

Domain: **Biology**  
Specialization: **Biology**

**I-st YEAR**

No. crt.	Compulsory disciplines	Code discipline	Semester I					Semester II				
			C	S	L	Form of examination	Credits no.	C	S	L	Form of examination	Credits no.
1	Plant cytology, anatomy and morphology	3906BB1F01I001	2	-	2	E1	5	-	-	-	-	-
2	Systematic of cryptogams	3906BB1F01I002	2	-	2	E1	5	-	-	-	-	-
3	Systematic of phanerogams	3906BB1F02I003	-	-	-	-	-	2	-	2	E2	5
4	Invertebrate Zoology 1	3906BB1F01I004	2	-	2	E1	6	-	-	-	-	-
5	Invertebrate Zoology 2	3906BB1F02I005	-	-	-	-	-	2	-	2	E2	6
6	Animal cytology and histology	3906BB1F01I006	2	-	2	E1	5	-	-	-	-	-
7	Basic human anatomy and hygiene	3906BB1F02I007	-	-	-	-	-	2	-	2	E2	5
8	General Ecology	3906BB1F02I008	-	-	-	-	-	3	1	2	E2	6
9	General Chemistry	3906BB1F01I009	1	1	1	C1	5	-	-	-	-	-
10	Applied special mathematics in biology	3906BB1C01I010	1	1	-	C1	3	-	-	-	-	-
11	Computer operation	3906BB1C02I011	-	-	-	-	-	-	-	2	C2	3
12	Foreign language 1	3906BB1C01I012	1	1	-	C1	3	-	-	-	-	-
13	Foreign language 2	3906BB1C02I013	-	-	-	-	-	1	1	-	C2	3
14	Physical training 1	3906BB1C01I014	-	2	-	V1	-	-	-	-	-	-
15	Physical training 2	3906BB1C02I015	-	-	-	-	-	-	2	-	V2	-
Total obligatory hours on week			11	3	9	4E3C1V	32	10	2	10	4E2C1V	28
			23					22				
<b>Facultative disciplines</b>												
16	Basic of Biology	3906BB1F01F016	2	1	-	C1	3	-	-	-	-	-
17	Principles and Methods of taxonomy	3906BB1F02F017	-	-	-	-	-	2	1	-	C2	3
Total facultative hours on week			2	1	-	1C	3	2	1	-	1C	3
			3					3				

## II-nd YEAR

No. crt.	Compulsory disciplines	Code discipline	Semester III					Semester IV				
			C	S	L	Form of examination	Credits no.	C	S	L	Form of examination	Credits no.
18	Phytosociology and romanian vegetation	3906BB1S03I018	2	1	1	E3	5	-	-	-	-	-
19	Plant physiology	3906BB1F03I019	2	-	2	E3	4	-	-	-	-	-
20	Animal physiology	3906BB1F04I020	-	-	-	-	-	2	-	2	E4	4
21	Vertebrate zoology (1)	3906BB1F03I021	2	-	2	E3	5	-	-	-	-	-
22	Vertebrate zoology (2)	3906BB1F04I022	-	-	-	-	-	2	-	2	E4	4
23	Comparative anatomy	3906BB1S04I023	-	-	-	-	-	1	1	1	C4	3
24	Microbiology	3906BB1F04I024	-	-	-	-	-	2	-	2	E4	3
25	Genetics I	3906BB1F04I025	-	-	-	-	-	2	1	1	E4	4
26	Cell biology	3906BB1F03I026	1	1	1	C3	4	-	-	-	-	-
27	Biochemistry I	3906BB1F03I027	2	-	2	E3	5	-	-	-	-	-
28	Biophysics I	3906BB1F03I028	2	-	1	C3	3	-	-	-	-	-
29	Laboratory techniques	3906BB1S03I029	-	-	2	C3	3	-	-	-	-	-
30	Physical training 3	3906BB1C03I030	-	2	-	V3	-	-	-	-	-	-
31	Practical training 1 14 days x 6 hours = 84 hours	3906BB1S04I031	-	-	-	-	-	-	-	-	C4	3
	Optional course 1		-	-	-	-	-	2	-	1	C4	5
	Optional course 2							2		1	E4	5
			11	2	11	4E3CIV	29	13	2	10	5E3C	31
Total compulsory hours on week			24						25			
<b>Optional disciplines</b>												
Optional course 1												
32	Mountain flora	3906BB1F04O032	-	-	-	-	-	2	-	1	C4	5
33	Metabolic biochemistry	3906BB1S04O033	-	-	-	-	-	2	-	1	C4	5
Optional course 2												
34	Mountain Fauna	3906BB1F04O034	-	-	-	-	-	2	-	1	E4	5
35	Enzimology	3906BB1C04O035	-	-	-	-	-	2	-	1	E4	5
<b>Facultative disciplines</b>												
36	Biochemistry II	3906BB1F03F036	1	-	1	C3	3					
37	Biophysics II	3906BB1F03F037	1	1	-	C3	3					
38	Ethnobiology	3906BB1S03F038	1	1	-	C3	3	-	-	-	-	-
39	Development biology	3906BB1F04F039	-	-	-	-	-	1	1	-	C4	3
40	Biospeology	3906BB1C04F040	-	-	-	-	-	1	1	-	C4	3
			3	2	1	3C	9	2	2	-	2C	6
Total facultative hours on week			6						4			

### III-rd YEAR

No. crt.	Compulsory disciplines	Code discipline	Semester V					Semester VI				
			C	S	L	Form of examination	Credits no.	C	S	L	Form of examination	Credits no.
41	Genetics II	3906BB1F05I041	2	-	2	E5	4	-	-	-	-	-
42	Parazithology	3906BB1S05I042	2	-	2	E5	4	-	-	-	-	-
43	Entomology	3906BB1S05I043	2	-	2	E5	4	-	-	-	-	-
44	Biogeography	3906BB1C05I044	2	1	1	E5	4	-	-	-	-	-
45	Evolutionism	3906BB1F05I045	2	1	-	E5	4	-	-	-	-	-
46	Ethology	3906BB1C06I046	-	-	-	-	-	2	1	-	E6	4
47	Hidrobiology	3906BB1F06I047	-	-	-	-	-	2	-	2	E6	4
48	Biodiversity conservation	3906BB1C06I048	-	-	-	-	-	2	1	1	E6	4
	Optional course 3		1	1	1	C5	5	-	-	-	-	-
	Optional course 4		1	-	1	C5	5	-	-	-	-	-
	Optional course 5		-	-	-	-	-	2	-	2	C6	6
	Optional course 6		-	-	-	-	-	2	-	1	C6	6
	Optional course 7		-	-	-	-	-	1	2	-	C6	6
			12	3	9	5E2C	30	11	4	6	3E3C	30
Total compulsory hours on week			24					21				
<b>License examination</b>												
	License examination		-	-	-	-	-	-	-	-	-	15
	License elaboration		-	-	-	-	-	-	-	-	-	15
<b>Optional disciplines</b>												
<b>Optional course 3</b>												
49	Animals reproduction and nutrition relation functions	3906BB1S05O049	1	1	1	C5	5	-	-	-	-	-
50	Plants development and nutrition physiology	3906BB1S05O050	1	1	1	C5	5	-	-	-	-	-
<b>Optional course 4</b>												
51	Medical biology	3906BB1S05O051	1	-	1	C5	5	-	-	-	-	-
52	Bioproductivity	3906BB1F05O052	1	-	1	C5	5	-	-	-	-	-
<b>Optional course 5</b>												
53	Biotechnologies	3906BB1S06O053	-	-	-	-	-	2	-	2	C6	6
54	Mycology	3906BB1S06O054	-	-	-	-	-	2	-	2	C6	6
<b>Optional course 6</b>												
55	Neurobiology	3906BB1F06O055	-	-	-	-	-	2	-	1	C6	6
56	Ornitology	3906BB1S06O056	-	-	-	-	-	2	-	1	C6	6
<b>Optional course 7</b>												
57	Imunology	3906BB1S06O057						1	2	-	C6	6
58	Acvaculture	3906BB1S06O058						1	2	-	C6	6
<b>Facultative disciplines</b>												
59	Human genetics	3906BB1F06F059						1	-	1	C6	3
60	Antropology	3906BB1S05F060	1	-	1	C5	3	-	-	-	-	-
61	Integrated pest control	3906BB1C06F061	-	-	-	-	-	1	-	1	C6	3
Total facultative hours on week			1	-	1	1C	3	2	-	2	2C	6
			2					4				

