

ALGERIAN PEOPLE'S DEMOCRATIC REPUBLIC
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC
RESEARCH

Common Core Pedagogical Program

1st Year Domain

Natural and Life Sciences

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I – Semester-wise Teaching Organization Sheets

« Common Core in the "Natural and Life Sciences" Domain »

Semester 1

Units of teaching	Subject		Credits	Coefficients	Weekly Teaching Hours			SHV (15 Weeks)	Other*	Evaluation Method			
	Code	Title			Course	DW	PW			CC*		Exam	
U T Fundamental Code : UTF 1.1 Credits : 18 Coefficients : 9	F 1.1.1	General and Organic Chemistry	6	3	1h30	1h30	1h30	67h30	82h30	x	40%	x	60%
	F 1.1.2	Cellular Biology	8	4	1h30	1h30	3h00	90h00	110h00	x	40%	x	60%
	F 1.1.3	Mathematica Statistics	4	2	1h30	1h30	-	45h00	55h00	x	40%	x	60%
U T Methodology Code : UTM 1.1 Credits : 9 Coefficients: 5	M 1.1.1	Géology	5	3	1h30	1h30	1h00	60h00	65h00	x	40%	x	60%
	M 1.1.2	Communication and Expression Techniques 1 (in French)	4	2	1h30	1h30	-	45h00	55h00	x	40%	x	60%
U T Discovery Code : UTD 1.1 Credits : 2 Coefficients : 2	D 1.1.1	Study Methods and Terminology 1	2	2	1h30	1h30		45h00	5h00	x	40%	x	60%
U T Transversal Code : UET 1.1 Credits : 1 Coefficients : 1	T 1.1.1	Universal History of Biological Sciences	1	1	1h30	-	-	22h30	2h30	-	-	x	100
Total Semestre 1			30	17	10h30	9h00	5h30	375h00	375h00				

Other* = Additional work during semester consultation; CC* = Continuous control.

« Common Core in the "Natural and Life Sciences" Domain »

Semester 2

Units of teaching	Subject		Credits	Coefficients	Weekly Teaching Hours			SHV (15 Weeks)	Other*	Evaluation Method			
	Code	Title			Course	DW	PW			CC		Exam	
U T Fundamental Code : UTF 2.1 Crédits : 18 Coefficients : 9	F 2.1.1	Thermodynamics and Chemistry of Solutions	6	3	1h30	1h30	1h30	67h30	82h30	x	40%	x	60%
	F 2.1.2	Plant Biology	6	3	1h30	-	3h00	67h30	82h30	x	40%	x	60%
	F 2.1.3	Animal Biology	6	3	1h30	-	3h00	67h30	82h30	x	40%	x	60%
U E Méthodology Code : UTM 2.1 Crédits : 9 Coefficients : 5	M 2.1.1	Physics	5	3	1h30	1h30	1h00	60h00	65h00	x	40%	x	60%
	M 2.1.2	Communication and Expression Techniques 2 (in English)	4	2	1h30	1h30	-	45h00	55h00	x	40%	x	60%
U E Discovery Code : UTD 2.1 Crédits : 2 Coefficients : 2	D 2.1.1	Life Sciences and Socio-economic Impacts	2	2	1h30	1h30	-	45h00	5h00	x	40%	x	60%
U E Transversale Code : UTT 2.1 Crédits : 1 Coefficients : 1	T 2.1.1	Study Methods and Terminology 2	1	1	1h30	-	-	22h30	2h30	-	-	x	100%
Total Semestre 2			30	17	10h30	6h00	8h30	375h00	375h00				

Other* = Additional work during semester consultation; CC* = Continuous control.

II - Detailed Program by Subject

Semester: 1st Semester

UE: Fundamental Teaching Unit

Subject 1: GENERAL AND ORGANIC CHEMISTRY

Teaching Objectives:

This subject aims to provide instruction on the fundamental principles of the organization and chemical structure of matter. It serves as a complement to other subjects by facilitating the understanding of biological phenomena from a chemical perspective.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

Students should have a grasp of the basic concepts of general and organic chemistry, including the structure of the atom, atomic bonding, and redox reactions.

Contenu de la matière

1.General Chemistry

1.1. Generalities

1.1.1. Atom, nucleus, isotopy,

1.1.2. Stability and cohesion of the nucleus, binding energy per nucleon,...

1.2. Radioactivity

1.2.1. Definition

1.2.2. Natural radioactivity: main types of radiation

1.2.3. Artificial radioactivity

1.2.4. Law of radioactive decay

1.2.5. Different types of nuclear reactions

1.3. Electronic configuration of atoms

1.3.1. Introduction to quantum numbers

1.3.2. Principles governing the electronic structure of an atom:

1.3.3. Energetic rule (Klechkoweski's rule)

1.3.4. Pauli's exclusion principle

1.3.5. Hund's rule

1.4. Periodic classification

1.4.1. Group (Column), Period (Row)

1.4.2. Evolution of physical properties within the periodic table: atomic radius, ionization energy, electron affinity,...

1.5. Chemical bonding

1.5.1. Introduction: strong and weak bonds

1.5.2. Representation of chemical bonding: Lewis diagram

1.5.3. Different types of strong bonds (covalent bond, ionic bond, metallic bond)

1.5.4. Ionic character of a covalent bond

1.5.5. Molecular geometry: VSEPR Theory (Gillespie's Rule)

2. Organic Chemistry

2.1. Organic Compounds, Formulas, Functions, Nomenclature

2.1.1. Formulas of organic compounds

2.1.2. Functions, functional groups

2.1.3. Nomenclature

2.1.4. Study of organic functions - Saturated hydrocarbons, alkenes, alkanes, benzene hydrocarbons - Halogen derivatives, halides - Alcohols, thiols, ethers, phenols, polyfunctional amines, aldehydes - Polyfunctional heterocyclic compounds

2.2. Reaction mechanisms in organic chemistry

2.2.1. Resonance and mesomerism

2.2.2. Conjugation

2.2.3. Stereochemistry

2.2.4. Electronic effects

2.2.5. Nucleophilic substitutions

2.2.6. Eliminations

2.2.7. Radical reactions

2.2.8. Reduction reactions

2.2.9. Oxidation reactions

Directed Work

Practical Work 1: Fundamental concepts of chemistry (atoms, molecules, gram atoms, moles, concentration calculations)

Practical Work 2: Nucleus stability and radioactivity

Practical Work 3: Electronic configuration and periodic classification of elements

Practical Work 4: Chemical bonds

Practical Work 5: Nomenclature and stereochemistry

Practical Work 6: Reaction mechanisms

Laboratory Work

Laboratory Work 1: Principles of experimental chemistry Objective: Evaluate the student's

knowledge of the equipment used in chemistry experiments and the safety rules to be followed in the laboratory.

Laboratory Work 2: Determination of the quantity of matter Objective: Determine the quantity of matter (expressed in moles) contained in a sample and prepare a sample containing a fixed quantity of matter.

Laboratory Work 3: Preparation of solutions by dissolution and dilution Objective: Prepare a sodium chloride (NaCl) solution of normality 0.1N and prepare a hydrochloric acid (HCl) solution of normality 0.1N by diluting a 1N HCl solution.

Laboratory Work 4: Measurement of the density of... Objective: Determine the density of a saturated saltwater solution and determine the density of iron.

Laboratory Work 5: Identification of functional groups Objective: Identify functional groups: Alcohols and carbonyls.

Assessment Method Continuous assessments and semester exams

References (Books and lecture notes, websites, etc.):

Jacques Maddaluno, Véronique Bellosta, Isabelle Chataigner, François Couty, et al., 2013- Organic Chemistry. Ed. Dunod, Paris, 576 p.

Jean-François Lambert, Thomas Georgelin, Maguy Jaber, 2014- Mini Manual of Inorganic Chemistry. Ed. Dunod, Paris, 272 p.

Elisabeth Bardez, 2014- Mini Manual of General Chemistry: Chemistry of Solutions. Ed. Dunod, Paris, 256 p.

Paula Yurkanis Bruice, 2012- Organic Chemistry. Ed. Pearson, 720 p.

Jean-Louis Migot, 2014- Analytical Organic Chemistry. Ed. Hermann, 180 p.

Semester: 1st Semester

UE: Fundamental Teaching Unit

Subject 2: CELLULAR BIOLOGY

Teaching Objectives: The objectives of this course are to introduce students to the living world at the cellular level, to acquire basic concepts of eukaryotic and prokaryotic cells, and to study cellular components. These objectives are reinforced through practical laboratory sessions.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

Students should have knowledge in General Biology.

Contenu de la matière

1. Généralités

- 1.1. Classification et importance relative des règnes
- 1.2. Cellule et théorie cellulaire
- 1.3. Origine et évolution
- 1.4. Types cellulaires (Procaryote, Eucaryote, Acaryote)

2. Méthodes d'étude de la cellule

- 2.1. Méthodes de microscopie optique et électronique
- 2.2. Méthodes histochimiques
- 2.3. Méthodes immunologiques
- 2.4. Méthodes enzymologiques

3. Membrane plasmique: structure et fonction

4. Cytosquelette et motilité cellulaire

5. Adhésion cellulaire et matrice extracellulaire

6. Chromatine, chromosomes et noyau cellulaire

7. Ribosome et synthèse des protéines

8. Le système réticulum endoplasmique-appareil de Golgi

9. Le noyau interphasique

10. Le système endosomal: endocytose

11. Mitochondrie

12. Chloroplastes

13. Peroxysomes

14. Matrice extracellulaire

15. Paroi végétale

Travaux dirigés / Travaux pratiques

1. Méthodes d'étude des cellules

- 1.1. Séparation des constituants cellulaires
- 1.2. Observation des constituants cellulaires
- 1.3. Identification des constituants cellulaires
- 1.4. Paroi végétale

2. Cultures cellulaires

3. Tests des fonctions physiologiques

- 3.1. Reconstitution de la fonction à partir des constituants isolés
- 3.2. Tests anatomiques: autoradiographie, marquages par fluorescence, protéines vertes fluorescentes
- 3.3. Tests Physiologiques: contrôle de l'expression d'une protéine, mutation, surexpression

Mode d'évaluation

Contrôle continu et examen semestriel

Références

1. B. Albert, A. Johnson, J. Lewis, M. Raff, K. Roberts et P. Walter, 2011- Biologie moléculaire de la cellule. Ed. Lavoisier, Paris, 1601p.
2. Abraham L. Kierszenbaum, 2006- Histologie et biologie cellulaire: Ed De Boeck, 619p.
3. Thomas Dean Pollard et William C. Earnshaw, 2004- Biologie cellulaire. Ed. Elsevier Masson, Paris, 853p.
4. Marc Maillet, 2006- Biologie cellulaire. Ed. Elsevier Masson, Paris, 618p.

Semestre : 1^{er} Semestre

UE: Unité d'Enseignement Fondamentale

Matière 3: MATHÉMATIQUES, STATISTIQUE, INFORMATIQUE

Objectifs de l'enseignement

Cette matière permet à l'étudiant d'intégrer l'outil statistique et informatique dans le domaine biologique, et d'utiliser l'analyse numérique, la probabilité et le calcul par l'outil informatique.

Connaissances préalables recommandées (*descriptif succinct des connaissances requises pour pouvoir suivre cet enseignement – Maximum 2 lignes*).

L'étudiant doit avoir une connaissance sur les fonctions, les intégrales et les variables aléatoires.

Subject Content

1. Generalities
 - 1.1. Classification and relative importance of kingdoms
 - 1.2. Cell and cell theory
 - 1.3. Origin and evolution
 - 1.4. Cell types (Prokaryote, Eukaryote, Acaryote)
2. Cell study methods
 - 2.1. Optical and electron microscopy methods
 - 2.2. Histochemical methods
 - 2.3. Immunological methods
 - 2.4. Enzymological methods
3. Plasma membrane: structure and function
4. Cytoskeleton and cell motility
5. Cell adhesion and extracellular matrix
6. Chromatin, chromosomes, and cell nucleus
7. Ribosome and protein synthesis
8. Endoplasmic reticulum-Golgi apparatus system
9. Interphase nucleus
10. Endosomal system: endocytosis
11. Mitochondria
12. Chloroplasts
13. Peroxisomes

14. Extracellular matrix

15. Plant cell wall

Directed Work / Practical Work

2. Cell study methods

1.1. Separation of cell components

1.2. Observation of cell components

1.3. Identification of cell components

1.4. Plant cell wall

3. Cell cultures

Tests of physiological functions

3.1. Reconstruction of function from isolated components

3.2. Anatomical tests: autoradiography, fluorescence labeling, green fluorescent proteins

3.3. Physiological tests: control of protein expression, mutation, overexpression

Assessment Method Continuous assessment and semester exam

References

1. B. Albert, A. Johnson, J. Lewis, M. Raff, K. Roberts, and P. Walter, 2011- Molecular Biology of the Cell. Ed. Lavoisier, Paris, 1601p.
2. Abraham L. Kierszenbaum, 2006- Histology and Cell Biology: Ed De Boeck, 619p.
3. Thomas Dean Pollard and William C. Earnshaw, 2004- Cell Biology. Ed. Elsevier Masson, Paris, 853p.
4. Marc Maillet, 2006- Cell Biology. Ed. Elsevier Masson, Paris, 618p.

