations from panmixia • Evolutionary forces: mutation, migration, selection and drift 									

Bachelor's degree in Life Sciences – 2nd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 4 BOP	C	Animal Biology 2	3	22		10.5 (EN)		<ul style="list-style-type: none"> - Discovery of the orders and the main families of each branch. - Basic knowledge of the European fauna. - Deepening of the animal body plans. <p><i>Practicals:</i> Dissections, structure-function relationships, understand a body plan. Mollusks, Lophophorates, Arthropods, Teleosts, Squamates, Birds, Mammals. Dissection of the dogfish, common snail, chick, crayfish.</p>
	C	Plant Biology 2	3	15	8 (EN)	14.5 (EN)		<ul style="list-style-type: none"> • Introduction to plant phylogenetic classification of plants - Evolution of the vegetative apparatus and modes of reproduction within the large groups of plants and fungi: <ul style="list-style-type: none"> - Mushrooms - Algae - Embryophytes I: bryophytes, pteridophytes - Embryophytes II: spermatophytes or seed plants, fossil and actual • - Synthesis on the diversity and evolution of reproduction modes
	C	Plant Ecophysiology	3	14	8 (EN)	4(EN)		<p><i>Lectures objectives:</i> To understand the physiological mechanisms of plant responses to environmental constraints (drought, light, flooding, soil pollution).</p> <ul style="list-style-type: none"> • Antioxidant mechanisms • Plant Hormones • Plant tropisms <p><i>Lab work:</i> Study of plant responses subjected or not to water stress .</p>
	C	Animal Ecophysiology 1: Nutrition	3	20	8	11		<p>At the end of the course, the student is able to:</p> <ul style="list-style-type: none"> - Understand the structures and mechanisms involved by animals to cope with problems posed by their habitat and how they exploit the opportunities offered by this particular environment. - Become familiar with the methodological approaches used in classic studies of animal ecophysiology. - Carry out an experiment on animal organisms and write a scientific report

Bachelor's degree in Life Sciences – 2nd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 4 BOP	C	Numeric certification (PIX)	3		10			
	C	Biostatistics		12	12 (EN)	3 (EN)		
	C	Tools	3	Tools associated with disciplinary units (lab works in plant and animal biology, in population genetics, in microbial ecology, in ecophysiology). Teaching hours are included in the previous counts.				
	C	English	3		12 or 24 (EN)			
		Communication in Life Sciences		10 (EN)				Goal 1: If necessary, revision of the essential grammar and lexicon. Goal 2: preparation for a certification (CLES, TOEIC, TOEFL). Goal 3: link between the English lessons and the labs Goal 4: Development of "know-how" and technics to understand documents
	C	Professional project	3		26			
Totals for semester 4			30 ECTS	290 hours (96 taught in English = 33%)				

(EN) : taught in English. Otherwise, in French

Bachelor's degree in Life Sciences – 3rd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 5 BOP	C	Origin and Evolution of Biodiversity	6	18	6+3 (EN)	9 (EN)		
				<i>Courses :</i> <ul style="list-style-type: none"> Species concepts and speciation Phylogeny : basics Paleobiodiversity Major transitions in evolution <i>Tutorials on all course topics, format:</i> 1hr group work, 1 hr questionnaires <i>Practicals :</i> phylogenetic reconstruction				
	C	Quantitative and Evolutionary Genetics	6	20	22 (EN)			
				<i>Courses :</i> Quantitative genetics, Population genetics, Molecular evolution At the end of the course, the student should be able to: <ul style="list-style-type: none"> apply the genetic patterns of populations to different situations panmixia (Inbred or subdivided populations) understand the influence of evolutionary forces on genetic diversity for complex traits (quantitative genetics) and nucleotide sequences (molecular evolution) analyze pedigrees and calculate the inbreeding coefficient understand and analyze the multifactorial determinism of complex characters Understand the importance of gene duplication as a driver of genome evolution 				
C	Ecotoxicology	6	20	15	4			
			<ul style="list-style-type: none"> Definitions, spatial and temporal scales of phenomena and studies, Main sources and classes of pollutants Dispersion / Pathways of pollutants in media and organisms Impact on the living: From molecular to communities Environmental monitoring 					
C	Ecophysiology		20	11	6			
			<i>Courses:</i> Relation functions. Sensing organs. Locomotion. Immunology. Intra- and interspecific relationships. <i>Directed works:</i> adaptations to extreme environments. <i>Practical works:</i> functional histology, behaviour, locomotion.					

Bachelor's degree in Life Sciences – 3rd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 5 BOP	C	Continental Fauna and Flora	6	20	4	11		
				<p><i>Courses:</i></p> <ul style="list-style-type: none"> Define the state of nature, Natural processes (dynamics of plant communities, soil and vegetation relationships) - focus on certain environments (calcareous grasslands, forests, dunes...) Study of the entomofauna (in interaction with the environment) ... <p><i>Tutorials:</i></p> <ul style="list-style-type: none"> Plant-pollinator networks The major taxonomic groups of invertebrates <p><i>Practicals:</i></p> <ul style="list-style-type: none"> Floristic and systematic of invertebrates Inventory methods. 				
	C	Marine Fauna and Flora			10	35		
				<p><i>Animal biology: benthic fauna</i></p> <ul style="list-style-type: none"> Taxonomic determination of macrofauna and meiofauna Two habitats were studied (2 field trips): rocky foreshore (Audresselles) and sandy foreshore (Wimereux). <p><i>Plant biology: macroalgae</i></p> <ul style="list-style-type: none"> Taxonomic determination Two habitats studied (2 field trips): rocky foreshore sheltered environment (Audresselles), rocky ford beaten environment (Pointe de la Crèche) 				
	C	Tools	6	Tools associated with disciplinary units (species determination; phylogenetic reconstruction; population genetics; practicals in Ecophysiology and Ecotoxicology). Teaching hours are included in the previous counts.				
C	English	3		12 or 24				
Scientific communication			<p>Goal 1: If necessary, revision of the essential grammar and lexicon. Goal 2: preparation for a certification (CLES, TOEIC, TOEFL). Goal 3: link between the English lessons and the labs Goal 4: Development of "know-how" and technics to understand documents Hours included in disciplinary units.</p>					