**IX. Synthetic situation of the subject matters, number of hours and of their weight in the educational plan**

Total of subject matters in the educational plan = 61

Total of subject matters (compulsory and complementary) for the credits achievement = 43

Total ore 1876 ore + 84 ore practică = 1960ore

A. Fundamental discipline = 31; 50,81% 1302 ore;

C. Specialization discipline = 17; 27,86% 252 ore;

D. Complementary discipline =13; 21,31% 322 ore;

# I-st YEAR

# PLANT CYTOLOGY, ANATOMY AND MORPHOLOGY

**Course coordinator:** Lecturer Mihas Craciunas, Ph.D. Candidate

**Year :** I semestre : 1

**No. hours course:** 2 ; no. hours laboratory : 2

**Discipline type :** compulsory ; fundamental/basic

**ECTS:** 5

**Prerequisites:** -

## **Aims:**

Knowledge of peculiarities, form, dimensions and ultrastructure of plant cell. Knowledge of plant tissue types and peculiarities. Knowledge of vegetative and reproductive organs' morphology of plants.

## **Content:**

Plant cell; Histology; Peculiarities of plant tissues; Root; Stem; Leaf; Plant reproduction; Flower in Angiospermae, Flower and inflorescence types; Fruit; Seed.

## **Skills :**

Capability to understand and render terms, concepts and principles of Botany. Competence to explore the vegetal world at micro and macroscopic level. Competence to communicate by using terms specific to Botany, to explain the organization/ structure of the plants, their ecological preferences, plant-environment interactions, their adaptation to the environment.

## **Assesement :**

The final mark will be calculated based on :

Practical examination 25 %

Mid semester examination 25%

Final examination 50%.

## **References :**

Andrei, M., Predan, G.M.I., 2003, Practicum de morfologia și anatomia plantelor, Ed. Științelor Agricole, București

Deliu, C., 2003, Morfologia și anatomia plantelor, Univ. Babeș-Bolyai, Cluj-Napoca

Palade, M. 1998, Botanica farmaceutică vol 1, Ed. Tehnică

# SYSTEMATIC OF CRYPTOGAMS

**Course coordinator :** Prof. Drăgulescu Constantin Ph.D. –

**Year :** I semester : 1

**No. hours course:** 2 ; **no. hours laboratory :** 2

**Discipline type:** compulsory; fundamental/basic

**ECTS:** 5

**Prerequisites –**

## **Aims:**

The knowledge and understanding by the students of terms, notions, concepts, and principles specific to Botany, focusing on the systematics of plant kingdom. The presentation of talophytes (inferior plants) phyla's characteristics and the description of main representatives. Highlighting the role of these plants in nature.

## **Content:**

Classification of plant kingdom ; Phylum Bacteriophyta; Phylum Cyanophyta ; Phylum Euglenophyta ; Phylum Chrysophyta ; Phylum Pyrrophyta ; Phylum Chlorophyta ; Phylum Phaeophyta ; Phylum Rhodopyta ; Phylum Myxophyta ; Phylum Mycophyta ; Phylum Lichenophyta ; Phylum Bryophyta.

## **Skills:**

Capability to understand and render terms, concepts and principles of the Systematic Botany, of the unity of living world and of the evolution from simple to complex. Capability to explore the vegetal world and to identify the main plant species of the region/country and to perform intellectual and practical activities

## **Assessment:**

The final mark will be calculated based on:

Practical examination 25 %

Mid semester examination 25%

Final examination 50%.

## **References :**

Drăgulescu, C., Bartók, K., Crişan, Fl., 2005, Lichenoflora judeţului Sibiu (Lichenoflora of Sibiu County), Edit. Univ. "Lucian Blaga" Sibiu

Momeu, Laura, Drăgulescu, C., 2008, Algoflora judeţului Sibiu (Algoflora of Sibiu County), Edit. Univ. "Lucian Blaga" Sibiu

Negrean, G., Drăgulescu, C., 2005, Mycobiota judeţului Sibiu (Mycobiota of Sibiu County), Edit. Univ. "Lucian Blaga" Sibiu

Pop. I. şi colab., 1983, Botanică sistematică (Systematic Botany), Edit. did. şi pedag. Bucureşti

# SYSTEMATIC OF PHANEROGAMS

**Course coordinator:** Prof. Drăgulescu Constantin Ph.D. –

**Year:** I semester: 2

**No. hour's course:** 2; **no. hours laboratory:** 2

**Discipline type:** obligatory; fundamental/basic

**ECTS:** 5

**Prerequisites:** Plant morphology and anatomy, Systematic of cryptogams

## **Aims:**

The knowledge and understanding by the students of terms, notions, concepts, and principles specific to Botany, focusing on the systematic of plant kingdom. The presentation of cormophytes (superior plants) phyla's characteristics and the description of main representatives. Highlighting the role of these plants in nature.

## **Content:**

General characteristics of Cormobionta; Phylum Pteridophyta; Phylum Gymnospermatophyta; General characteristics of Phylum Angiospermatophyta. Class Magnoliatae; Class Liliatae.

## **Skills:**

Capability to understand and render terms, concepts and principles of the Systematic Botany, of the unity of living world and of the evolution from simple to complex. Capability to explore the vegetal world and to identify the main plant species of the region/country and to perform intellectual and practical activities

## **Assessment:**

*The final mark will be calculated based on:*

*Practical examination 25 %*

*Mid semester examination 25%*

*Final examination 50%.*

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## **References:**

Drăgulescu, C., 1993, Botanică sistematică și ecologică (Systematic and ecologic botany), Edit. Univ. Sibiu

Drăgulescu, C., 2003, Cormoflora județului Sibiu (Cormoflora of Sibiu County), Edit. Pelecanus Brașov

Pop. I. și colab. 1983, Botanică sistematică (Systematic botany), Edit. did. și pedag. București

Ștefan, N., Oprea, A., 2007, Botanica sistematică (Systematic botany), Edit. Univ. "Al. I. Cuza" Iași



# ANIMAL CYTOLOGY AND HISTOLOGY

**Course coordinator** Lecturer **DANIEL GHEOCA** Ph.D. Candidate

**Year I, semester: I**

**No. hours course, no. hours laboratory: 28/28**

**Discipline type:** fundamental,

**ECTS:** 4

**Prerequisites:** -

## **Aims:**

Study of cell structures, of biochemical processes representing the basis of life's phenomena. Highlighting the universal character of cell system, of its structural and functional complexity, as well as the structural and functional peculiarities of specialized cells. Getting knowledge on the main tissue types and their structure and functioning.