Semester: 1st Semester

UE: Methodological Teaching Unit 1

Subject: GEOLOGY

Teaching Objectives: The subject enables students to understand the constituents and structure of the Earth, the interactions between these constituents, and external and internal geodynamics.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines): No prerequisites

Subject Content:

1. General Geology
 - 1.1. Introduction
 - 1.2. The Earth
 - 1.3. The Earth's crust
 - 1.4. Earth's structure
2. External Geodynamics
 - 2.1. Erosion
 - 2.1.1. Action of water
 - 2.1.2. Action of wind
 - 2.2. Deposits
 - 2.2.1. Study methods
 - 2.2.2. Sedimentary rocks
 - 2.2.3. Notion of stratigraphy
 - 2.2.4. Notion of paleontology
3. Internal Geodynamics
 - 3.1. Seismology
 - 3.1.1. Study of earthquakes
 - 3.1.2. Origin and distribution
 - 3.1.3. Flexible and brittle tectonics (folds and faults)
 - 3.2. Volcanology
 - 3.2.1. Volcanoes
 - 3.2.2. Igneous rocks
 - 3.2.3. Study of magmas
 - 3.3. Plate tectonics

Practical Work

- Laboratory Work 1: Topography
- Laboratory Work 2: Geology (Sections)
- Laboratory Work 3: Rocks and Minerals

Assessment Method: Continuous assessment and semester exam

References (Books and lecture notes, websites, etc.):

1. Jean Dercourt, 1999- Geology: courses and exercises. Ed. Dunod, Paris.
2. Denis Sorel and Pierre Vergely, 2010- Introduction to geological maps and sections. Ed. Dunod, Paris, 115p.
3. Jean Tricart, 1965- Principles and Methods of Geomorphology. Ed. Masson, Paris, 496p.

Semester: 1st Semester

UE: Methodological Teaching Unit

Subject 2: COMMUNICATION AND EXPRESSION TECHNIQUES 1 (French)

Teaching Objectives (Describe what the student is expected to have acquired as skills after successfully completing this subject – maximum 3 lines):

This subject aims to develop the understanding and writing of scientific documents in French, as well as the use and translation of scientific terms.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

No prerequisites

Subject Content:

1. Scientific Terminology
2. Study and comprehension of texts
3. Techniques of written and oral expression (report, synthesis, use of modern communication means)
4. Expression and communication in a group. Study of proposed texts (observe, analyze, summarize, written expression)

Directed Work: Proposal of exercises related to the most important language points.

Assessment Method:

Continuous assessment and semester exam

References (Books and lecture notes, websites, etc.): Scientific articles and papers

Semester: 2nd Semester

UE: Discovery Teaching Unit

Subject: Work Method and Terminology 1

Teaching Objectives:

Assist students in designing research and synthesis methods for work according to scientific rules.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course –

Maximum 2 lines):

Students are expected to have knowledge of bibliographic research.

Subject Content:

- Introduction to bibliographic research
- Writing a scientific report
- Introduction to reading and understanding a scientific article

Assessment Method:

Continuous assessment and semester exam

References (Books and lecture notes, websites, etc.):

Semester: 1st Semester

UE: Transversal Teaching Unit

Subject: UNIVERSAL HISTORY OF BIOLOGICAL SCIENCES

Teaching Objectives:

This program should emphasize the history of biology and the concept of life across eras and civilizations. It aims to highlight the role of technological progress in the evolution of biology.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

No prerequisites.

Subject Content:

1. Prehistory
2. Antiquity
3. Middle Ages 3.1. In the West 3.2. In the East (Muslim civilization)
4. Sixteenth and seventeenth centuries
5. Eighteenth century: Darwin
6. Nineteenth century: Cellular theory (microscopy), Sexuality Embryology, Molecular Biology (DNA) Genetics
7. Twentieth century: Gene therapy and cloning

Assessment Method:

Semester exam

References:

1. Denis Buican, 2008 - Darwin in the history of biological thought. Ed. Ellipses, 232p.
2. Christophe Ronsin, 2005 - History of molecular biology. Ed. De Boeck, 106p.
3. Jean Théodoridès, 2000 - History of biology. Ed. Puf, 127p.

Semester: 2nd Semester

UE: Fundamental Teaching Unit

Subject 1: THERMODYNAMICS AND CHEMISTRY OF MINERAL SOLUTIONS

Teaching Objectives:

This course aims to provide a certain understanding of the principles governing the transformations and interactions of matter, the principles of thermodynamics, energy equilibrium, and the kinetics of chemical reactions.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

Students should have knowledge of redox reactions.

Subject Content:

1. Chemical Equilibria
 - 1.1. Acid-base equilibrium
 - 1.1.1. Definition according to: Arrhenius; Bronsted; Lewis
 - 1.1.2. Equilibrium constants: water dissociation, acidity, and basicity
 - 1.2.3. pH: water, strong monoacid, strong monobase, etc.
 - 1.2. Redox equilibrium
 - 1.2.1. Redox reactions: electron transfer
 - 1.2.2. Oxidation number
 - 1.2.3. Writing redox reactions
 - 1.2.4. Electrochemical cells
 - 1.2.5. Redox potential
 - 1.3. Precipitation equilibrium: Solubility and solubility product
 - 1.3.1. Definition
 - 1.3.2. Effect of adding an ion on solubility
 - 1.3.3. pH effect

2. Chemical Kinetics

2.1. Definition

2.2. Reaction rate

2.3. Expression of the rate law and reaction order

2.4. Factors influencing the reaction rate

3. Thermodynamics

3.1. Systems and thermodynamic quantities: Functions and thermodynamic transformations

3.2. First law of thermodynamics

3.2.1. Expression of work and heat

3.2.2. Expression of internal energy and enthalpy

3.3. Second law of thermodynamics

3.3.1. Expression of entropy

3.3.2. Expression of free energy and Gibbs free energy

3.4. Thermochemistry

3.4.1. Heat of reactions

3.4.2. Enthalpy of reactions

3.4.3. Calculation of internal energy of a reaction

3.4.5. Kirchhoff's law

3.4.6. Hess's law

3.5. Prediction of reaction direction

3.5.1. Isolated systems

3.5.2. Calculation of reaction entropies

3.5.3. Reactions at constant temperature

3.5.4. Calculation of free enthalpy and free energy of a system.

4. Inorganic Chemistry

Directed Works: TD No. 1: Chemical Kinetics

TD No. 2: Acid-base equilibria and precipitation equilibria

TD No. 3: Redox equilibria

TD No. 4: Thermodynamics and thermochemistry

TD No. 5: Organic Chemistry (Reaction mechanisms)

Practical Work:

TP No. 1: Chemical Kinetics Part 1: Experimental determination of the reaction order with respect to sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) using the initial rates method. Part 2: Temperature influence on the reaction rate for the same reactant concentrations.

TP No. 2: Titration by the redox method. Manganometric titration of Fe^{2+} Determination of the normality of a given solution of KMnO_4 Determination of the Fe^{2+} concentration in a solution of FeSO_4 .

TP No. 3: Identification of ions and separation of precipitates by centrifugation Identify ions present in a solution Write chemical formulas of an ionic compound in solution Write precipitation reactions Express the relationship between equilibrium constant and solubility.

Assessment Method:

Continuous assessment and Semester exam

References:

1. John C. Kotz and Paul M. Treichel, 2006 - Chemistry of solutions. Ed. De Boeck, 376p.
2. René Gaborriaud et al., Applied thermodynamics to the chemistry of solutions. Ed. Ellipses, 335p.

Semester: 2nd Semester

UE: Fundamental Teaching Unit

Subject 2: GENERAL PLANT BIOLOGY

Teaching Objectives:

The objective of this subject is to instill in students the fundamental principles of the tissue organization of plants and their development.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

Students should have some knowledge of the different parts of a plant.

Subject Content:

1. Introduction to plant biology

Different types of tissues

2.1. Primary meristem (root and cellular)

2.1.1. Primary tissues 2.1.2. Protective tissues (epidermis)

2.1.3. Filling tissues (parenchyma)

2.1.4. Support tissues (collenchyma and sclerenchyma)

2.1.5. Conducting tissues (primary xylem, primary phloem)

2.1.6. Secretory tissues

2.2. Secondary (lateral) meristems (cambium and phellogen)

2.2.1. Secondary tissues

2.2.2. Conducting tissues (secondary xylem and secondary phloem)

2.2.3. Protective tissues (cork or bark, phelloderm)

2. Anatomy of higher plants

2.1. Study of the root

2.2. Study of the stem

2.3. Study of the leaf

2.4. Comparative anatomy between mono- and dicotyledons

3. Morphology of higher plants and adaptation

3.1. Roots

3.2. Leaves

3.3. Stems

3.4. Flowers

3.5. Seeds

3.6. Fruits

4. Gametogenesis

4.1. Pollen grain

4.2. Ovule and embryo sac

5. Fertilization

5.1. Egg and embryo

5.2. Notion of development cycle

Practical Work:

TP No. 1: Morphological study of Angiosperms (roots-stems-leaves-flowers)

TP No. 2: Morphological study of Gymnosperms (roots-stems-leaves-flowers)

TP No. 3: Primary meristems (root and shoot)

TP No. 4: Covering tissues: epidermis – piliferous layer – suberous layer - suberoid

TP No. 5: Parenchyma (chlorophyllous-reserve-aeriferous-aquiferous)

TP No. 6: Support tissues (collenchyma-sclerenchyma)

TP No. 7: Secretory tissues (hairs-glands-tannin cells-laticifers)

TP No. 8: Primary conducting tissues (phloem-xylem)

Assessment Method:

Continuous assessment and Semester exam

References:

1. Alain Raveneau et al., 2014 - Plant Biology. Ed. De Boeck, 733p.
2. Jean François Morot-Gaudry et al., 2012 - Plant Biology. Ed. Dunod, Paris, 213p.

Semester: 2nd Semester

UE: Fundamental Teaching Unit

Subject 3: ANIMAL BIOLOGY

Teaching Objectives:

This module aims to introduce students to the peculiarities of the developmental biology of certain animal species.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

No prerequisites.

Subject Content:

First Part: Embryology

1. Introduction
2. Gametogenesis
3. Fertilization
4. Segmentation
5. Gastrulation
6. Neurulation: fate of the layers
7. Delimitation: bird annexes
8. Peculiarities of human embryology (Cycle, implantation, evolution of annexes, placenta)

Second Part: Histology

1. Covering epithelia
2. Glandular epithelia
3. Connective tissues
4. Blood tissues
5. Cartilaginous tissues
6. Osseous tissues

7. Muscular tissues

8. Nervous tissues

Titles of TD-TP:

No. 1: Gametogenesis

No. 2: Fertilization, segmentation in sea urchin

No. 3: Gastrulation in amphibians and birds

No. 4: Exercises on gastrulation and neurulation

No. 5: Neurulation in bird annexes

No. 6: Human embryology

Assessment Method:

Continuous assessment and Semester exam

References: Paul Richard W. FUNCTIONAL HISTOLOGY

Semester: 2nd Semester

UE: Methodological Teaching Unit

Subject 1: PHYSICS

Teaching Objectives:

The objective of this course is to enable students to acquire knowledge related to the basic principles of physics that can be applied in the field of life and natural sciences.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

Students must have basic knowledge in mathematics and mechanics.

Subject Content:

1. Mathematical Review

1.1. Physical quantities and dimensional analysis

1.2. Error calculation (Different types of errors, uncertainty calculation, and significant figures).

2. Optics

2.1. Introduction (objective of optics)

2.2. Nature of light (electromagnetic wave spectrum, photons, waves...)

2.3. Geometric optics

2.3.1. Principles of geometric optics and light propagation.

2.3.2. Refraction (Snell's law, critical angle, and total reflection)

2.3.2.1. Plane diopters, conjugation formula, Parallel-sided plate, and Prism.

2.3.2.2. Spherical diopters (convergent, divergent), conjugation formula, and geometric construction (image construction).

2.3.2.3. Thin lenses (convergent, divergent), conjugation formula, magnification, combination of two thin lenses, and geometric construction (image construction).

2.3.3. Reflection

2.3.3.1. Plane mirror (image construction)

2.3.3.2. Spherical mirror (image construction, conjugation formula)

2.3.4. Optical instruments

2.3.4.1. The Eye

2.3.4.2. Magnifying glass and optical microscope

3. Fluid Mechanics

3.1. Definition and characteristics of a fluid.

3.2. Hydrostatics (Fundamental hydrostatic relationship, Archimedes' buoyancy, floater)

3.3. Hydrodynamics (dedite, continuity equation, Bernoulli's theorem)

4. Notion of Crystallography

5. Notions of Spectral Analysis

Directed Works:

TD No. 1. Exercises on dimensional analysis and error calculation.

TD No. 2. Exercises on light propagation, plane diopters, and prism

TD No. 3. Exercises on spherical diopters and thin lenses.

TD No. 4. Exercises on plane and spherical mirrors and the reduced eye.

TD No. 5. Exercises on Pascal's law and Archimedes' buoyancy. (Hydrostatics)

TD No. 6. Exercises on Bernoulli's law (hydrodynamics)

Assessment Method:

Continuous assessments (presentation + test) and Semester exam.

References:

1. Christophe Texier, 2015 - Quantum Mechanics. Ed. Dunod, Paris.
2. Eugene Hecht, 1998 - Physics. Ed. De Boeck, 1304p.
3. Michel Blay, 2015 - Optics. Ed. Dunod, Paris, 452p.