Bachelor's degree in Life Sciences – 3rd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/tutorials	Topics		
Semester 5 BOP	O	Student's Project 1 option out of 3: - Pedology - or Geographic Information systems - or other choice	3	12	6	6				
				Choice 1: Pedology :						
				<ul style="list-style-type: none"> • Introduction to pedology: • Definition, Formation, Evolution • Soil description (field, lab) • Organic Matter and Humification • Soils and climate change 						
					12	12				
Choice 2: Urban ecology and geographic information systems										
<ul style="list-style-type: none"> • major environmental issues in urban areas for the coming decades. • climate change mitigation in urban areas • how to make the city more welcoming for biodiversity? • take local biodiversity into account in local urban planning 										
					24					
				Choice 3: free choice						
Totals for semester 5			30 ECTS	281 hours (63 taught in English = 22%)						

(EN) : taught in English. Otherwise, in French-

Bachelor's degree in Life Sciences – 3rd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 6 BOP	C	Ecology: from concepts to data analysis	9	48	18 (EN)	21 (EN)		<p><i>Courses :</i></p> <ul style="list-style-type: none"> • Behavioural ecology • Population dynamics • Species interactions • Species diversity • Biogeography <p><i>Tutorials on all course topics:</i> habitats & resources, reproductive strategies, population growth models, population structure, maternal effects, biodiversity/ecosystem functioning relationship, conservation biology, fragmented populations, climate change effects on biodiversity</p> <p><i>Practicals :</i> introduction to R, multivariate data analysis, measuring biodiversity, modelling species geographic distributions, growth models, dynamics of exploited populations, estimating population size, dynamics of structured populations, stochastic models of population dynamics, behaviour</p>
	C	Fauna and Flora of Continental Habitats 2	9	20	10	10		<p><i>Courses:</i></p> <ul style="list-style-type: none"> • Man and nature: since the Iron age, the Anthropocene • Examples of anthropized environments • Sampling methods <p><i>Tutorials:</i></p> <ul style="list-style-type: none"> • Soil fauna and soil anthropization • Spiders • Drivers of vegetation distribution • Phytosociology and its uses in conservation biology <p><i>Practicals:</i> 1-week field work (anthropized environments: fauna and flora; sampling, focus on vegetation and arthropods)</p>
	C	Fauna and Flora of Marine Habitats 2			10	30		<ul style="list-style-type: none"> • Zooplankton: observation, determination, diversity • Ichtyofauna: observation, determination, diversity • Avifauna: observation, initiation to determination • Group project: sampling, determination, interpretation and analysis of results • Two field trips: Mareis aquarium and Canche Bay

Bachelor's degree in Life Sciences – 3rd year

Biology of Populations and Organisms

	Type (C compulsory ; O option)	Name of the unit	ECTS	H Courses	H tutorials	H practicals	H course/ tutorials	Topics
Semester 6 BOP	C	Biostatistics 3	3	10	10,5	6		
				<i>Courses:</i> <ul style="list-style-type: none"> I – Correlation & linear regression II – One-way ANOVA III – Hierarchical ANOVA, 2 way ANOVA) IV – Linear regression, tests, parametric tests <i>Tutorials and practicals</i> : exercises, work on Excel and R				
	O	Student Project 1 option out of 3 : - Initiation to programming - Organisms' defenses - Larvae and development	3			24		
				Choice 1: Initiation to programming:				
				<ul style="list-style-type: none"> Python language: basic notions Applications to bioinformatics (requests on databases, sequence analysis) 				
				18	6	8		
	Choice 2: Organisms' defenses:							
<ul style="list-style-type: none"> Plant defenses: biotic/abiotic stresses. Phytopathology. Biostimulants. Secondary compounds. Xenobiotics Eco-immunology: resources, co-infections, influence of life-history traits; trade-offs between immunity and other functions Intra and interspecific differences (practicals: frost resistance in <i>Arabidopsis</i> or in worms) 								
			20		10			
Choice 3: Larvae and Development:								
<ul style="list-style-type: none"> Characterization of larvae Determination Uses and interest Larval development in different taxonomic groups. Observations. Raising some species. 								
C	English	3		12 or 24				
	Scientific communication			Preparation for a certification (CLES, TOEIC, TOEFL); link between the English lessons and the labs; Development of "know-how" and technics to understand documents				
C	Training period	3	4 weeks, full-time. <i>Report and oral presentation.</i>					
Totals for semester 6			30 ECTS	246 hours (67 taught in English = 27%)				

(EN) : taught in English. Otherwise, in French-