## **Content**

The cell – open system. Chemical composition of the cell; Origin of prokaryotic and eukaryotic cell. Cellular wall and membranes, chemical composition, physiological role, structural models of plasmalemma, physiological role; factors influencing permeability of cell membranes. Hialoplasma – structure and ultrastructure; biochemical mechanisms. Interphasic nucleus; the nucleus in mitosis and meiosis. Cell organelles: mitochondria, ribosomes and protein synthesis, endoplasmic reticulum and Golgi apparatus and their role in metabolism. Lysosomes and movement organella of unicellular and multicellular organisms. Tissues – structure, localization – epithelial tissue, conjunctive tissue, muscular tissue, nervous tissue.

## **Skills**

Ability of understanding and reproducing terms, concepts and principles of cytology and histology, of the life's structural and physiological unity. Correct use of speciality terms. Capacity of distinguishing and identification different cell structures specific to animal cell and different tissue cells, using optical apparatus.

## **Assessment:**

The final mark will be calculated based on mid semester evaluations (15%), evaluation of independent activity consisting of essay preparation (20%), evaluation of the activity during the practices (15%), and final written theoretical examination (50%).

## **References**

Benga, Gh., 1985, Biologie celulară și moleculară, Ed. Dacia, Cluj-Napoca  
Gheoca D, Gheoca V. 2004, Practicum de citohistologie, Ed. Mira Design

# BASIC HUMAN ANATOMY AND HYGIENE

**Course coordinator:** Assoc. Prof. ZAMFIR ALEXANDRA Ph.D.

**Year, semester:** I, 1, EPM; I, 2 BIOLOGIE

**No. hours course: 2; no. hours 2 laboratory:**

**Discipline type** compulsory,

**ECTS:** 5

**Prerequisites:** Cell Biology, Molecular Cell Biology, Biochemistry

**Aims** This course present the fundamental structure of human organs and systems in a format that is suitable for undergraduate students, regardless of academic background or fields of study: ecology, biology, or other allied health professions. This course progresses from the tissues to the organ of human and finally to the total organism like a biological system

## Content

Whereas Part 1 focussed mainly on the basic principles of structure of human tissues. Part 2 converges on form and anatomy of nutritional and relational organs of human systems. The risk factors are presented for each anatomical structure and the prevention of anatomical diseases and protection means.

## Skills

- recognize morphological and anatomical features of all systems from human body;
- describe anatomical structures of nutrition and relations and control human systems;
- point out which actual risk factors related diseases and modified the structures of human organs;
- perform to act in specific situation ( nutrition, breath, circulatory, excretory, mental, endocrinology, motor, diseases ) of the first aim or prevention measures of those diseases

**Assessment:** The final mark will be calculated based on:

activity during laboratory (%)

practical examination (%)

essay preparation (%)

mid semester examination 25 (%)

final examination 75 (%)

## References

Ilie, Daniela, Minodora și Alexandra Zamfir, 2005, Anatomia omului, vol.I, Ed.Univ. "Lucian Blaga", Sibiu

Zamfir Alexandra, 2000, Anatomia și igiena omului, Ed. Alma Mater, Sibiu

## **APPLIED SPECIAL MATHEMATICS IN BIOLOGY**

**Course coordinator** Lecturer Amelia Bucur Ph.D.

**Year, semester:** I,I, the specialization EPM+Biology

**No. hours course: no. hours seminary / laboratory:** 1C,1S

**Discipline type:** Fundamental,

**ECTS:**3

**Prerequisites:** Basic knowledge of highschool mathematics.

### **Aims**

Knowing applied mathematical models with applicability in biology and ecology.

### **Content:**

The course contains applications of one and many variable functions, differential equations, mathematical statistics and fractals theory in biology and ecology.

### **Skills:**

Gain the ability to use functions, differential equations and mathematical statistics elements to solve ecology and biology problems.

### **Assessment:**

The final mark is composed by 40% semestrial activity (20% partial exam and 20% activity at course) and 60% the final exam(the final exam has a calssical subject style).

### **References**

Amelia Bucur,Applied special mathematics in biology and ecology,Ed.ULBS,2008

# II-nd YEAR

# PHYTOSOCIOLOGY AND ROMANIAN VEGETATION

**Course coordinator** : Prof. Drăgulescu Constantin Ph.D. –

**Year** : II **semester** : 3

**No. hours course**: 2 ; **no. hours laboratory** : 1 ; **no. hours seminary** : 1

**Discipline type** : compulsory ; speciality

**ECTS**: 5

**Prerequisites**: Plants biology 2 (for ecologists), Systematic of cryptogams (for biologists), General ecology, Mathematics with applications in biology and ecology

## **Aims:**

The knowledge and understanding by the students of terms, notions, concepts, and principles specific to Phytosociology, mainly those regarding the phytocoenoses' structure, functions, dynamics and systematics. Getting the students familiarized with the main plant associations from the zones and vegetation levels from Romania.

## **Content:**

Phytocoenological schools. The structure of phytocoenoses. Phytocoenological indices. The technique of samples' achievement. The functions of phytocoenoses. Coenotaxonomy of vegetal groups. The mapping of vegetation. General characterization of Romanian vegetation. The zones of vegetation from Romania with principal associations. The levels of vegetation from Romania with principal associations.

## **Skills:**

Capability to understand and render terms, concepts and principles of Phytosociology and to communicate using Phytosociology specific language. Capability to identify the main plant associations within the country and to perform applicative activities. Capability to explore the vegetal world in order to make prognoses and extrapolations on phyto-ceno-diversity.

## **Assessment:**

*The final mark will be calculated based on:*

*Practice examination 25 %*

*Mid semester examination 25%*

*Final examination 50%.*

## **References :**

Borza, Al., Boşcaiu, N., 1965, Introducere în studiul covorului vegetal (Introduction in the study of vegetal carpet), Edit. Acad. Bucureşti

Cristea V., Gafta, D., Pedrotti F., 2004, Fitosociologie (Phytosociology), Edit. Presa Universitară Clujană, Cluj-Napoca

Drăgulescu, C., Sîrbu, I., 2002, Practicum de fitocenologie (Practicum of phytocoenology), Edit. Alma Mater Sibiu

Sanda V., 2002, Vademecum ceno-structural privind covorul vegetal din România (Coeno-structural vademecum of Romanian vegetal carpet), Edit. Vergiliu Bucureşti

# PLANT PHYSIOLOGY

**Course coordinator** Assoc. Prof. ZAMFIR ALEXANDRA Ph.D.

**Year, semester:** II, 1

**No. hours course: 28 no. hours 28 laboratory:**

**Discipline type compulsory, ECTS:** 5

**Prerequisites:** Plant Biology, Chemistry, Biochemistry

**Aims** In this course the students in ecology and biology fields will be acquainted with (possible) correlation between the environmental factors and the physiological mechanism of the plant. The course presents also, how these factors influence the nutrition, respiration, production, and in which conditions are positive or negative in the plant life. One of our goal is to correlate the theoretical information with technology in order to protect the primary producers of the ecosystems.

**Content:** In the first part of the course are presented the cell structure of plant and the physiological role of each one. Then it is presented the interrelation of plant physiological mechanism with environmental factors : water, mineral substances, light, oxygen, another plants. The environmental factors influence the plant physiology in two conditions: quantitative and qualitative.

## **Skills**

- to understand the influence and the effects, of environmental factors on the plant physiological mechanisms;
- to point out the relationship between structure of cell plants and their functionality, anatomical structure of plant organs and the physiological adaptability in optimal condition;
- to explain the influence of environmental factor in minimal or maximal condition, the tolerance of plant trough the physiological mechanisms;
- to integrate and apply his basic knowledge on physiology.