Semester: 2nd Semester

UE: Methodological Teaching Unit

Subject 2: COMMUNICATION AND EXPRESSION TECHNIQUES 2 (English)

Teaching Objectives:

To complement the learning of understanding and writing scientific documents in English.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

No prerequisites.

Subject Content:

1. Scientific Terminology
2. Study and understanding of texts
3. Written and oral expression techniques (report, synthesis, use of modern communication means)
4. Expression and communication in a group. Study of proposed texts (observe, analyze, take stock, written expression)

Directed Works: Proposed exercises related to the most important language points.

Assessment Method:

Continuous assessment and Semester exam

References: Scientific articles

Semester: 2nd Semester

UE: Discovery Teaching Unit

Subject: Life Sciences and Socio-Economic Impacts

Teaching Objectives:

To help students conceive jobs directly or indirectly related to different specialties in the natural and life sciences.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

No prerequisites.

Subject Content:

I. Animal and plant production (breeding, processing, production...) II. Toxicology and environmental health (effect of pollutants on plant and animal life and human health) III. Biology and health (discussing the importance of biology in the diagnosis of animal and plant diseases) IV. Biotechnology and molecules of interest (Pharmaceutical and agri-food industry) V. Biology and forensics VI. Terrestrial and marine ecosystems (park management...) VII. Technical-commercial biology (e.g., commercial representative)

Assessment Method:

Continuous assessment and Semester exam

References:

Semester: 2nd Semester

UE: Transversal Teaching Unit

Subject: Work Method and Terminology 2

Teaching Objectives:

To help students conceive research and synthesis methods for work following scientific rules.

Recommended Prior Knowledge (brief description of the required knowledge to follow this course – Maximum 2 lines):

Students are supposed to have notions in bibliographic research.

Subject Content:

- Terminology
- Writing a scientific report
- Introduction to reading and understanding a scientific article

Assessment Method:

Semester exam

References: Scientific articles

**PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER DIDACTICISM AND SCIENTIFIC
RESEARCH**

PEDAGOGICS PROGRAM

**COMMON GROUND
2ND YEAR**

**DOMAIN
NATURAL AND LIFE SCIENCES**

Biological Sciences sector

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I

I – Semester-wise Teaching Organization Sheets

**Appendix to the curriculum of the second-year Bachelor's degree in the
Field of Natural Sciences and Life Sciences, Major in "Biological Sciences."**

Semester 3

Units of teaching	Subject	Credits	Coefficients	Weekly eaching hours			SHV (15 semaines)	Other*	Evaluation Method			
	Title			Course	DW	PW			CC*		Exam	
UT Fondamental Code : UTF 2.1.1 Crédits : 6 Coefficients : 3	Zoology	6	3	3h00	-	1h30	67h30	82h30	x	40%	x	60%
UT Fondamental Code : UTF 2.1.2 Crédits : 12 Coefficients : 6	Biochemistry	6	3	3h00	1h30	-	67h30	82h30	x	40%	x	60%
	Genetics	6	3	3h00	1h30	-	67h30	82h30	x	40%	x	60%
UT Méthodology Code : UTM 2.1.1 Crédits : 4 Coefficients: 2	Communication and Expression Techniques (in English)	4	2	1h30	1h30	-	45h00	55h00	x	40%	x	60%
UT Méthodology Code : UTM 2.1.2 Crédits : 5 Coefficients: 3	Biophysics	5	3	1h30	1h30	1h00	60h00	65h00	x	40%	x	60%
U T Discovery Code : UTD 2.1.1 Crédits : 2 Coefficients : 2	Environment and Sustainable Development	2	2	1h30	1h30	-	45h00	5h00	x	40%	x	60%
U t Transversal Code : UTT 2.1.1 Crédits : 1 Coefficients : 1	Ethics and Academic Deontology	1	1	1h30	-	-	22h30	2h30	-	-	x	100%
Total Semester 3		30	17	15h00	7h30	2h30	375h00	375h00				

Other* = Additional work during semester consultation; CC* = Continuous control.

**Appendix to the curriculum of the second-year Bachelor's degree in the
Field of Natural Sciences and Life Sciences, Major in "Biological Sciences."**

Semester 4

Units of teaching	Subject	Credits	Coefficients	Weekly eaching hours			SHV (15 semaines)	Other*	Evaluation Method			
	Title			Course	DW	PW			CC*		Exam	
UT Fondamental Code : UTF 2.2.1 Crédits : 6 Coefficients : 3	Botany	6	3	3h00	-	1h30	67h30	82h30	x	40%	x	60%
UT Fondamental Code : UTF 2.2.2 Crédits : 12 Coefficients : 6	Microbiology	8	4	3h00	1h30	1h30	90h00	110h00	x	40%	x	60%
	Immunology	4	2	1h30	1h30	-	45h00	55h00	x	40%	x	60%
U T Méthodologi Code : UTM 2.2.1 Crédits : 4 Coefficients: 2		4	2	1h30	-	1h30	45h00	55h00	x	40%	x	60%
U E Méthodology Code : UEM 2.2.2 Crédits : 5 Coefficients: 3	Scientific Methodology and Techniques for Studying Living Organisms	5	3	1h30	1h30	1h00	60h00	65h00	x	40%	x	60%
U T Discovery Code : UTD 2.2.1 Crédits : 2 Coefficients : 2		2	2	1h30	1h30	-	45h00	5h00	x	40%	x	60%
UT Transversal Code : UTT 2.2.1 Crédits : 1 Coefficients : 1	Biostatistics	1	1	1h30	-	-	22h30	2h30	-	-	x	100%
Total Semester 4		30	17	13h30	6h00	5h30	375h00	375h00				

Other* = Additional work during semester consultation; CC* = Continuous control.

II - Detailed Program by Subject

Semester: 3rd

TU: Fundamental Teaching Unit 1

Subject : Zoology

Teaching objectives

Understand the main groups of living organisms in terms of: General architecture, Characteristics (Systematics, Morphology, Anatomy, Reproduction, Ecology), constraints, adaptations and evolution. Particular emphasis will be placed on updated classification and zoological groups of agricultural, medical, veterinary medical, veterinary, fisheries or environmental interest.

Recommended prerequisites (brief description of the knowledge required required to follow this course - Maximum 2 lines).

The student should have an idea of the different classes of the animal kingdom

Contents

1. Introduction to the animal kingdom

1.1. Basics of classification

1.2. Zoological nomenclature

1.3. Evolution and phylogeny

1.4. Numerical importance of the animal kingdom

2. Sub-kingdom of protozoa

2.1. General information on protozoa.

2.2. Classification

2.2.1. Phylum Sarcomastigophora

2.2.2. Phylum Ciliophora

2.2.3. Phylum Apicomplexa

2.2.4. Phylum Cnidosporidia

3. Sub-kingdom Metazoa

3.1 Embranchment Sponges

3.2. phylum Cnidaria

3.3 Phylum Ctenaria

3.4. Phylum Plathelminthes :

3.5. Phylum Nemathelminthes.

3.6. Phylum Annelidae

3.7. Phylum Mollusca

3.8. Phylum Arthropoda

3.9. Phylum Echinoderms

3.10. Phylum Chordates

Practical work

TP N°1: Study of some typical Protozoan species: *Trypanosomarahodesiense*, *Leishmania major*, *Leishmaniainfantum*, *Trypanosomagambiense*, *Entamoebahistolytica*, *Paramecium* sp.

TP N°2: Study of some typical Plathelminthes species: *Monieziaexpansa*, *Taeniahydatigena*, *Taeniapisiformis*, *Fasciola hepatica*.

TP N° 3: Study of some Annelid species: *Lumbricusterrestris*, *Hirudoofficinalis*.

TP N° 4: Study of some typical Arthropod species: Crustaceans (king shrimp, Squilla, morphology and biramed appendages), Chelicerae (Scorpion), Insects (Cricket, Bee).

TP N° 5: Study of insect mouthparts: The different mouthparts and adaptation to diets, crusher-type mouthparts (Orthoptera, Cricket).

TP N° 6: Study of some typical Echinoderm species: Echinids (sea urchin), Asteroids (Starfish).

TP N° 7: Study of some typical vertebrate species: Fish (Carp), Birds (Pigeon), Mammals. (Pigeon), Mammals (Rat, Mouse)

Film screenings

-Turtles.

-Birds

-Amphibians.

Evaluation

Continuous assessment and semester exam

References

1. ARAB A., CHERBI M., KHERBOUCHE-ABROUS O., Amine F., BIDI AKLI S., HADDOU SANOUN G., 2013: Zoologie Tome 1. Polycopié, Œuvres et Publications Universitaires. Algérie. 152 p.

2. ARAB A., CHERBI M., KHERBOUCHE-ABROUS O., Amine F., BIDI AKLI S., HADDOU SANOUN G., 2013 : Zoologie Tome 2 : Travaux Pratiques .Polycopié, Œuvres et Publications Universitaires. Algérie.224 p.

Semester: 3rd

TU: Fundamental Teaching Unit 1

Subject : Biochemistry

Teaching objectives

This subject aims to provide instruction on the fundamental basics of biochemistry, including concepts of enzymology, and to familiarize students with biochemical techniques.

Recommended Prerequisites (brief description of the required knowledge to undertake this course – Maximum 2 lines).

Students should have a basic understanding of chemical bonds (weak and strong) and the physicochemical properties of organic molecules.

module Content

1. Chemical Bonds

1.1. Strong Bonds

1.2. Weak Bonds

2. Structure and Physicochemical Properties of Carbohydrates

2.1. Simple Sugars

2.2. Oligosaccharides

2.3. Polyholosides, Heterosides

3. Structure and Physicochemical Properties of Lipids

3.1. Simple Lipids

3.2. Complex Lipids

4. Structure and Physicochemical Properties of Amino Acids, Peptides, and Proteins

4.1. Amino Acids, Peptides, Proteins

4.2. Structure (Primary and Secondary, Tertiary and Quaternary)

4.3. Properties and Effects of Treatments (solubility, electrophoretic behavior, denaturation)

4.4. Protein Separation

5. Basics of Enzymology

5.1. Definition, Classification

5.2. Mechanisms of Action

5.3. Active Site

5.4. Enzymatic Kinetics and Types of Representation

5.5. Enzymatic Inhibition

5.6. Allosteric Phenomenon

6. Basics of Bioenergetics

6.1. Types of Chemical Reactions

6.2. The Respiratory Chain and Energy Production

6.3. Phosphorylation and Redox Reactions

7. Carbohydrate Metabolism

7.1. Catabolism (Glycolysis, Glycogenolysis, Pentose Phosphate Pathway, Krebs Cycle, Energetic Balance)

7.2. Anabolism (Gluconeogenesis and Glycogenesis)

7.3. Regulation

8. Lipid Metabolism

8.1. Fatty Acid Catabolism (Beta-Oxidation)

8.2. Sterol Catabolism

8.3. Synthesis of Fatty Acids and Triglycerides

8.4. Sterol Biosynthesis

8.5. Regulation

9. Peptide and Protein Metabolism

9.1. Catabolism of Amino Groups

9.2. Catabolism of Carboxylic Groups

9.3. Catabolism of Side Chains

9.4. Glucoformative and Ketogenic Amino Acids

9.5. Biosynthesis of Essential Amino Acids

9.6. Nitrogen Elimination, Urea Cycle

9.7. Example of Peptide Biosynthesis (case of biologically active peptides)

9.8. Example of Protein Biosynthesis

9.9. Regulation

10. Structure and metabolism of other compounds of biological interest

10.1. Vitamins

10.2. Hormones

Mode of Evaluation

Continuous assessment and semester examination

References (Books and course notes, websites, etc.):

1. Cathérine Baratti-Elbaz et Pierre Le Maréchal, 2015- Biochimie. Ed. Dunod, Paris, 160p.
2. Norbert Latruffe, Françoise Bleicher-Bardelett, Bertrand DucloS et Joseph Vamecq, 2014- Biochimie. Ed. Dunod, Paris.
3. Serge Weinman et Pierre Méhul, Toute la biochimie. Ed. Dunod, Paris, 464p.
4. Françoise Lafont et Christian Plas, 2013- Exercices de biochimie. Ed. Doin, Paris, 410p.

Semester: 3rd

TU : Fundamental Teaching Unit 2

Subject : Genetic

Teaching objectives

This subject allows the student to acquire the notions and terminology of genetics, the transmission of characters, the structure of DNA, replication, transcription, alterations and mechanisms of regulation of gene expression.

Prerequisite knowledge recommended

(brief description of the knowledge required to be able to follow this course – Maximum 2 lines).
The student must have knowledge of nucleic acids and genetics Mendelian.

Content of the module

1. Genetic material
 - 1.1. Chemical nature of genetic material
 - 1.2. Structure of nucleic acids (DNA-RNA)
 - 1.3. DNA replication: in prokaryotes and eukaryotes
 - 1.4. Chromosome organization
2. Transmission of genetic characters in eukaryotes
3. Haploid genetics
 - 3.1. Independent genes
 - 3.2. Related genes
 - 3.3. Establishment of genetic maps
4. Genetics of diploids
 - 4.1. Independent genes
 - 4.2. Related genes
 - 4.3. Establishment of genetic maps
5. Bacterial and viral genetics
 - 5.1. Conjugation
 - 5.2. Transformation
 - 5.3. Transduction

Mode of Evaluation

Continuous assessment and semester examination

References (Books and course notes, websites, etc.)

Semester: 3rd

TU: methodological Teaching Unit

Subject: Techniques of communication

Teaching objectives (Describe what the student is supposed to have acquired asskills after passing this subject – maximum 3 lines).Learn and apply research methods and the collection of useful and essential information for the synthesis and written format (report, oral, defense). Application of English grammar in a scientific context.

Prerequisite knowledge recommended

(brief description of the knowledge required to be able to follow this course – Maximum 2 lines).

Some notions of terminology and research methodology acquired in L1.

Course content :

Chapter 1

Study of proposed texts (observing, analyzing, etc..)

Chapter 2

Terminology

Chapter 3

Bibliographical research methodology

Chapter 4

Methods of scientific reports writing

Evaluation mode

Continuous monitoring and final exam

References (Books and handouts, websites, etc.): Research article.

Semester: 3rd

TU : methodological Teaching Unit

Subject: biophysics

Teaching objectives:

The general objective of teaching the biophysics course is to enable SNV students to acquire the basics of physics.

Prerequisite knowledge recommended:

(a brief description of knowledge required to take this course – 2 lines maximum).

Content of the module

I. States of the matter

I.1. Gases: elements of kinetic theory, equation of state of ideal or real gases, state changes

I.2. Liquids: water structure, dissolution

I.3. Solids: different structures

I.4. Intermediate states: glasses, liquid crystals, granular states, polymers deformable

II. General information on aqueous solutions

II.1. Study of solutions: classification of solutions

II.2. Concentrations: mole fraction, molarity, molality, weight concentration, osmolarity, equivalent concentration.

II.3. Solubility

II.4. Electrolyte solutions: electrical conductivity, physical and chemical properties of electrolytes

III. Surface phenomenon

III.1. Surface tension: definition, measurements, and biological applications

III.2. Capillary action: definition, measurements, and biological applications

III.3. Adsorption

IV. Diffusion phenomenon

IV.1. Diffusion

IV.2. Osmosis phenomenon and osmotic pressure: definition, measurements, and biological applications

IV.3. Permeability: definition, measurements, and biological applications

V. Study of viscosity

V.1 Laminar and turbulent flow

V.2. Viscous resistance and viscosity measurements

V.3 Sedimentation

VI. Sound and ultrasonic waves

VI.1. The sound wave and its properties: production, nature, and classification of sound waves

VI.2. The Doppler effect: definition, measurements, and biological applications.

VI.3. Ultrasound: definition, measurements, and biological applications.

Practical work: (do 3 practical work at least)

TP No. 1: Surface tension

TP No. 2: Conductometric titration

TP No. 3: Titration by PH meter

TP No. 4: Viscosity measurement

TP No. 5: Spectrophotometer

TP No. 6: Refractometer

Evaluation method

Continuous assessments (presentation + test) and half-yearly examination.

References (Books and handouts, websites, etc.)

- F.GrémyetJ.Perin.ElémentsdeBiophysique.Tome1et2.Flammarion. Paris.
- C.BénézechetJ.Llory.PhysiqueetBiophysique. MassonetCie.Paris,1973.
- Y.THOMAS,2000,Biophysiqueàl'usagedesétudiantsensciencesbiologique,Bréal,

Paris.

- A.Bertrand, D.Ducassou et JC. Healy. Biophysique. Utilisation médicale des rayonnements

–Vision – Audition

Semester: 3rd

TU: Discovery Teaching Unit

Subject: Environment and sustainable development

Teaching objectives:

This teaching aims to raise students' awareness of the issues, content and actions of sustainable development. It is about making them aware that it is possible to act to preserve the environment, through their training, as well as on their scale, on their consumption, their daily activities and their society. During their university education, whatever their specialty and their ambition for their future professional orientations, the student will have the opportunity to learn and experiment with their knowledge of sustainable development.

Sustainable Development is currently one of the responses emerging throughout the world to address the current conjunction of the world's major ecological, economic and societal challenges.

Recommended prior knowledge (brief description of the knowledge required to be able to follow this course – Maximum 2 lines). Without prerequisites

Content of the subject

1. Definitions: Environment, components of an environment, Sustainable development.
2. Meaning of development?

2.1. The main dimensions of the environmental crisis: human demography, global warming, fossil fuels (non-renewable), depletion of natural resources, drinking water, biodiversity and agriculture

2.2. Sustainable development, why?

2.3. The Concept of Sustainable Development

2.4. Areas of sustainable development

2.5. The principles of SD and their origins: precaution, prevention, responsibility, solidarity, equity, pollute countries

2.6. Some indicators of sustainable development: ecological footprint and biocapacity, impact on the environment, environmental performance index, human development index, GDP: gross lower product (economic) and boys/girls schooling rate (societal), accessibility to care (societal).

2.7. Environmental education, nature awareness and animation, environmental communication.

Program for personal work

1- Identify examples in the press (international and national) illustrating the principles of sustainable development (precaution, responsibility for example). Presentation and debate.

2- Test ecological reflexes

3- Comparison of the life cycle of a biodegradable product and a non-biodegradable product
biodegradable

4- Illustrate the polluter pays principle by taking an example of a polluting company
in Algeria taking into account national legislation.

5- Give examples of implementing preservation, conservation or restoration of environments

Evaluation method

Continuous monitoring and half-yearly review

References (**Books and handouts, websites, etc.**).

Semester : 3rd

U.T: Transversal Teaching Unit

Subject: Ethics and Academic Deontology

Teaching objectives

The general objective of this teaching is to enable SNV students to acquire the resources of deontology and professional ethics.

Recommended Prerequisites

(brief description of the knowledge required to be able to follow this course – Maximum 2 lines).

Module Content

1. Introduction: Contexts of the Algerian university

2. CONCEPTS

2.1 Morale

2.2 Ethics

2.3 Deontology

2.4 Law

2.5 Professional values

2.6 Learning and teaching

2.7 Didactics and pedagogy

3. The charter of deontology and university ethics

3.1 Fundamentals

3.2 Rights

3.3 Obligations and duties

4. APPS

4.1 Teaching: courses, assessment of knowledge and behavior.....

4.2 Scientific research: research methodology, plagiarism, copyright, scientific writing.....

Evaluation mode: 100% exam

Reference

- Bergadaà, M., Dell'Ambrogio, P., Falquet, G., Mc Adam, D., Peraya, D., & Scariati, R. (2008). La relation éthique-plagiat dans la réalisation des travaux personnels par les étudiants.
- Chartedel'éthique etdeladéontologieuniversitaires,Alger,mai2010www.mesrs.dz
- GilbertTsafak,Ethiqueetdéontologiedel'éducation*CollectionSciencesdel'éducation*

Pressesuniversitairesd'Afrique,1998

- Gohier,C.,&Jeffrey,D.(2005).*Enseignereformeràl'éthique*.PressesUniversitéLaval.
- Jaunait,A.(2010).Éthique,moraleetdéontologie. *Poche-Espaceéthique*, 107-120.

Semester: 4th

TU: Fundamental teaching unit1

Subject: Botanic

Educational objectives of the course

This subject aims to provide an introduction to the classification and anatomical characterization of the major groups of the plant kingdom. The teaching provided also attempts to provide students with the methods of reproduction.

Prerequisite knowledge recommended

The student must have knowledge of plant biology (morphology, anatomy, physiology).

Content of the module

Introduction to botany

- Definitions, notions and classification criteria. Systematics of the major groups of the “plant” kingdom

PART ONE: Algae and Fungi

1. Algae

1.1. Prokaryotic Algae (Cyanophytes / Cyanobacteria)

1.2. Eukaryotic algae

1.2.1. Morphology

1.2.2. Cytology

1.2.3. Reproduction (concept of range, development cycle)

1.3. Systematics and particularities of the main groups

1.3.1. Glaucophyta

1.3.2. Rhodophyta

1.3.3. Chlorophyta and Streptophyta

1.3.4. Haptophyta, Ochrophyta, Dinophyta, Euglenozoa, Cryptophyta, Cercozoa

2. Mushrooms and lichens

2.1. Problems in classifying fungi

2.2. Structure of thalli (mycelia, stroma, sclerotium)

2.3. Reproduction

2.4. Systematics and particularities of the main groups of mushrooms

2.4.1. Myxomycota

2.4.2. The Oomycota

2.4.3. Eumycota (Chytridiomycota, Zygomycota, Glomeromycota, Ascomycota, Basidiomycota)

2.5. A particular algae-fungus association: lichens

2.5.1. Morphology

2.5.2. Anatomy

2.5.3. Reproduction

PART TWO: Embryophytes

1. Bryophytes: Morphology and reproduction of the different branches

1.1. Marchantiophytes

1.2. Anthocerotophytes

1.3. Bryophytes s. str.

2. Pteridophytes: Morphology and reproduction of the different phyla

- 2.1. Lycophytes
- 2.2. Sphenophytes (= Equisetines)
- 2.3. Filicophytes
- 3. Gymnosperms sensu lato
 - 3.1. Cycadophytes: concept of ovule
 - 3.2. Ginkgophytes
 - 3.3. Coniferophytes: concept of flower, inflorescence and seed
 - 3.4. Gnetophytes: pivotal group
- 4. Angiosperms
 - 4.1. Vegetative system and concept of morphogenesis: growth of stems, leaves and roots
 - 4.2. Floral morphology (organization of the flower, inflorescences)
 - 4.3. Floral biology: microsporogenesis and macrosporogenesis
 - 4.4. Seeds and fruits
 - 4.5. Concept of modern systematics, cladogenesis and main taxa. Presentation of classifications (Engler 1924, APG II)

Practical work (3 weeks):

TP No. 1. Algae (Phycophytes)

Morphology and reproduction of some species such as *Ulvalactuca* and *Cystoseiramediterranea*.

TP No. 2. Mushrooms (Fungi)

Morphology and reproduction of *Rhizopusnigricans* (Zygomycetes), **Agaricuscampestris** (Basidiomycetes)

TP No. 3. Lichens

Morphology of different types of lichens and study of *Xanthoriaparietina*

TP No. 4. Bryophytes

Morphology and reproduction of *Bryum* sp.

TP No. 5. Pteridophytes

Morphology and reproduction of *Polypodiumvulgare* and *Selaginelladenticulata*

TP No. 6. Cycadophytes

Morphology and reproduction of *Cycasrevoluta*

TP No. 7. Coniferophytes (Gymnospermessensu stricto)

Morphology and reproduction of *Pinushalepensis* and *Cupressussempervirens*

TP N°8 and 9: Monocotyledonous and Eudicotyledonal Angiosperms.

Illustration of the concept of trimery and pentamery, of the concept of actinomorphy and zygomorphy; dialypetaly, gamopetaly, hypogynous flower, epigynous flower... .

TP No. 8. Floral morphology of Monocot Angiosperms on examples such as *Asphodelus* (or *Allium*)

TP No. 9. Floral morphology of Angiosperms Eudicotyledons on examples such as *Lathyrus* or *Vicia*

TP No. 10. Sexual reproduction in angiosperms

Pollen grain, pollination and fertilization in angiosperms Fruit types and seed types.

Evaluation mode

Continuous monitoring and final exam

References

1. APGII.2003.AnupdateoftheAngiospermPhylogenyGroupclassificationforthe orders and families of flowering plants: APG II. *Bot.J.LinneanSociety* 141:399–436.
2. APGIII.2009.AnupdateoftheAngiospermPhylogenyGroupclassificationforthe orders and families of flowering plants: APG II. *Bot.J.LinneanSociety* 161:105–121.

3. Lecointre G. et Le Guyader H. 2001. Classification phylogénétique du vivant. Ed. Belin.
4. Reviere de B. 2002. Biologie et Phylogénie des algues. Tome 1 et 2. Ed. Belin.
5. Meyer S., Reeb C. et Bosdeveix R. 2004. Botanique: Biologie et Physiologie végétales. Ed. Maloine.
6. Dupont F., Guignard J.L. 2012. Botanique Les familles de plantes. Ed. Elsevier-Masson

Semester: 4th

TU: Fundamental teaching unit 1

Subject: General microbiology

Teaching objective

The student must acquire notions of the microbial world, the techniques used to observe microorganisms, bacterial growth and classification.

The student must have a general understanding of pathogens.