**Assessment:** The final mark will be calculated based on:

essay preparation (%) -

mid semester examination (%) 20

final examination (%) 80

## **References**

Atanasiu, L., 1984, Ecofiziologia plantelor, Ed. Șt. și Encicl., București

Zamfir Alexandra, 2000, Noțiuni de fiziologie și ecofiziologie vegetală, Ed. Alma Mater din Sibiu

# ANIMAL PHYSIOLOGY

**Course coordinator** Assoc.Prof.ZAMFIR ALEXANDRA Ph.D.

**Year, semester:** II, 2

**No. hours course: 28 no. hours 28 laboratory:**

**Discipline type** compulsory,

**ECTS:** 4

**Prerequisites:** Cell Biology, Biochemistry , Animal Biology

**Aims** In this course the student in ecology and biology fields will be acquainted with (possible) correlation between the environmental factors and the physiological mechanism of the animal. The course presents also how sensitive, neuronal, hormonal, receptors and the movement systems are implicated in steady station, or homeostasis of animal and human organisms.

**Content:** In the first part of the course are presented the mechanisms of autoregulation in physiological processes. Then is presented sensory system like a part of nervous system, how these receive stimuli from the external and internal environmental. In the third part the course it is explain the role of nervous sistem in the movement, the relation of this with endocrine glands, the mouvement of different animals, and processes of regulation of body temperature in poikilotherm and homeotherm animals.

## **Skills**

- to understand the influence and the effects, of environmental factors on the animal physiological mechanisms;
- to point out the relationship between structure of animal cell and their functionality, anatomical structure of organs and the physiological adaptability in optimal conditions;
- to explain the influence of environmental factor, like stimuli, the sensibility and specificity of the receptors, nervous systems capacity to process the information and the reflex response of animals.

**Assessment:** The final mark will be calculated based on:

essay preparation (%) -

mid semester examination (%) 20

final examination (%) 80

## **References**

Ardelean, G., Roşioru, C., 1996, Integrarea și coordonarea organismului animal, Ed.Univ., Baia Mare,

Zamfir Alexandra, Noțiuni de fiziologie și ecofiziologie animală, Ed.Alma Mater, Sibiu

# PLANT PHYSIOLOGY

**Course coordinator** Assoc.Prof. ZAMFIR ALEXANDRA Ph.D.

**Year, semester:** II, 1

**No. hours course: 28 no. hours 28 laboratory:**

**Discipline type compulsory, ECTS:** 5

**Prerequisites:** Plant Biology, Chemistry, Biochemistry

**Aims** In this course the student in ecology and biology fields will be acquainted with (possible) correlation between the environmental factors and the physiological mechanism of the plant. It is presented also, how these factors influence the nutrition, respiration, production and in which conditions are positive or negative on the plant life. One of our goal is to correlate the theoretical information with technology in order to protect the primary producers of the ecosystems.

**Content:** In the first part of the course are presented the cell structure of plant and the physiological role of each one. Then is presented the interrelation of plant physiological mechanism with environmental factors : water, mineral substances, light, oxygen, another plants. The environmental factors influence the plant physiology in two conditions: quantitative and qualitative.

## **Skills**

- to understand the influence and the effects, of environmental factors on the plant physiological mechanisms;
- to point out the relationship between structure of cell plants and their functionality, anatomical structure of plant organs and the physiological adaptability in optimal conditions;
- to explain the influence of environmental factor in minimal or maximal condition, the tolerance of plant trough the physiological mechanisms;
- to integrate and apply his basic knowledge on physiology.

**Assessment:** The final mark will be calculated based on:

essay preparation (%) -

mid semester examination (%) 20

final examination (%) 80

## **References**

Atanasiu, L., 1984, Ecofiziologia plantelor, Ed. Șt. și Encicl., București

Zamfir Alexandra, 2000, Noțiuni de fiziologie și ecofiziologie vegetală, Ed. Alma Mater din Sibiu



# VERTEBRATE ZOOLOGY (I)

**Course coordinator:** Lecturer VOICHITA GHEOCA Ph.D.

**Year, semester:** II/I

**No. hours course: no. hours laboratory:** 28/28

**Discipline type:** compulsory,

**ECTS:** 5

**Prerequisites:** Invertebrate zoology ( I ); Invertebrate zoology ( II);

## Aims

Study of vertebrates, based on the knowledge of aspects regarding: morphology, structure, development, systematics and phylogeny, distribution, way of life, relations with the environment and other living organisms. Presentation of Earth's fauna diversity, and especially of Romania's fauna. Highlighting the theoretical and practical importance of animal biology study, of the knowledge of the role animals play in nature and man's life.

## Content

The course presents information on Chordata – general characters, origin. Cephalochordata – general characterization of a common form ( *Branchiostoma lanceolatum* ) – biology, importance. Urochordata – general characters, systematics, biology, importance. Vertebrata – fish and amphibians – morphological and anatomical characterization, origin, adaptations to the environment, principles of classifications, phylogenetic considerations, classification, representatives.

The laboratory presents the general characters of the groups by anatomical and morphological study of some representatives.

## Skills

Ability of understanding and reproducing specific terms, principles of animal biology, of structural and physiological unity of living world and of evolution from simple to complex. Capacity of identifying the main animal species in the field. Ability of exploring the animal world in order to forecast local diversity based on own observations and experiments.

## Assessment:

The final mark will be calculated based on mid semester evaluations (15%), evaluation of independent activity consisting of essay preparation (10%), evaluation of the activity during the practices (25%), and final written theoretical examination (50%).

## References

Bucșa, C., Gheoca, V., 1995, Biologie animală. Îndrumător de lucrări practice, Univ. "L. Blaga" Sibiu

Gheoca, V., 2000, Biologie animala III, Ed. Alma Mater Sibiu

Stugren, B., Coroiu, I., 1996, Sistemática filogenetică, anatomia comparată și zoologia vertebratelor, vol. I-II, Univ. "Babeș Bolyai", Cluj-Napoca

## VERTEBRATE ZOOLOGY (II)

**Course coordinator** Lecturer **VOICHTA GHEOCA Ph.D.**

**Year, semester:** II/IV

**No. hours course: no. hours laboratory:** 28/28

**Discipline type:** fundamental,

**ECTS:** 4

**Prerequisites:** Invertebrate zoology ( I ); Invertebrate zoology ( II), vertebrate zoology ( I );

### **Aims**

Study of vertebrates, based on the knowledge of aspects regarding: morphology, structure, development, systematics and phylogeny, distribution, way of life, relations with the environment and other living organisms. Presentation of Earth's fauna diversity, and especially of Romania's fauna. Highlighting the theoretical and practical importance of animal biology study, of the knowledge of the role animals play in nature and man's life.

### **Content**

Amniotic vertebrates – Classis Reptilia, Aves, Mammalia – general characters, evolution, biology, phylogenetic considerations, importance, classification, systematics.

### **Skills**

Ability of understanding and reproducing specific terms, principles of animal biology, of structural and physiological unity of living world, of evolution from simple to complex. Capacity of identifying the main animal species in the field and laboratory. Ability of exploring the animal world in order to forecast local diversity based on own observations and experiments.

### **Assessment:**

The final mark will be calculated based on mid semester evaluations (15%), evaluation of independent activity consisting of essay preparation (10%), evaluation of the activity during the practices (25%), and final written theoretical examination (50%).