Content of the material

Chapter 01 :The Microbial World

- 1.1. History
- 1.2. Place of microorganisms in the living world
- 1.3. General characteristics of the prokaryotic cell

Chapter 02 : The bacterial cell

- 2.1. Bacterial cell observation techniques
- 2.2. Cellular morphology
- 2.3. The wall
 - 2.3.1. Chemical composition
 - 2.3.2. Molecular structure
 - 2.3.3. Functions
 - 2.3.4. Gram stain
- 2.4. The plasma membrane
 - 2.4.1. Chemical composition
 - 2.4.2. Structure
 - 2.4.3. Functions
- 2.5. The cytoplasm
 - 2.5.1. Ribosomes
 - 2.5.2. Reserve substances
- 2.6. Chromosome
 - 2.6.1. Morphology
 - 2.6.2. Composition
 - 2.6.3. Chemical replication

2.6.4. Structure

2.7. Plasmids

2.7.1. Structure

2.7.2. Replication

2.7.3. Properties

2.8. Pilli

2.8.1. Structure

2.8.2. Function

2.9. The capsule

2.9.1. Morphology

2.9.2. Chemical composition

2.9.3. Functions

2.10. Cilia and flagella

2.10.1. Highlighting

2.10.2. Structure

2.10.3. Functions

2.11. The spore

2.11.1. Morphology

2.11.2. Structure

2.11.3. Sporulation phenomena

2.11.4. Properties

2.11.5. Germination

Chapter 03 : Bacterial classification

3.1. Phenetic classification

3.2. Phylogenetic classification

3.3. Bergey classification

Chapter 04 : Bacterial nutrition

4.1. Basic needs

4.2. Growth factors

4.3. Trophic types

4.4. Physico-chemical parameters (temperature, pH, O₂ and a_W)

Chapter 05 : Bacterial growth

5.1. Measuring growth

5.2. Growth parameters

5.3. Growth curve (batch culture)

5.4. Bacterial culture

5.5. Antimicrobial agents.

Chapter 06 : Concepts of mycology and virology

6.1. Mycology (yeast and mold)

6.1.1. Taxonomy

6.1.2. Morphology

6.1.3. Reproduction

6.2. Virology

6.2.1. Morphology (capsid and envelope)

6.2.2. Different types of viruses

Practical work

TP No. 1: Introduction to the microbiology laboratory

TP No. 2: Method of studying microorganisms and the different sterilization processes

TP No. 3: Seeding methods;

TP N°4: Microscopic study of bacteria, simple staining

TP N°5: Morphological study of the different bacterial colonies on culture medium

TP N°6: Gram staining

TP N°7: Culture media

TP N°8: Study bacterial growth

TP N°9: Criteria for biochemical identification of bacteria

TP N°10: Yeasts and cyanobacteria

TP N°11: Growth inhibitors, antibiogram

TP N°12: Isolation of total and specific flora of certain products (water, milk, etc.).

Evaluation method : Continuous assessment and half-yearly examination.

References

1. Henri Leclerc, Jean-Louis Gaillardet et Michel Simonet, 1999- Microbiologie générale. Ed. Doin, Paris, 535p.
2. Jerome Perry, James Staley et Stephen Lory, 2004- Microbiologie- Cours et questions de révision. Ed. Dunod, Paris, 889p.
3. Jean-Pierre Dedet, 2007- La microbiologie, de ses origines aux maladies émergentes. Ed. Dunod, Paris, 262p.

Semester: 4th

U.T: Fundamental Teaching Unit 2

Subject: Immunology

Teaching Objectives

The objective of this teaching is to introduce students to the role of immunity, immune defense systems, types of immune response and dysfunctions of the immune system.

Prerequisite knowledge recommended

(brief description of the knowledge required to be able to follow this course – Maximum 2 lines).

The student must have basic knowledge of the immune system.

Content of module

1. Introduction to immunology.
 - 1.1. Role of immunity
 - 1.2. Relationship with everyday life and great discovery
2. Ontogenesis of the immune system
 - 2.1. B cells and lymphoid organs
 - 2.2. T cells
 - 2.3. Education of B cells inside the marrow
 - 2.4. Education of T cells inside the thymus
 - 2.5. Other cells (Myeloid cells)
3. CMH
4. The non-specific immune response
 - Intervening cells and complement
5. The specific immune response
 - 5.1. Cellular
 - 5.2. Humorous
6. Cellular and humoral cooperation
 - 6.1. Cooperation between different cells
 - 6.2. Cytokines
7. Immune system dysfunction
8. The main immunology tests
 - 8.1. Agglutination

 - 8.2. Immunoprecipitation
 - 8.3. Immunoelectrophoresis
 - 8.4. Immunofluorescence
 - 8.5. Elisa Techniques

Directed work

TD N°1: Ag-Ac reaction (precipitation: immunodiffusion, ELISA, RIA, etc.) TD N°2: Preparation of monocyte lymphocytes from whole blood TD N°3: Separation of T and B lymphocytes
TD No. 4: Lymphomicrocytotoxicity test

Evaluation mode

Continuous monitoring and final exam

References

1. Marie-Christine Bené, Yvon Lebranchu, François Lemoine et Estelle Seillès, 2013- Immunologie fondamentale et immunopathologie. Ed. Elsevier Masson, Paris, 260p.
2. Judy Owen, Jenni Punt et Sharon Stranford, 2014- Immunologie. Ed. Sciences de la vie, 832p.
3. Abul-K Abbas et Andrew-H Lichtman, 2013- Les bases de l'immunologie fondamentale et clinique. Ed. Elsevier Masson, Paris, 284p.

Semester: 4th

U.T: Methodological teaching Unit 1

Subject: Scientific methodology and techniques for studying life

Teaching objectives

Different scientific practices on observation (descriptive methods), manipulation (analytical methods) and exploration (synthetic methods) of animal and plant life. This module allows students to have notions of the methods applied to the study of living things: Cytological methods, methods of studying the biochemical composition of cells and techniques for approaching living things.

Prerequisite knowledge recommended

(brief description of the knowledge required to be able to follow this course – Maximum 2 lines).

Content of the module

General Introduction.

PART ONE: METHODS FOR STUDYING CELL MORPHOLOGY

I. Cytological Methods

1. Microscopy

1.1. Light microscopes or photonic microscopes

1.1.1. Transmission microscopes

1.1.2. Other light microscopes

* The phase contrast microscope

* The dark field microscope

* The polarized light microscope

* The UV ray microscope (= fluorescence microscope)

* The scanning microscope

1.2. Electron microscopes

1.2.2. The transmission electron microscope

1.2.3. The scanning electron microscope

II. Methods for studying the biochemical composition of cells

1. Cellular materials

1.1. Whole cells or sections of cells

1.2. Cellular homogenates = cellular homogenates (Different techniques can be used)

1.3. Cell fractions

* Principle of separation of cellular organelles

* Differential ultracentrifugation

* Ultracentrifugation on density gradient

2. methods

2.1. electrophoresis

2.2. biochemical analysis and dosage methods

- 2.2. cytochemical methods.
- 2.3. immune cytology / immunology technique.
- iii. genetic engineering techniques (dna sequencing)

PART TWO: Methods and techniques for approaching life.

- i. the herbar: collection of dry plants, an essential basis for research.
- ii. techniques for approaching living things.
 - 1. breeding.
 - 2. crops.
 - 3. collections.
 - 4. dissections.

III. Access to demographic parameters of animal and plant populations.

Evaluation method

Continuous monitoring and final exam

References (Books and handouts, websites, etc.)

Semester: 4th

U.T: Methodological teaching Unit 2

Subject: Biostatistics

Teaching objective

The objective of this teaching is to provide certain methodological tools classically used to describe and test biological phenomena.

Prerequisite knowledge recommended

(brief description of the knowledge required to be able to follow this course – Maximum 2 lines).

The student must have knowledge of probability and numerical analysis already seen in first year.

Content of the module

1. Reminders

1.1. Reminders on descriptive statistics

1.1.1. Position parameters

1.1.2. Dispersion parameters

1.1.3. Shape settings

2. Reminders on the main distribution laws: normal and log normal, Student, Pearson, Fischer-Snedecor...

3. Statistical inference: Hypothesis testing

3.1. Compliance testing

3.2. Comparison test

3.3. Independence test

4. Correlation study and Regression

4.1. Correlation coefficient

4.2. Testing significance of correlation

4.3. Simple linear regression

4.3.1. Regression line (least squares method)

4.3.2. Confidence interval of regression estimate

4.3.3. Significance Test of Regression Coefficients

5. One-way and two-way analysis of variance

The use of software such as Statistica or SAS as practical work for each chapter which will be covered in detail in the third year.

Directedwork :

Series of exercises on each chapter of the course

Evaluation mode

Continuous monitoring and final exam

References

1. BENZEON J.P., 1984- L'analyse des données. Ed. Bordas, Tomes I et II.

2. HUET S., JOLIVET E. et MESSEON A., 1992- La régression non linéaire : méthodes et applications en biologie. Ed. INRA.

3. TROUDEC.,LENOURR.etPASSOUANTM.,1993-MéthodesstatistiquessousLisa
-statistiquesmultivariées.CIRAD-SAR,Paris,PP:69-160.

Semester: 4th

T.U: Discoveryteaching Unit 1

Subject: General ecology

Objective of teaching

The objective of the subject is to help students understand the notion of ecosystem, the abiotic and biotic factors and the interactions between these factors, the components of the ecosystem and its functioning.

Recommended prior knowledge (brief description of knowledge required to be able to follow this course – Maximum 2 lines).

No prerequisites

Content of module

Chapter I

1.1. Definition of the ecosystem and its constituents (Notions of biocenosis and factor ecological.)

1.2. Areas of intervention

Chapter II: Environmental factors

2.1. Abiotic factors

2.1.1. Climate

2.1.2. Edaphic

2.1.3. Water

2.2. Biotic factors

2.2.1. Competitions

2.2.2. Pests and predators

2.2.3. Interaction of cooperation and symbiosis

2.2.4. Parasite

2.3. Interaction of environments and living beings

2.3.1. Role of ecological factors in population regulation

2.3.2. Concept of ecological optimum

2.3.3. Ecological Valencia

2.3.4. Ecological niche.

Chapter III: Structure of ecosystems

3.1. Structure of food chains; relationships between producers (autotrophs) and their dependence on nutrients and light or chemical energy.

3.2. Consumers (Heterotrophs) who are linked to producers and finally the decomposers which ensure the recycling and mineralization of matter organic.

Chapter IV: Functioning of ecosystems

4.1. Energy flow in the biosphere:

4.2. Concepts of ecological pyramids, production, productivity and yield bioenergetics

4.3. Circulation of matter in ecosystems and main biological cycles geochemical

4.4. Influence of human activities on biological balances and particularly on the disruption of bio-geochemical cycles (consequences of pollution of aquatic environments and atmospheric pollution (eutrophication, greenhouse effect, ozone, acid rain.)

Chapter V: Summary description of the main ecosystems

5.1. Forest, meadow, surface water, ocean

5.2. Evolution of ecosystems and notion of climax

Directed work :

The supervised work concerns the methods applied to study the environment.

Evaluation method

Continuous monitoring and half-yearly review

References (Books and handouts, websites, etc.):

1. DAJET P. et GORDAN M., 1982- Analyse fréquentielle de l'écologie de l'espèce dans les communautés. Ed. Masson.
2. RAMADE F., 1984- Eléments d'écologie : Ecologie fondamentale. Ed. McGraw-Hill.

Semester: 4th

Teaching unit Transversal unit

Subject: Informatics tools

Teaching Objectives

Getting started with basic resource operating system definitions computers. At the end of this teaching, the student will be able to design documents and tables in Word and Excel.

Prerequisite knowledge recommended:

(brief description of knowledge required to be able to follow this course – Maximum 2 lines). .

content of module:

Discovery of the operating system

- Definition of an OS
- Different existing OS: Windows, Linux and Mac OS.

II. Discovery of the office suite

- Design documents on WORD.
 - Design tables with EXCEL.
 - Designing a presentation with Power point.
 - Introduction to Latex.
- III. Software and algorithms
- Definition of software.
 - Definition of algorithmics.
 - Use of algorithms in biology.

Evaluation method:

100% exam

References (Books and handouts, websites, etc.)

PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC
RESEARCH

Compliance framework

TRAINING OFFER **L.M.D.**

ACADEMIC LICENSE **2014 - 2015**

Establishment	Faculty	Department
Mohamed Khider University, Biskra	Faculty of Exact Sciences and Natural Sciences and Life	Natural Sciences and Life

Domain	Sector	Speciality
Natural Sciences and Life	Biological Sciences	ANIMAL BIOLOGY AND PHYSIOLOGY

Order N° : 327 du 08-09-2010

وزارة التعليم العالي و البحث العلمي

نموذج مطابقة

عرض تكوين

ل. م. د

ليسانس أكاديمية

2015-2014

القسم	الكلية/ المعهد	المؤسسة
قسم علوم الطبيعة والحياة	كلية العلوم الدقيقة و علوم الطبيعة والحياة	جامعة محمد خيضر بسكرة

التخصص	الفرع	الميدان
بيولوجيا وفيزيولوجيا الحيوان	علوم بيولوجية	علوم الطبيعة و الحياة

قرار رقم 327 مؤرخ في 08-09-2010

SUMMARY

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2 - External partners -----	
3 - Context and objectives of the training -----	
A - General organization of training: project position -----	
B - Training objectives -----	
C - Targeted profiles and skills -----	
D - Regional and national employability potential -----	
E - Gateways to other specialties -----	
F - Performance indicators expected from the training -----	
4 - Human resources available-----	
A - Supervisory capacity -----	
B - Internal teaching team mobilized for the specialty -----	
C - External teaching team mobilized for the specialty -----	
D - Overall summary of human resources mobilized for the specialty -----	
5 - Material resources specific to the specialty -----	
A - Educational Laboratories and Equipment -----	
B - Internship sites and company training -----	
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D - Personal work and ICT spaces available on the level of the department, the institute and the faculty	
II - Semester organization sheets for specialty teaching (S5 and S6)	
- Semester 5-----	
- Semester 6-----	
- Overall summary of the training -----	
III - Detailed program by subject for semesters S5 and S6 -----	
IV - Opinions and Visas from administrative and consultative bodies -----	
V - Opinion and Visa of the Regional Conference -----	
VI - Opinion and Visa of the National Pedagogical Committee of the Domain (CPND)-----	

I – License identity sheet

1 - Training location:

Faculty (or Institute): Faculty of exact sciences and natural and life sciences.

Department: Natural and life sciences.

References to the license authorization order (attach copy of the order)

Order No.: 327 of 08-09-2010

2- External partners

- Other partner establishments:

Belezma National Park, CRSTRA, ITDAS, INRAA Biskra, ITAF, ITAS, INRAA Touggourt, INPV, conservation of Biskra forests, DSA

- Businesses and other socio-economic partners:

GMS mill, date packaging units, medical analysis laboratories, public health establishments, Algerian waters, mineral water production units, milk and dairy product production units, public and private milk drums, veterinary medicine offices , Breeders.

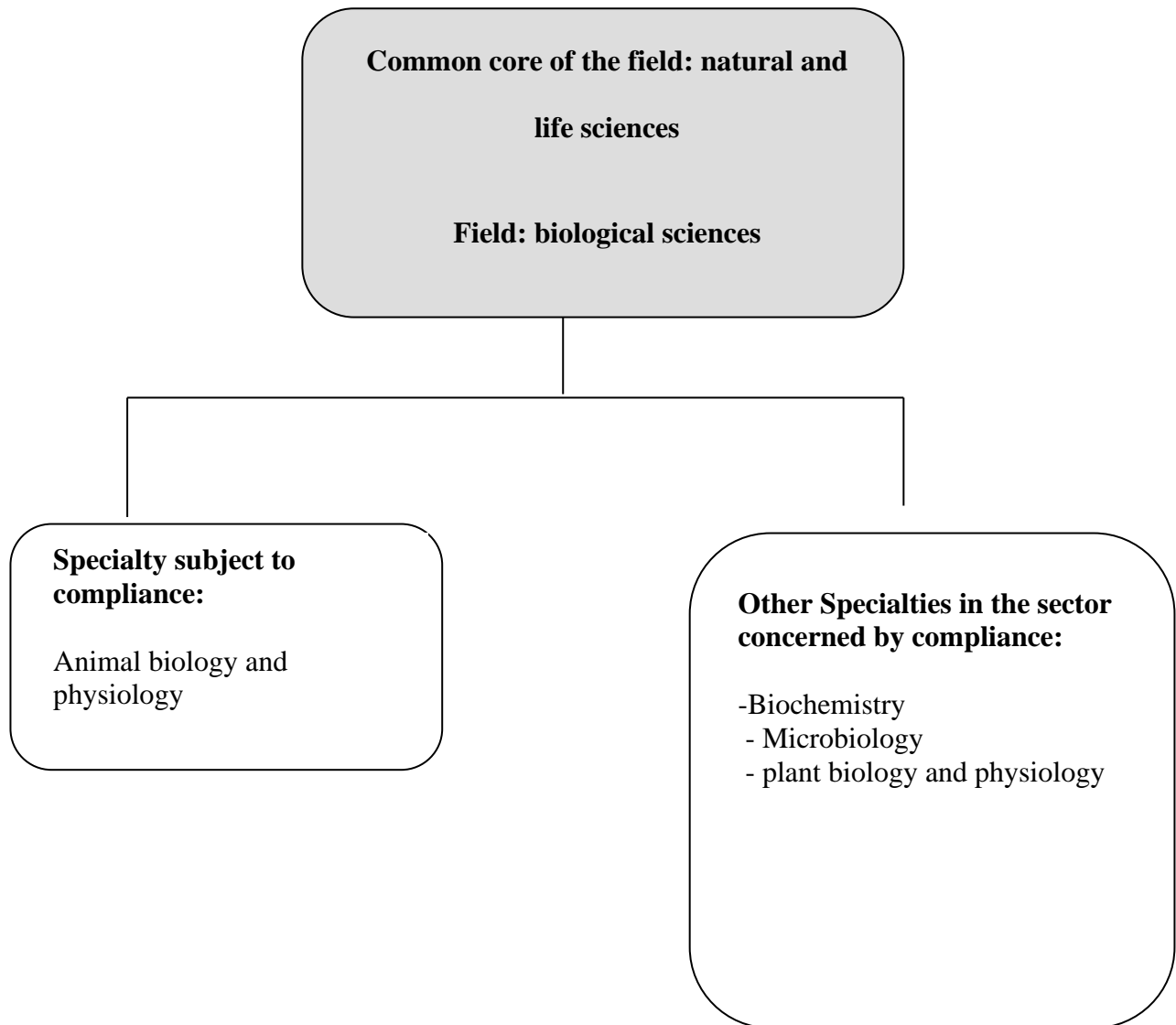
- International partners:

University Agency of Francophonie, Vaasa University of applied sciences FINLAND

3 – Context and objectives of the training

A – General organization of training: project position (obligatory field)

If several licenses are offered or already supported at the establishment level (same training team or other training teams), indicate in the following diagram the position of this project in relation to the other courses.



B - Training objectives

The training of specialists in the animal world in all its dimensions, competent in fundamental and applied research for health, the environment and agriculture. The world of animals is very vast (insects, birds, rodents, glasses, etc.) importance will be given to livestock (camels, horses, cattle, sheep, etc.)

C – Profiles and targeted skills:

Animal biology and physiology studies gene and metabolic regulations in animals during their development and their adaptations to the environment. Understanding the mechanisms of development and adaptation will make it possible to better manage strategies for improving these animals and conservation, and will provide new ways of using animals. The course provides modern theoretical and practical teaching (in laboratories and in the field) relating to animal biology. Graduates will be ready to be integrated into structures linked to different sectors (agricultural services, forestry, environment, technical institutes, etc.). They can also join the education sector as teachers. Skills are acquired in the field of Animal Physiology with a good knowledge base in Cellular Biology, Molecular Biology, Genetics and Microbiology. Skills in Animal Physiology: - experiment in vivo: plasma dosages, organ sampling, non-invasive physiological analysis (ECG, EMG.....), the relationship between the structure of an organ and its function Skills in Cellular Biology; Genetics Skills.

D – Regional and national employability potential

The skills acquired at the end of the training enable graduates to: The biochemistry degree introduces the student to numerous disciplines, of major importance in the operation of research and quality control laboratories:

- University Research Laboratory, Research and Development Centers
- Hospital-university analysis laboratories, biological analysis laboratories
- Agricultural services; Pilot laboratories in Bio Industries; The professions of scientific journalism; advisors in the field of agriculture (livestock breeding)

E – Gateways to other specialties

License in immunology, toxicology, genetics and molecular biology, License in Aquaculture and Pisciculture, License in Biology and Ecology of aquatic environments, License in Ecology and Environment, License in Forestry, License in Parasitology, and other equivalent courses. This specialty is accepted for continued master's studies at the national or international level.

F – Performance indicators expected from the training

Continuous assessment of knowledge and presentations to committees (parts of the overall work). Through this training, future graduates will have the opportunity to easily integrate into professional life and those who wish to continue their studies in Masters and Doctorates will have the opportunity to do so.

4 – Human resources available

A: Supervision capacity (expressed in number of students that can be supported):

100

B: Internal teaching team mobilized for the specialty:

Name, first name	Graduation diploma	Specialty diploma (Magister, doctorate)	Grade	Subject to be taught	Emargement
Belhamra Mohamed		Ecology	Pr		
LaiadiZiane	Vegetal Biology	Bio moleculaire vegetal	M.C.A	Proj. Per. In. Rech.	
Tarai Nacer	Agronomy	Ecology	M.C.A		
BoukharoubaKhadidja	Hydrolic	Environment	M.C.A	Anal.des don. en bio.	
BenazizaAdelaziz	Agronomy	Vegetal	M.C.A		
MoussiAbdlhamid	Microbiology	Cellular Physiology	M.C.B	Systé. of procaryotes	
Athemena Ahmed	Biochimy	Biochimy	M.C.B	Enzymol. approfondy	
Benziouche Salah eddine	Agronomy	rural Economy	M.C.B		
BelambriSahra Amel	Biochimy	Immunology	M.C.B	Bio cel. et Enzymo.	
Masmoudi Ali	Agronomy	Pedology	M.C.A		
Bouatrous Yamina	Biochimy	Vegetal Biology	M.C.A	Physiology of stress	
DandouguaOuassila	Biochimy	Biochimy Appliquée	M.A.A	Bio. Ap. path. Anim. vég.	
Neffoussi Fatima	Biochimy	Plant biochemistry	M.A.A	Ontog. plants sup.	
AggouniMadjed	Animal Bio. and phys.	Animal Biology	M.A.A	Dévelop. Embryon.	
Arrigue Soulef Farida	Animal Bio. and phys.	Animal Biology	M.A.A	Hist. fonctionel	

Visa from the department

Visa from the faculty or institute

C: External teaching team mobilized for the specialty: (to be informed and approved by the faculty or institute)

Name, first name	Graduation diploma	Specialty diploma (Magister, doctorate)	Grade	Subject to be taught	Emargement
Dr. BOUBENDIR Abd El Hafid	Center univ of Mila	D.E.S. microbiology	Microbiology	M.C. B	Génétic microbienne

Visa from the department

Visa from the faculty or institute

D : Overall summary of human resources mobilized for the specialty (L3):

Grade	Internal workforce	External workforce	Total
Professeurs	1	-	1
Maîtres de Conférences (A)	8	-	8
Maîtres de Conférences (B)	2	1	3
Maître Assistant (A)	42	-	42
Maître Assistant (B)	5	-	5
Other (*)	12	-	12
Total	70	1	71

(*)Technical and support staff

E : Overall summary of human resources mobilized for the specialty (L3) :

Grade	Internal workforce	External workforce	Total
Professeurs	1	-	1
Maîtres de Conférences (A)	8	-	8
Maîtres de Conférences (B)	2	1	3
Maître Assistant (A)	42	-	42
Maître Assistant (B)	5	-	5
Other (*)	12	-	12
Total	70	1	71

(*)Technical and support staff

5 – Material resources specific to the specialty

A- Educational Laboratories and Equipment:

1. laboratory1: Animal Biology and Physiology
2. laboratory2: Biochemistry
3. laboratory3: Microbiology I
4. laboratory4: Microbiology II
5. laboratory5: Biochemistry and Immunology
6. laboratory6: Molecular Biology
7. laboratory7: Botany
8. laboratory8: Zoology
9. laboratory9: Biophysics

The 09 laboratories are functional. The equipment available within these laboratories makes it possible to carry out the various TPs programmed for licenses and Masters.

Student capacity for each laboratory: 25 students**Laboratory title: laboratory 1: Animal Biology and Physiology**

N°	Equipement title	Number	Observations
1	Stereomicroscope	04	Functional
2	Benchtop conductimeter	01	Functional
3	Cold light source	02	Functional
4	Trin eye stereomicroscope	01	Functional
5	Trinocular microscope	01	Functional
6	Microtome	02	Functional
7	Coloring box of 8 glass slides	10	Functional
8	Compass	01	Functional
9	Mercury thermometer, 22c +95/+103°c	10	Functional
10	Mercury controlled thermometer, 0 to +50°c	10	Functional
11	Alcohol bottle thermometer, -25 a -5°c	10	Functional
12	Single cell quad. malassez	05	Functional
13	Single cell quad. nageotte	05	Functional
14	Rotavapor r210/v vertical p+g	01	Functional
15	Universal oven type um 400	01	Functional
16	Single cell quad. thomas	05	Functional
17	Blade storage box	04	Functional
18	Dissection box	10	Functional
19	Staining box slide holder for 10 slides	02	Functional
20	Entomological pins	15	Functional
21	Entomological box	10	Functional
22	Microscopes	20	Functional

Laboratory title: laboratory 2: Vegetal Biology and Physiology

N°	Equipement title	Number	Observations
1	Vortex tube agitator	1	Functional
2	Precision scale	1	Functional
3	Calcination furnace 15l 1100c prog	1	Functional
4	Refractometer	1	Functional
5	Standard flame photometer	1	Functional
6	Rotavapeur	1	Functional
7	Bain marie agitator	2	Functional
8	Staining box slide holder for 10 slides	2	Functional
9	Spectrophotometer	2	Functional
10	Bain-marie	2	Functional
11	Microtome	2	Functional
12	Floor thermometers	2	Functional
13	Dryers	3	Functional
14	Fridge	3	Functional
15	Blade storage box	4	Functional
16	Storage cupboards and appliances	8	Functional
17	Micropipettes	10	Functional
18	Heating stirring plate	10	Functional
19	Mercury thermometer, 22c +95/+103°c	10	Functional

20	Stereomicroscope	24	Functional
21	Binocular microscope	20	Functional

Laboratory title: laboratory 3: Microbiology I and II

N°	Equipement title	Number	Observations
1	Microbiological hood	1	Functional
2	Agitator with incubation chamber	4	Functional
3	Vortex tube agitator	1	Functional
4	Bain marie agitator	2	Functional
5	Precision scale	1	Functional
6	Benchtop centrifuge	1	Functional
7	Micropipettes	10	Functional
8	Heating stirring plate	10	Functional
9	Mercury thermometer, 22c +95/+103°c	10	Functional
10	Single cell quad. malassez	5	Functional
11	Single cell quad. nageotte	5	Functional
12	Single cell quad. thomas	5	Functional
13	Blade storage box	4	Functional
14	Staining box slide holder for 10 slides	2	Functional
15	Spectrophotometer	1	Functional
16	Bacteriological stove	3	Functional
17	Pastor's oven	1	Functional
18	Autoclave	2	Functional
19	Distiller	1	Functional
20	Bain-marie	2	Functional
21	Bunsen burns	20	Functional
21	Microscopes	30	Functional
21	Colony counter	2	Functional