### **References**

Bucşa, C., Gheoca, V., 1995, Biologie animală. Îndrumător de lucrări practice, Univ. "L. Blaga" Sibiu

Gheoca, V., 2000, Biologie animala III, Ed. Alma Mater Sibiu

Stugren, B., Coroiu, I., 1996, Sistemática filogenetică, anatomia comparată și zoologia vertebratelor, vol. I-II, Univ. "Babeş Bolyai", Cluj-Napoca

# COMPARATIVE ANATOMY

**Course coordinator:** Lecturer VOICHITA GHEOCA Ph.D.

**Year, semester:** II/IV

**No. hours course: no. hours seminary / laboratory:** 28/14/14

**Discipline type** specialisation,

**ECTS:** 3

**Prerequisites:** Vertebrate zoology I, Vertebrate zoology II

## **Aims**

The study of vertebrates' complex morphological systems' evolution. The placement of anatomical systems in evolutionary context, the study of each major system and the establishment of its evolution, from its appearance to the present structures in the developed groups. To clarify the way these systems co-operate and function as a whole representing life.

## **Content:**

Evolution, phylogeny, palaeontology – comparative anatomy as a science. Short recapitulation of the main taxa. Form and function in vertebrate series. Development: tegument – structure, horny tegument formations; skeleton – cephalic, axial, zone skeleton; musculature – structure and organization; respiratory system – branchial, pulmo-tegumentary, pulmonary respiration, and other respiratory surfaces; circulatory system – evolution of the heart and the correlation with the respiratory system; digestive system- organization and adaptation to the different trophic regimes; urogenital system – organization and adaptive evolution; nervous system – brain evolution in vertebrates; sensorial structures – structure types and development degree.

## **Skills**

Ability of understanding and reproducing terms, concepts and comparative anatomy's principles, of the living world's structural and physiological unity, of evolution from simple to complex. Capacity of identification of different anatomic structures and establishing the correspondences with the systematically categories.

**Assessment:** The final mark will be calculated based on mid semester evaluations (20%), evaluation of independent activity consisting of essay preparation (15%), final written theoretical examination (65%).

## **References**

Mișcalencu, D., Mailat-Mișcalencu, Fl. 1978. *Anatomia comparată a vertebratelor*, E.D.P., București.

Stugren, B. Coroiu, I. 1994. *Sistematica filogenetică, anatomia comparată și zoogeografia vertebratelor, vol. I-II, curs litografiat*, Univ. "Babeș-Bolyai", Cluj-Napoca

# GENETICS (I)

**Course coordinator** Lecturer **VOICHITA GHEOCA Ph.D.**

**Year, semester:** II/IV

**No. hours course: no. hours seminary / laboratory:** 28/14/14

**Discipline type** Fundamental,

**ECTS:** 4

**Prerequisites:** Animal cytology and histology, General chemistry, Biochemistry

**Aims:** The knowledge of basic genetic terms, structures and processes involved in inheritance of characters. Knowledge of chromosomal mechanism of heredity, of the Mendel's laws of heredity, and sources of genetic variability.

**Content:** The genetic material – support of heredity. Structure of nucleic acids – DNA, RNA - and their chromosomal disposal. Chemical codification – replication, transcription, translation; genetic regulation. Mendelian laws of segregation. Other modalities of gene segregation. Gene interaction, epistasis. Lethal genes. Chromosomal mechanism of heredity. Chromosomal theory of the heredity. Sources of genetic variability – mutation and recombination in procariotes and eucariotes. Chromosomal maps. Heredity of sexes.

## **Skills:**

Understanding and reproduction of genetic terms and principles. Capacity of communication using the genetics specific language, to explain how the genetic material is organised, the mechanisms involved in genetic material replication, gene expression and genetic regulation. The capacity to identify

normal and modified genetic structures, of mutations in plants and animals.

**Assessment:** The final mark will be calculated based on:

practical examination (15%)

essay preparation (10%)

mid semester examination (15%)

final examination (60%)

## **References:**

Coman, N., 1977, *Genetica populațiilor*, Univ. "Babeș-Bolyai" Cluj-Napoca

Coman, N., 1991, *Genetica*, vol. I, Univ. "Babeș-Bolyai" Cluj-Napoca

Raicu, P., 1991, *Genetica*, EDP, București

# CELL BIOLOGY

**Course coordinator:** Assoc.Prof ZAMFIR ALEXANDRA Ph.D.

**Year, semester:** II, 1 (BIOLOGY)

**No. 28 hours course;** no. 14 hours laboratory; no. 14 hours seminary

**Discipline type** Optional,

**ECTS:** 4

**Prerequisites:** Biochemistry

**Aims** The students in biology and medicine fields can receive the basic knowledge for another more specialized course: plant and animal physiology, genetic, cell biotechnology. The students can achieve a working knowledge through describe, explain, integrate and synthesized information about the ultra structure and function of cells, its organelles and bio molecules.

## Content

Whereas Part 1 focussed mainly on the basic chemical contents of animal and plant cells. Part 2 converges on prokaryote and eukaryote cells origin. Then are presented eukaryote cells organelles with their molecular structure and their biochemical mechanisms: plasma membrane and transmembranar transport, ribosome's and protein syntheses, mitochondrial organelle and Krebs cycle, electron transport chain, chloroplast and photosynthesis, etc;

## Skills

- to recognize morphological and molecular of all cell organelles;
- to describe the technology to research the cellular mechanism and their interest in practice;
- to point out that cells are biological systems and the basic units of living organisms.

**Assessment:** The final mark will be calculated based on:

activity during laboratory (%) -

practical examination (%) -

essay preparation (%) -

mid semester examination 20 (%)

final examination 80 (%)

## References

Benga, Gh. 1985, Biologie celulară și moleculară, Ed. Dacia, Cluj-Napoca

Darnell, J., Lodish, H., Baltimore, D., 2001, Molecular cell biology, Scientific American Press., New York

Diculescu, I., și colab., 1983, Biologie celulară, Ed. Did. și Ped., București

Zamfir Alexandra, 2000, Noțiuni de biologie celulară, Alma Mater, Sibiu

# BIOCHEMISTRY (I)

**Course coordinator:** Assoc. Prof. biochemist Simona OANCEA, Ph.D.

**Year, semester:** II, III

**No. hours course: no. hours seminary / laboratory:** 28/28

**Discipline type:** Fundamental

**ECTS:** 5

**Prerequisites:** General Chemistry, Molecular Biology, Microbiology

## **Aims:**

Presentation of bioelements and biomolecules of the living matter.

Enzymes' mechanism of action and their involvement in biological processes in plants, animals and microorganisms.

Biochemistry of the interactions of organisms with the environment.

Application of analytical methods to study biocomponents isolated from different biological sources.

## **Content:**

Organisation levels' of the living matter. Biochemistry of saccharides, lipids and proteins. Enzymes. Vitamins. Nucleic acids. Structure and functions of hormones from plants and animals. Biochemical communication between same species. Biochemical interactions between different species.

Biochemical methods of analysis of the cell constituents.

## **Skills**

In addition of the course and practical activity, the student must know the main biochemical characteristics of cellular chemical constituents, the effects and functions of bio molecules, biochemical communication in living organisms and analytical methods for bio molecules' identification.

## **Assessment:**

The final mark will be calculated based on:

activity during seminars, essay preparation (20 %)

practical examination (30%)

final examination (50%)

## **References**

Oancea S., *Biochimie ecologică*, Editura Alma Mater, Sibiu, 2007.

Oancea S., *Căi metabolice primare în sistemele biologice*, Editura Universității "Lucian Blaga" Sibiu, 2005.

Lehninger A., *Biochimie*, vol. I și II, Editura Tehnica, București, 1987.

Neamtu G., *Biochimie vegetala*, Editura Ceres, București, 1981.