Laboratory title: laboratory 4: Biochimistry and Immunology

N°	Equipement title	Number	Observations
1	Agitator with incubation chamber	4	Functional
2	Vortex tube agitator	1	Functional
3	Bain marie agitator	2	Functional
4	Precision scale	1	Functional
5	Benchtop centrifuge	1	Functional
6	Micropipettes	10	Functional
7	Heating stirring plate	10	Functional
8	Mercury thermometer, 22c +95/+103°c	10	Functional
9	Spectrophotometer	2	Functional
10	Pastor's oven	1	Functional
11	Distiller	1	Functional
12	Bain-marie	2	Functional
13	Stirrer	8	Functional
14	Chemical hood	1	Functional
15	Ventilated benchmark centrifuge	1	Functional
16	Analytical balance	1	Functional
17	Microplate washer	10	Functional

18	Microplate reader	1	Functional
19	Thin layer chromatography system	10	Functional
20	Column liquid chromatography system	5	Functional
21	Electrophoresis system	5	Functional
22	Benchtop conductimeter	1	Functional

Laboratory title: laboratory 5: Molecular Biology

N°	Equipement title	Number	Observations
1	Agitator with incubation chamber	1	Functional
2	Vortex tube agitator	1	Functional
3	Bain marie agitator	2	Functional
4	Precision scale	1	Functional
5	Benchtop centrifuge	1	Functional
6	Micropipettes	20	Functional
7	Heating stirring plate	10	Functional
8	Mercury thermometer, 22c +95/+103°C	10	Functional
9	Spectrophotometer	1	Functional
10	Chemical hood	1	Functional
11	Ventilated benchmark centrifuge	1	Functional
12	Analytical balance	1	Functional
13	Electrophoresis system	3	Functional
14	Oven	2	Functional
15	Autoclave	1	Functional
16	Bunsen burns	8	Functional
17	Mercury controlled thermometer, 0 to +50°C	10	Functional
18	Alcohol bottle thermometer, -25 a -5°C	10	Functional
19	Storage cupboards and appliances	8	Functional
20	Hotplate	2	Functional
21	Cold rooms	2	Functional
22	Thermocycler (PCR)	1	Functional

Laboratory title: laboratory 6: Botanical

N°	Equipement title	Number	Observations
1	Bain marie agitator	1	Functional
2	Balance	1	Functional
3	Heating stirring plate	1	Functional
4	Oven	1	Functional
5	Bunsen burns	8	Functional
6	Binocular microscope	20	Functional
7	Trin eye microscope	1	Functional

Laboratory title: laboratory 7: Zoology

N°	Equipement title	Number	Observations
1	Bain marie agitator	1	Functional
2	Balance	1	Functional
3	Heating stirring plate	1	Functional
4	Oven	1	Functional

5	Trin eye microscope	1	Functional
6	Binocular microscope	20	Functional
7	Binocular magnifiers	10	Functional

B- Internship sites and in-company training:

Training place	Number of students	Training period
Hygiene laboratory	15	15 days
Hospitals	30	15 days
Mills	30	15 days
CRSTRA Laboratory	15	15 days
LARYSS Laboratory	15	15 days
Milk collection and processing units	15	15 days
Juice Units	15	15 days
ITEDAS	15	15 days
INRAA Touggourt	15	15 days
Pet breeding farms	30	15 days
Belezma national Parc	10	15 days
ITAF	10	15 days

C- Documentation available at the establishment level specific to the training offered:

Students benefit from the department and university libraries.

The department's library has around 10 titles for... copies. The background can be divided into two classes; books in native language and others in foreign languages

Foreign languages: approximately 1128 titles: "http://www.univ-biskra.dz/fac/fsesnv/images/Docs/ouverage_snv_fr.pdf"

Arabic language: approximately 484 titles: "http://www.univ-biskra.dz/fac/fsesnv/images/Docs/ouverage_snv_ar.pdf"

D- Personal work spaces and ICT available at department and faculty level:

At department level

2 reading rooms with a WiFi area, the WiFi zone covers the entire area of the department

2 computer rooms (15 workstations)

Internet room (25 stations).

At the faculty level

Library reading room

Internet room

At the university level

The central library has two large reading rooms with a capacity of 1,200 places for students, two reference rooms which have all the titles which the user can access directly and consult the document before requesting borrowing, a room reading for teachers, a central store and different offices for dragging the book's documentary from the analysis of the demand to the distribution of the document

II – Half-yearly organization sheet for specialty teaching (S5 and S6)

(include the annexes to the decrees of the common bases of the field and the sector)

Semester 5 :

Teaching unit	VHS	V.H weekly				Coeff	Credits 14-16 wee	Evaluation mode	
	14-16 wee	C	TD	TP	Others			C	TD
UE fundamental									
UEF 1.5 (O/P) : Descriptive biology									
Module 1 UEF1.5.1 : Embryonic development	112h30	3h00	1h30	3h00	60h00	3	7	x	x
Module 2 UEF1.5.2 : Functional histology	67h30	1h30		3h00	60h00	3	7	x	x
Module 2 UEF1.5.3 : Comparative Anatomy of Vertebrates	67h30	1h30		3h00	60h00	3	7		
UE methodology									
UEM1.5 (O/P) : analysis and control techniques									
Module 1 UEM1.5.1 : Biological analysis techniques	90h00	1h30	1h30	3h00	15h00	4	4	x	x
Module 2 UEM1.5.2 : Data analysis in biosciences	45h00	1h30		1h30	15h00	2	3	x	x
UE transverse									
UET1.5 (O/P) : Languages									
Module 1 UET1.5.1 : English I	22h30	1h30			15h00	1	2		x
Total Semester 5	405	10,5	3	13,5	15 (225h)	16	30		

Semester 6 :

Teaching unit	VHS	V.H weekly				Coeff	Credits	Evaluation mode	
	14-16 wee	C	TD	TP	Others			Continuous	Exam
UE fundamental									
UEF 1.6 (O/P) : General Physiology									
Module 1 UEF 1.6.1 : Physiology of major functions	112h30	3h00	1h30	3h00	50h00	3	6	x	x
Module 2 UEF 1.6.2: Functional Endocrinology	90h00	3h00	1h30	1h30	50h00	3	6	x	x
Module 2 UEF 1.6.3: Cellular and molecular physiology	90h00	3h00	1h30	1h30	50h00	3	6		
UE methodology									
UEM1.6 (O/P) : Work methods									
Module 1UEM 1.6.1 : Personal project and introduction to research	45h00	1h30	1h30	-	45h00	4	10	x	x
UE discovery									
UED1.6 (O/P) : Applied biochemistry									
Module 1 UED 1.6.1: Pathological anatomy	45h00	1h30	-	1h30	15h00	2	1	x	x
UE transverse									
UET1.6 (O/P) : Languages									
Module 1 UET 1.6.1: English II	22h30	1h30	-	-	15h00	1	1		x
Total Semester 6	405	13,5	6	7,5	14 (210h)	16	30		

Overall summary of the training: (indicate the separate overall VH in progress, TD, TP... for the 06 semesters of teaching, for the different types of EU)

VH \ UE	UEF	UEM	UED	UET	Total
Course	585	247,5	67,5	90	990
TD	315	180	22,5	0	517,5
TP	495	90	90	0	1507,5
Personal work	967,5	375	82,5	97,5	1522,5
Total	2362,5	892,5	262,5	187,5	3705
Credits	122	43	8	7	180
% in credits for each UE	67,78	23,89	4,44	3,89	100

III - Detailed program by subject for semesters S5 and S6

(1 detailed sheet per subject)

(all fields must be completed)

Semester : 5

Fundamental teaching unit 1 (UEF 1.5): Descriptive biology

Subject 1 (UEF 1.5.1): Embryonic development

Credits : 7

Coefficient : 3

Teaching objectives:

This subject will enable the student to acquire, after reviewing embryonic development in amphibians, birds and mammals, the cellular and molecular mechanisms for the establishment of different tissues during the stages of embryonic development.

Recommended prior knowledge:

Stages of embryogenesis, primordial tissues, establishment of primordial tissues

Content of the material:

I. Main Characteristics of Development of some Fundamental Types

II. Elements necessary for development

III. Fertilization

IV. Segmentation

V. Gastrulation

VI. Neurulation

VII. Organogenesis

VIII. Morphogenesis of embryonic appendages: Birds and Mammals

IX. Genetic control of development

X. Placenta

XI. Development of Insects

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; TD control; presentations + questions)

References

1. L'embryon chez l'homme et l'animal. 2002. Editions Quae, 323 pages
2. Scott F. Gilbert. 2004. Biologie du développement. De Boeck Supérieur, 858 pages
3. William Larsen. 2003. Embryologie humaine. De Boeck Supérieur, 568 pages

Semester : 5

Fundamental teaching unit 1 (UEF 1.5): Descriptive biology

Subject 2 (UEF 1.5.2): Functional histology

Credits : 7

Coefficient : 3

Teaching objectives:

This subject is devoted to the anatomical study of the different systems of the body and the histological study of the tissues which constitute them.

Recommended prior knowledge:

Anatomical and histological study of the different devices and systems (study approached from the tissue to the organ)

Content of the material:

Histological study of the different structures of mammalian apparatus and systems

1. Structure and Histology of the digestive system
2. Structure and Histology of the respiratory system
3. Circulatory system
4. Histology of blood vessels and lymphatic vessels
5. Lymphatic system
6. Urogenital system
7. Endocrine system
8. Musculoskeletal system
9. Nervous system

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; presentations + questions)

References :

1. Platzer W. (2001) –Atlas de poche d’anatomie. 3 tomes, Eds Flammarion
2. Wheater (2008) –Atlas d’histologie fonctionnelle de Wheater. Eds De Boeckuniversité
3. Paul Richard Wheater, Barbara Young, John W.. Heath. 2001. Histologie fonctionnelle.De Boeck Supérieur, 413 pages

Semester :5

Undamental teaching unit 1 (UEF 1.5): Descriptive biology

Subject 3 (UEF 1.5.3): Comparative anatomy of vertebrates

Credits : 7

Coefficient : 3

Teaching objectives:

This subject deals with the comparison of the anatomy of the different apparatus and systems of vertebrates Recommended prior knowledge Animal biology, zoology

Content of the material:

1. Anatomy of the digestive system
2. Anatomy of the respiratory system
3. Anatomy of the cardiovascular system
4. Urogenital apparatus
5. Endocrine system
6. Anatomy of the nervous system
7. Sense organs

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; presentations + questions)

References :

1. Jean Lavergne. 1996. Précis d'anatomie comparée crânio-faciale des Vertébrés. Heures de France, 319 pages
2. Daniel Richard, André Beaumont, Pierre Cassier. 2009. Biologie animale - Les Cordés - 9ème édition - Anatomie comparée des vertébrés: Anatomie comparée des vertébrés. Dunod, 688 pages
3. Sy Hung Nguyen, RedhaBourouina. 2008. Manuel d'anatomie et de physiologie. Wolters Kluwer France, 421 pages

Semester : 5

Teaching unit: methodological1 (UEM1.5), analysis and control techniques

Subject 1 (UEM1.5.1): Biological analysis techniques

Credits : 4

Coefficient : 4

Teaching objectives

To learn the different biological techniques which allow the extraction and purification of biomolecules (proteins, carbohydrates, lipids, nucleic acids, etc.) and their valorization. Recommended prior knowledge Concepts on biomolecules; Biochemistry, biological sources (biological material); Animal and plant biology.

Content of the material:

Chapter 01: General concept

Chapter 02: Homogenization and extraction technique

Chapter 03: Separation or fractionation technique

Chapter 04: Spectroscopic technique

Chapter 05: Chromatographic Techniques

Chapter 06: Electrophoresis Techniques

TD Program:

Exercices: numerical applications on different techniques (spectral.....)

TP program:

1. Separation techniques:
2. Spectrophotometric assay techniques (direct and indirect)
3. CCM

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; TD control + presentations + questions)

References :

1. C. T. Phan, 1984. Introduction aux méthodes d'analyse biologique : BIO 1000. Librairie de l'Université de Montréal, 69 pages
2. Elena Rossello, J.M., Fernandez de Gorostiza, M. 1995. Guide Technique des Essais Varietaux en Plein Champ. Food & Agriculture Org., 1995 - 152 pages
3. Claude Audigié, Gérard Dupont, François Zonszain. 1992. Principes des méthodes d'analyse biochimique, Volume 2. Wolters Kluwer France, 173 pages

Semester : 5

Teaching unit: methodological 1 (UEM1.5), analysis and control techniques

Subject 2 (UEM 1.5.2): Data analysis in biosciences

Credits : 3

Coefficient : 2

Teaching objectives

Basic statistical elements for applications in biology and biochemistry, and to learn the processing of scientific results and the comparison between the averages of the results. Recommended prior knowledge Basics of mathematics and statistics

Content of the material:

Data representation in the biological domain; central and dispersion values. Normal distribution and normality tests. Mean Comparison Test (Student).

Applications in biochemistry and genetics:

the principles stated in class will be applied to analyzes of data from work in the field Biochemistry (Clique, research, etc.).

Application in plant biology

Application in animal biology

Application in ecology Particular emphasis will be placed on the relevance of the use of this or that statistical test and the graphic presentation of the results (mean, standard deviation, standard error of the mean, etc.)

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; questions)

Bibliographic references

1. Amazallag E., Piccioli N., et Bry F., (1978). Introduction à la statistique. Ed. Hermann, Paris ? 339p.
2. Bernier, J. (2000). Statistique pour l'environnement : traitement bayésien de l'incertitude, Tec et Doc.
3. Chauvat, G. (2002). Statistiques descriptives : résumés des cours, 85 exercices corrigés, 40 problèmes, Armand Colin.
4. Falissard, B. (1998). Comprendre et utiliser les statistiques dans les sciences de la vie, Masson.
5. Grais, B., (2003), Méthodes statistiques, Dunod.
6. Huguier M, Flahault A., (2003). Biostatistiques au quotidien. Ed. Elsevier, Paris, 206p.
7. Lecoutre, J-P., (2006), Statistique et probabilités : manuel et exercices corrigés, Dunod
8. Milhaud, X (2001). Statistique. Ed. Belin
9. Schwartz D., (1992). Méthodes statistiques à l'usage des médecins et biologistes. Flammarion, Paris, 306p.
10. Valleron A. Z. et Lazard P., (1995). Exercices programmés de statistiques à l'usage des médecins et biologistes. Flammarion, Paris, 247p.

Semester : 5

Teaching unit: Transversal 1 (UET 1.5), languages UET 1.5.1

Subject: English I

Credits : 2

Coefficient : 1

Teaching objectives

Scientific communication in English. This teaching aims to: - Familiarize students with the means of communication in English within the scientific community, - Work in small groups to encourage speaking and develop oral skills. Access to international multimedia means Recommended prior knowledge General and organic chemistry, Statistical Mathematics and Computer Science, Communication and Expression Techniques, Universal History of Biological Sciences, Plant Biology, Animal Biology, Physics, Genetics, Biochemistry, Microbiology, Biophysics, Working methods and Terminology, Botany, General ecology .

Content of the material:

The work will focus on the grammatical and syntactic specificities of scientific communication, both written and oral. The lexical fields covered will be those of the different scientific disciplines and their applications to biology.

The program includes

1. Terminologies In the form of simplified scientific texts or diagrams and figures
2. Lessons

Evaluation method:

Final exam 100%

References :

1. Martin, B., et Tony, D. E., 1983, Nucleus English for science and technology (General Science part II). Longman.
2. Thomson, A. J., et Martinet, A.V., 1993, A practical English Grammar. Low Priced edition.
3. Michael, S., 1984, Practical English Usage. Oxford University Press.
4. Kristine, B., et Susan, H., 2003, Writing matters. Cambridge.
5. New Prospect, 2007, for Secondary education school. National Authority for School Publication.
6. www.bbclearningenglish.com

Semester :6

Fundamental teaching unit 1 (UEF 1.6): General physiology

Subject 1 (UEF 1.6.1): Physiology of major functions

Credits : 6

Coefficient : 3

Teaching objectives:

This component makes it possible to teach the basic notions of general endocrinology, to study the hypothalamic-pituitary complex and the neuroendocrine transducers, the glandular and cellular endocrine systems of the body as well as the notions of immunoendocrinology.

Recommended prior knowledge:

Concepts of endocrine glands, regulation and immunology.

Content of the material:

Chapter I: General information on the functioning of the endocrine system

Chapter II: The hypothalamic-pituitary complex

Chapter III: The epiphysis

Chapter IV: The main endocrine glands in Vertebrates For each gland the following points will be addressed.

Chapter V: Immuno-endocrinology

Directed work :

- Statistical study of operated animals
- board projections, films, “3D datashow” etc.

Practical work :

- Extraction, Chromatography and Elution of hormones
- Adrenalectomy
- histo-physiology -Immuno-hormonemia
- Castrations

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; TD control; presentations + questions)

References:

1. Hadj-Bekkouche F. et Khaldoun T. (2005) -Polycopié de TP de Physiologie. Eds. OPU
2. Lonchanpt P. (2007) –Bases de physiologie générale : grandes fonctions et régulations. Eds. Ellipses
3. Christèle Manuelle. 2008. Les 5 fonctions vitales du corps humain: anatomo-physiopathologie. Wolters Kluwer France, 327 pages
4. Charles Kayser. 1970. Physiologie: Les grandes fonctions (Nutrition exceptée).Flammarion,

Semester :6

Fundamental Teaching Unit 1 (UEF 1.6): General Physiology

Subject 2 (UEF 1.6.2): General endocrinology

Credits : 6

Coefficient : 3

Teaching objectives:

This component makes it possible to teach the basic notions of general endocrinology, to study the hypothalamic-pituitary complex and the neuroendocrine transducers, the glandular and cellular endocrine systems of the body as well as the notions of immunoendocrinology.

Recommended prior knowledge:

Concepts of endocrine glands, regulation and immunology.

Content of the material:

Chapter I: General information on the functioning of the endocrine system

Chapter II: The hypothalamic-pituitary complex

Chapter III: The epiphysis

Chapter IV: The main endocrine glands in Vertebrates for each gland the following points will be discussed.

Chapter V: Immuno-endocrinology

Directed work :

- Statistical study of operated animals
- board projections, films, “3D datashow” etc.

Practical work :

- Extraction, Chromatography and Elution of hormones

- Adrenalectomy
- histo-physiology
- Immuno-hormonemia
- Castrations

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; TD control; presentations + questions)

References :

1. Aouichat S., Amirat Z. et Khammar F. -Polycope de TP d'endocrinologie. Eds. OPU
2. Basile Porta, Vanessa Lubin, Géraldine Skurnik. 2010. Endocrinologie. De Boeck Supérieur, 236 pages
3. Barbara Mallard. 2010. Endocrinologie.De Boeck Supérieur, 112 pages
4. Pierre Rochiccioli, Roger Mariani, Maité Tauber. 2001. Actualités en endocrinologie.Elsevier Masson, 446 pages

Semester: 6

Fundamental Teaching Unit 1 (UEF 1.6): General Physiology

Subject 3 (UEF 1.6.3): Cellular and molecular physiology

Credits:6

Coefficient: 3

Teaching objectives:

This component makes it possible to teach the fundamental concepts of cell biology and the molecular mechanisms involved in cell physiology.

Recommended prior knowledge:

Concepts of cell biology, biochemistry and molecular genetics (gene expression).

Content of the material:

- I. Functional compartmentation of the cell
- II. Biomembranes
- III. Cell sorting
- IV. Membrane transport
- V. Receptors and signaling pathways
- VI. Bioenergetics
- VII. Cellular principles of immune defense.
- VIII. Cell growth and differentiation

Directed work :

- Exercises on the different manipulations

Practical work :

- Methods for studying the cell
- Physico-chemical properties of proteins
- Cell fractionation
- Bioenergetics
- Membrane receptors

Evaluation method:

Final exam 60% + continuous 40% (TP control + reports; TD control; presentations + questions)

Bibliographic references

1. Alberts B. et coll. (2004) -Biologie moléculaire de la cellule. Eds. Flammarion
2. RüdigerWehner, Walter Gehring. 1999. Biologie et physiologie animales: bases moléculaires, cellulaires, anatomiques et fonctionnelles. De Boeck Supérieur, 844 pages
3. William Ganong. 2005. Physiologie médicale. De Boeck Supérieur, 849 pages

Semester : 6

Teaching unit: methodological 1 (UEM 1.6): working methods

Subject (UEM 1.6.1): Personal project and introduction to research

Credits : 10

Coefficient : 4

Teaching objectives Notes:

personal project Acquire the basics of the language, and introduction to documentary research
Recommended prior knowledge General and organic chemistry, Cellular biology, Statistical and Computer Mathematics, Communication and Expression Techniques, Universal History of Biological Sciences, Thermodynamics and chemistry of mineral solutions, Plant Biology, Animal Biology, Physics, Zoology, Genetics, Biochemistry, Microbiology, Biophysics, Working Methods and Terminology, Botany, General Ecology, Immunology

Content of the material:

Initiation to research :

The different types of scientific writing IMRAD structure of scientific work in experimental sciences Methods for citing bibliographic references Article analysis

Personnal project :

At the start of S6 for the license, a subject is proposed to the student. In the form of an end-of-study thesis or an internship report, this personal project is allocated a certain number of credits and mentioned when the training offer is developed. The subject must be related to the specialty and must be created in collaboration with the student. The subject can also be suggested by a company in the socio-economic sector. In all cases, the student must go to their internship location to carry out the work requested in this last semester. The personal project is necessarily supervised by a teacher and possibly monitored in the field by a co-promoter from the host company. Students can contact master's students who are preparing their dissertation.

Evaluation method:

Evaluation of the student's work by correction of the manuscript, either after defense before a jury, or exhibition of the work before a teacher or a committee.

Bibliographic references

1. Beaud M., (2006). L'art de la thèse. Ed. Découverte, Paris,
2. Marc Couture, René-Paul Fournier. 1999. La recherche en sciences : Guide pratique pour les chercheurs. De Boeck Supérieur, 264 pages
3. www.sciencedirect.com

4. www.springer.com

5. books.google.fr

Semester : 6

Teaching unit: discovery 1 (UED 1.6): Valorization of plants

Subject (UED 1.6.1): Pathological anatomy

Credits : 1

Coefficient : 2

Teaching objectives

Know how to specify the place of pathological anatomy in the medical approach. • Know and be able to give examples of the different types of cytological samples. • Know and be able to give examples of the different types of tissue samples. • Know the different technical steps that will allow the microscopic analysis of a cell sample. • Know the different technical steps that will allow the microscopic analysis of a tissue sample. • Know the principles of cell/tissue fixation. • Know the principles (contributions and limits) of a cytopathological examination. • Know the principles (contributions and limits) of an extemporaneous examination.

Recommended prior knowledge:

General and organic chemistry, Statistical Mathematics and Computer Science, Communication and Expression Techniques, Universal History of Biological Sciences, Plant Biology, Animal Biology, Physics, Genetics, Biochemistry, Microbiology, Biophysics, Working methods and Terminology, Botany, General ecology .

Content of the material:

Chapter 1 - Means and objectives of pathological anatomy in medicine

Chapter 2 - Basic lesions of cells, tissues and organs

Chapter 3 - The inflammatory reaction.

Chapter 4 - Vascular pathology and circulatory disorders

Chapter 5 - Developmental pathology: congenital malformations

Chapter 6- General information on tumors

Chapter 7 – Cancer Cell and Cancer Tissue

Evaluation method:

Half-yearly exam 60% and Continuous 40% (TP control + Reports; presentations + questions)

Bibliographic references

1. Enseignement d'Anatomie pathologique POLYCOPIE (Collège Français des Pathologistes (CoPath)), disponible sur <http://campus.cerimes.fr/anatomie-pathologique/poly-anatomie-pathologique.pdf>
2. Alan Stevens, James Lowe, Barbara Young. 2004. Anatomie pathologique. De Boeck Supérieur, 304 pages
3. Alan Stevens, James Lowe. 1997. Anatomie pathologique générale et spéciale. De Boeck Supérieur, 536 pages

Semester : 6

Teaching unit: Transversal 1 (UET 1.6): languages UET 1.6.1

Subject: English II

Credits : 1

Coefficient : 1

Teaching objectives

Scientific communication in English. This teaching aims to: - Familiarize students with the means of communication in English within the scientific community. - Access to international multimedia resources Recommended prior knowledge General and organic chemistry, Statistical Mathematics and Computer Science, Communication and Expression Techniques, Universal History of Biological Sciences, Plant Biology, Animal Biology, Physics, Genetics, Biochemistry, Microbiology, Biophysics, Working methods and Terminology, Botany, General ecology .

Content of the material:

The principle is the transition to English from French The lexical fields covered will be those of the different disciplines in biology The program includes Part 1. Terminologies: in the form of courses in English, courses in biology (from different subjects) preferably taught in common core. The courses must be a little detailed as they are taught in French. The best way is to use, within the course text, detailed diagrams (e.g. the structure of organs, cells; biological cycles. The stages of biochemical reactions, etc.)

Part 2. Lessons

Part 3. Scientific texts (texts or articles)

Evaluation method: Final exam 100%

Bibliographic references

6. Martin, B., et Tony, D. E., 1983, Nucleus English for science and technology (General Science part II). Longman.
7. Thomson, A. J., et Martinet, A.V., 1993, A practical English Grammar. Low Priced edition.
8. Michael, S., 1984, Practical English Usage. Oxford University Press.
9. Kristine, B., et Susan, H., 2003, Writing matters. Cambridge.
10. New Prospect, 2007, for Secondary education school. National Authority for School Publication.
6. www.bbclearningenglish.com

IV - Opinions and Visas from Administrative and Consultative Bodies

Title of license :

Head of department + Head of the domain team	
Date and visa:	Date and visa:
Dean of the faculty (or Institute Director)	
Date and visa:	
Head of university establishment	
Date and visa:	

V– Opinion and Visa of the Regional Conference
(Only in the final version sent to the MESRS)

**VI – Opinion and Visa of the National Educational Committee of
the Domain**
(Only in the final version sent to the MESRS)