Iordăchescu D., *Biochimia acizilor nucleici*, Ed. Universității din București, 1997.

## LABORATORY TECHNIQUES

**Course coordinator** Lecturer **DANIEL GHEOCA Ph.D. Candidate**

**Year, semester:** II/III

**No. hours course: no. hours seminary / laboratory:** 28

**Discipline type:** Speciality,

**ECTS:** 3

**Prerequisites:** Cytology and Animals histology, General chemistry

### **Aims**

Acquiring knowledge and practical abilities regarding the main techniques used in speciality labs.

### **Content**

Organizing a laboratory. Management of samples, sampling, identification, typisation, keeping, denaturation. Sterilization – principles and methods, disinfection. Smear (extemporaneous and permanent) technique. Histological preparation techniques. Techniques in bacteriology. Antigens-antibodies reaction. RCF (reaction of complement fixation). Electrophoresis. Direct and indirect immune-fluorescence. Polymerization chain reaction (PCR). ELIZA. Centrifuging principles and technique. Filtration and ultra filtration. Flotation and sedimentation. Cell cultures: types, the cytopathic effect of different biological agents. Bacteriophagous. Biological sample. Errors that may occur during analysis, the artefact. Limits of diagnostic methods.

### **Skills**

Ability of understanding and reproducing terms and principles of the main lab techniques. Capacity of using the techniques and interpret the results.

### **Assessment:**

The final mark will be calculated based on mid semester evaluations (25%), evaluation of independent activity consisting of essay preparation (25%), evaluation of the activity during the practical (50%).

### **References :**

Ghergariu, S., Pop A., Kadar, L., Spanu, M., 1999, Manual de laborator clinic veterinar, Ed. All, Bucuresti

# MOUNTAIN FLORA

**Course coordinator:** Prof. Drăgulescu Constantin Ph.D. – and Assoc Prof. Schneider Erika Ph.D. –

**Year:** II semester: 4

**No. hours course:** 2; **no. hours laboratory:** 1

**Discipline type:** Optional; Speciality

**ECTS:** 5

**Prerequisites:** Systematic of cryptogams, Systematic of phanerogams, Phytosociology and Romanian vegetation.

## **Aims:**

Getting the students familiarized with the botanical specificity of the Carpathians, with the plants' adaptations to geographic, climatic, and pedologic conditions in these mountains, with the main Carpathian ecosystems and plants associations and their differential flora depending on the ecological factors specific to each described ecosystem.

## **Content:**

The plants adaptations at mountain ecological factors. The classification of orophytes after plants adaptations at climatic, orographic, geological and pedological factors. Principal ecosystems from the Carpathians. The forests. The mountains, sub alpine and alpine bushes. The grass-plots. The saxicolous phytocoenoses. The springs, lakes and bogs vegetation. The agrocoenoses and weedscoenoses. The protected sites in the Carpathians. The plants with economic value.

## **Skills:**

Capability to understand and render terms, concepts of Plant Ecology applied to mountain habitats. Ability to explore the vegetal world in order to make prognoses and extrapolations concerning mountain phytodiversity, based on observation and experiments. Capability to identify the main mountain plant species.

## **Assessment:**

*The final mark will be calculated based on:*

*Practical examination 25 %*

*Mid semestre examination 25%*

*Final examination 50%.*

## **References:**

- Chiriță, C. și colab., 1981, Pădurile României. Studiu monografic (Romanian forests. Monographic study), Edit. Acad. București
- Drăgulescu, C., Schneider, Erika, Benedek Ana Maria, 2006, Fitodiversitatea habitatelor din Carpați (Phytodiversity of Carpathians habitats), Edit. Univ. "Lucian Blaga" Sibiu
- Pârvu, C. și colab. 1980, Ecosistemele din România (Ecosystems of Romania), Edit. Ceres București
- Sîrbu, I, Benedek Ana Maria, 2001, Cartea muntelui (The book of the mountain), Edit. Mira design Sibiu



# METABOLIC BIOCHEMISTRY

**Course coordinator Assoc. Prof. Simona OANCEA, Ph.D.**

**Year, semester:** II, IV

**No. hours course: no. hours seminary / laboratory:** 28/14

**Discipline type:** Speciality

**ECTS:** 5

**Prerequisites:** General Chemistry, Molecular Biology, Microbiology, Biochemistry I

## **Aims**

Knowledge of essential aspects regarding metabolism, bioenergetics, macroergic compounds.

Knowledge of essential aspects of primary metabolism and metabolic interactions.

Presentation of some mechanisms of metabolic regulation.

Knowledge of quantitative analysis of cellular components. Study of metabolic pathway

## **Content**

General concepts of metabolism. Bioenergetics. Macroergic compounds. Effects of environmental factors on plant metabolism. Metabolism of saccharides, lipids and amino acids. Biosynthesis of proteins. Metabolism of nucleotides. Intercellular communication: hormones and neurotransmitters. Mechanisms of metabolic regulation. Mineral metabolism, notions regarding secondary metabolism of plants.

Biochemical methods for quantitative analysis of cellular components

## **Skills**

In addition of the course and practical activity, the student must know the main metabolic pathways of saccharides, lipids, proteins, nucleotides, the types of intercellular communication, mineral metabolism, and to determine quantitatively bioactive substances from different biological sources.

## **Assessment:**

The final mark will be calculated based on:

activity during seminaries, essay preparation (20 %)

practical examination (30%)

final examination (50%)

## **References**

Oancea Simona, *Căi metabolice primare în sistemele biologice*, Editura Universității "Lucian Blaga" Sibiu, 2005.

Iordăchescu D., *Biochimie – partea II-a. Metabolism intermediar*, Edit. Universității din București, 1986.

Lehninger A., *Biochimie*, vol. II, Editura Tehnică, Bucuresti, 1987.

Elliott W.H., Elliott D.C., *Biochemistry and molecular biology*, Oxford University Press, 1997.

Hall J.L., Fowers T.J., Roberts R.M., *Plant cell structure and metabolism, second edition*, Longman, London and New York, 1982.

# ENZIMOLOGY

**Course coordinator** Assoc. Prof. biochemist Simona OANCEA, Ph.D.

**Year, semester:** II, IV

**No. hours course: no. hours seminary / laboratory:** 28/14

**Discipline type:** Speciality

**ECTS:** 5

**Prerequisites:** General Chemistry, Molecular Biology, Microbiology, Biochemistry (I)

## **Aims**

Students' understanding of concepts in enzymology.

Knowledge of the structure of enzymes and their mechanism of action.

Knowledge of essential aspects of chemical and enzymatic catalysis. Classes of enzymes.

Development of students' ability to use methods of extraction and purification of enzymes.

Determination of enzymatic activity.

**Content:** Structure of enzymes. Simple and conjugated enzymes. Enzymatic cofactors. Specificity of enzymes. Classification, codification and nomenclature of enzymes. Kinetics of enzymatic reactions. Factors that influence the enzymatic kinetics. Enzymatic inhibition and inhibitors. Mechanism of action and regulation of enzymatic activity. Allosteric enzymes. Practical applications.

Determination of activity of some enzymes.

## **Skills**

In addition of the course and practical activity, the student must know the structure of enzymes and the mechanism of enzymatic catalysis, the practical applications of enzymes and methods for determination of enzymatic activity.

## **Assessment:**

The final mark will be calculated based on :

activity during seminars, essay preparation (20 %)

practical examination (30%)

final examination (50%)

## **References**

Oancea Simona, *Biochimia structurală a produselor alimentare*, Editura Universității "Lucian Blaga" Sibiu, 2002.

Cojocaru D.C., Olteanu Z., Ciornea E., Oprică L., Cojocaru S.I., *Enzimologie generală*, Ed. TehnoPress, Iași, 2007.

Iordăchescu D., *Biochimie – partea II-a. Metabolism intermediar*, Edit. Universității din București, 1986.

Marangoni A.G., *Enzyme kinetics: a modern approach*, John Wiley & Sons, Inc., Hoboken, New Jersey, 2003.

Palmer T., *Understanding enzymes*, Prentice Hall/Ellis Horwood, 1995.

## ETHNOBIOLOGY

**Course coordinator** : Prof.. Drăgulescu Constantin Ph.D. –

**Year: II semester: 3**

**No. hours course: 1 ; no. hours seminary : 1**

**Discipline type** : Facultative ; Speciality

**ECTS: 3**

**Prerequisites:** Systematic of cryptogams, Systematic of phanerogams (for biologists), Zoology of invertebrates, General ecology

### **Aims:**

Getting the students familiarized with the study object of ethno biology; recapitulation of the main terms and concepts regarding biodiversity, flora, fauna, biocoenosis, ecosystem, habitat; evaluation of a region's biological potential; introduction of students to the methodology of ethno biological studies using the questionnaires.

### **Content:**

The study object of ethno biology. The environment, the techniques and the methods for research. The empiric research. The concept of biodiversity. Flora, vegetation, fauna. Ecotop, biocoenosis, ecosystem in scientific and popular vision. Ethno botany and ethozoology. Ethno biological questionnaire. The technique of ethno biological investigation. The importance of ethno biological investigations.

### **Skills :**

Capability to understand and render terms, concepts and principles of Ethno-botany and Ethno zoology and to explain the folk knowledge about plants and animals based on cultural specificity and local history. Capability to use ethno-botanical and ethno-zoological questionnaires.

### **Assessment :**

The final mark will be calculated based on :

Activity during seminars 50%.

Final examination 50%.

### **References :**

Băcescu, M., 1961, Păsările în nomenclatura și viața poporului român (The birds in the nomenclature and life of romanians), Edit. Acad. București

Butură, V., 1979, Enciclopedie de etnobotanică românească (Encyclopaedy of romanian ethnobotany), Edit. Științifică și enciclopedică București

Drăgulescu, C., 1992, Botanica populară în Mărginimea Sibiului (Popular botany in Mărginimea Sibiului), Sibiu

Drăgulescu, C., 1995, Botanica populară în Țara Făgărașului (Popular botany in Țara Făgărașului), Edit. Constant Sibiu

# III-rd YEAR

## GENETICS (II)

**Course coordinator** Lecturer Voichita Gheoca Ph.D.

**Year, semester:** III/V

**No. hours course: no. hours seminary / laboratory:** 24/14/14

**Discipline type:** Fundamental,

**ECTS:** 4

**Prerequisites:** Genetics (I)

### **Aims :**

The knowledge of the main notions of general and population genetics. Reveal the way the genetic material is modified under natural and artificial factors; presentation of principal mutagen factors. Knowledge of principles and laws of population genetics and of genetic diversity investigation means.

### **Content:**

Morphologic and numeric changes in chromosomes. Mutations: types, molecular mechanism, mutagen factors. The mutational process and the genetic code. Elements of human genetics: human genome origin and evolution; human normal and pathologic karyotype. Population genetics: populations and genetic equilibrium; gene and genotype frequencies in population; gene and genotype frequencies correlation. Hardy-Weinberg law and its application in different interallelic interaction. Genetic biodiversity. Genetic engineering.

### **Skills:**

Capacity of understanding and reproduction of general and population genetic terms and principles. Capacity of microscopic identification of normal and modified genetic structures; mutants identification in plant and animals.

**Assessment:** The final mark will be calculated based on:

- practical examination (15%)
- essay preparation (20%)
- mid semester examination (15%)
- final examination (60%)

### **References:**

- Coman, N., 1977, Genetica populațiilor, Univ. "Babeș-Bolyai" Cluj-Napoca
- Coman, N., 1991, Genetica, vol. I, Univ. "Babeș-Bolyai" Cluj-Napoca
- Raicu, P., 1991, Genetica, EDP, București

# PARASITOLOGY

**Course coordinator:** Lecturer Daniel Gheoca Ph.D.

**Year, semester:** III/V

**No. hours course: no. hours laboratory:** 28/28

**Discipline type:** Specialisation,

**ECTS:** 4

**Prerequisites:** Animal biology (I), Animal biology (II).

## **Aims**

Knowledge of the main groups of parasites, of their hosts and the relations parasite-host, of the interactions between the two groups of organisms, with the implications related to the life cycles' strategies, immunity and specific adaptations. Presentation of general issues of parasitism's, of origins and distribution of parasitic organisms in the animal kingdom.

## **Content**

Parasites and parasitism – general notions. Parasites and behaviour of parasitized organisms, parasite-host relation, host specificity. Life cycles strategies. Adaptations to parasitism – morphological and physiological adaptations of different classes of parasites. Parasitic protozoa – species, life cycles. Parasitic cestodes – parasite species, life cycles and control methods. Parasitic nematodes – biology, parasite species and their life cycles. Parasitic arthropods: biology, life cycles, their role as vectors of other parasites. Parasites and immunity. Parasitic diagnosis. Parasites control – classic control methods, integrated control. Exotic parasitosis. Classic methods used in parasitosis treatment. Traditional methods in folk medicine.

## **Skills**

Ability of understanding and reproducing terms, concepts and principles of parasitology. Acquiring knowledge related to parasite-host coevolution as a system in equilibrium. Capacity of identification of different classes of parasites and the changes caused by these in their hosts.

## **Assessment:**

The final mark will be calculated based on mid semester evaluations (15%), evaluation of independent activity consisting of essay preparation (10%), evaluation of the activity during the practical (25%), and final written theoretical examination (50%).

## **References**

Nitzulescu V., I. Gherman: 1985 Parazitologie clinica, Ed. Medicala, Bucuresti,  
Oprean, L. 1999, Microbiologie- Parazitologie II, Ed. Univ. "Lucian Blaga" Sibiu

# BIOGEOGRAPHY

**Course coordinator:** DR. DANIELA MINODORA ILIE

**Year, semester:** III, V

**No. hours course: no. hours seminary / laboratory:** 14 hours course, 14 hours seminary

**Discipline type** optional, **ECTS:** 3

**Prerequisites:** Plant biology II, Animal biology I, II, III, Ecology, Phytosociology and vegetation of Romania

**Aims:** Exposure of chorology's main issues. Presentation of Earth's and Romania's biogeographically regionalization

**Content:** Biogeography's definition and object. Its relations with other sciences. Importance of biogeography. Speciation. Organisms' dispersal. Chorology concepts. Ranges' size and shape. Distribution of organisms within their range. Ranges' evolution. Marine bio geographical regions and their evolution. Terrestrial and freshwater bio geographical regions. Introduction in the biogeography of Romania. Flora and fauna's evolution in Romania. Bio geographical regions in Romania. Bio geographic peculiarities of Romania.

**Skills:** Knowledge of terms and concepts specific to this science; right use of speciality terms; understanding of fundamental phenomena specific to biogeography, perception of some relations and connections, analytic and synthetic capacity; use of some specific investigations methods, techniques, and instruments; manifestation of a positive and responsible attitude towards the scientific field.

**Assessment:** The final mark will be calculated based on activity during seminars (25%) and final examination (75%).

## References :

1. DRĂGULESCU, C., ILIE, DANIELA MINODORA, 2001, *Biogeografie*, Edit. Univ. "Lucian Blaga" Sibiu
2. BĂNĂRESCU, P., BOȘCAIU, N., 1973, *Biogeografie*, Ed. Științifică, București

# EVOLUTIONISM

**Course coordinator:** Prof. IOAN SÎRBU Ph.D

**Year, semester:** III, 5

**No. hours course: no. hours seminary / laboratory:** 28 hours course, 14 hours seminary

**Discipline type:** Optional,

**ECTS:** 4

**Prerequisites:** Plant Biology, Animal Biology, Genetics, Ecosystems: structure and functions, Population Ecology

## **Aims:**

Conceptual and scientific foundations of evolutionism, proofs, theories and mechanisms of Universe, Earth and life evolution. Basics of evolutionary ecology. Knowledge of evolutionary forces and intimate mechanisms, theories of life origin and diversification, geochronological scale and features, descent of humanity.

## **Content:**

Definition and proofs of evolutionary theory, the meaning and scope of evolutionary thinking in science and daily life, genesis and history of the Universe, Earth and life, background and reasons for biodiversity, geochronological scale correlated with life development analysis, forces and mechanisms of evolution, natural selection, adaptation, phylogenetic reconstruction, species and speciation, superior taxa and their significance, origin and evolution of the hominids and of the modern humans.

## **Skills:**

Knowledge of terms and concepts specific to this science; right use of speciality terms; understanding of fundamental phenomena specific to evolutionism, perception of some relations and connections, analytic and synthetic capacity; use of some specific investigations methods, techniques, and instruments; manifestation of a positive and responsible attitude towards this scientific field.

**Assessment:** Final examination 80%, activity during the seminars 10%, mid semester examination 10%.

## **References :**

Sîrbu, I., 2008 - Evoluționism (in electronic format, available via internet)

Mayr, E., 2004 - De la bacterii la om. Evoluția lumii vii. Ed. Humanitas, București.

**Mustață G., Mustață M., 2001 - Origine, Evoluție și Evoluționism. Ed. „Vasile Goldiș” University Press, Arad.**

**Mustață G., Mustață M., 2002 - Homo sapiens sapiens L. Origine și evoluție. Ed. „Vasile Goldiș” University Press, Arad.**



# ETHOLOGY

**Course coordinator:** Prof. IOAN SÎRBU Ph.D

**Year, semester:** III, 6

**No. hours course: no. hours seminary / laboratory:** 28 hours course, 14 hours seminary

**Discipline type:** Optional,

**ECTS:** 4

**Prerequisites:** Animal Biology (I) and (II), Animal Ecophysiology

## **Aims:**

Study of behaviour as an environmental integration factor, proximal and distal ethological analysis, background, expressions, mechanisms and functions of the different behavioural patterns. Adaptive and evolutionary values of the animal behaviour. Developing skills for description, analysis, explanation and synthesis of different behaviours.

## **Content:**

Definition, historical development, significance, causal analysis and mechanisms of behaviour; motivations, stimulus, adaptive character, phylogeny and behavioural evolution. Ontogenetic development and learning. Study of ethological methods, describing and debating on the main behaviour categories, ethograms accomplishment, documentaries preview. Introduction in human ethology.

## **Skills:**

Knowledge of terms and concepts specific to this science; right use of speciality terms; understanding of fundamental phenomena specific to ethology, perception of some relations and connections, analytic and synthetic capacity; use of some specific investigations methods, techniques, and instruments; manifestation of a positive and responsible attitude towards this scientific field.

**Assessment:** The final mark will be calculated based on activity during seminars (10%), mid semester examination (10%), and final examination (80%).

## **References :**

Sîrbu, I., 2008 - Etologie - note de curs (available through CD or via www).

Cociu, M., 1999 - Etologie. Comportamentul animal. Ed. ALL, București.

# HIDROBIOLOGY

**Course coordinator:** Assoc. Prof. Angela Bănăduc Ph.D. Head of Ecology and Environment Protection Department

**Year, semester:** II, IV

**No. hours course: 28, no. hours laboratory: 28**

**Discipline type:** Compulsory, Specialty,  
**ECTS:** 4

**Prerequisites:** General ecology, Populations ecology, Physical environment (II).

**Aims:** Underling the knowledges related with the aquatic ecosystems structure and the characteristic processes of these ecosystems. The cognition by the students of the structural and functional of the continental ecological systems, the understanding of the aquatic biocenosis - biotope interactions.

**Content:** Course: Water as environment for life; Aquatic biotope characteristics; Aquatic communities classification: characterization, adaptations; Structural and functional characteristics of the main types of continental lotic aquatic ecosystems, hyporeic environment, lakes as ecosystems, ponds, swamps; General notions regarding the ecological assessment of the aquatic continental systems; Black Sea ecology.

Laboratory: Particularities of the aquatic ecosystems research; research phases; Water physico-chemical characteristics; Aquatic community's structure analyse.

**Skills:** The capacity to understand and reproduce the concepts, terms and principles specific for hydrobiology. The knowledge and understanding of the structures and processes characteristic for the aquatic ecologic systems. The capacity to communicate using the specific terms and concepts, to explain and interpret the way of structuring and functioning of the aquatic ecological systems. The capacity to analyse the aquatic biotope characteristics, the aquatic communities structure (benthos, plankton, ichtyofauna).

**Assessment:** The final mark will be calculated based on:

practical examination -20% of the final mark

essay preparation - 10% of the final mark

mid semester examination - 10% of the final mark

final examination - 60% of the final mark

## References:

1. Curtean-Bănăduc A., 2006, *Hidrobiologie. Note de curs* (format electronic)
2. Curtean-Bănăduc A., 2001, *Practicum de hidrobiologie*, Ed. Mira Design, Sibiu

## BIODIVERSITY CONSERVATION

**Course coordinator:** Assoc. Prof. Angela Bănăduc Ph.D. Head of Ecology and Environment Protection Department

**Year, semester:** III, VI

**No. hours course:** 28, **laboratory:** 14, **seminary:** 14

**Discipline type:** Compulsory, Complementary,

**ECTS:** 4

**Prerequisites:** General ecology, Ecosystems: structure and functions, Vegetal biology (I), Vegetal biology (II), Animal Biology (I), Animal Biology (II).

**Aims:** Underling the knowledges related with the biodiversity conservation: the biodiversity concept, the causes of the biodiversity perdition, the necessity of biodiversity conservation, biodiversity conservation strategies. The cognition by the students of the biodiversity assessment methods, of the operational units identification for its conservation, of the related legislation and of the administrative structures with responsibilities in the field of biodiversity conservation.

**Content:** The biodiversity concept. The biodiversity component elements. The biodiversity conservation necessity. The philosophic concepts evolution regarding the human-nature relation. The evolution in time of the measurements and methods for biodiversity conservation. The strategies and methods for biodiversity conservation. The methods of biodiversity assessment. The protected natural entities classification. The zoological categories of species. International programmes for biodiversity assessment and conservation. The protected natural areas management. The biodiversity conservation in Romania.

**Skills:** The capacity to understand and reproduce the concepts, terms and principles specific for biodiversity conservation. The strategies, measures and methods knowledge and understanding. The capacity to communicate using the specific terms and concepts, to explain and interpret the causes of the biodiversity perdition, the necessity of its conservation and the strategies of biodiversity conservation. The capacity of systemic approaching and interpretation of the biodiversity conservation problems in the context of the sustainable development. The capacity to identify the operational units for the biodiversity conservation and to apply methods for biodiversity assessment.

**Assessment:** The final mark will be calculated based on:

activity during seminars - 10% of the final mark

practical examination - 20% of the final mark

essay preparation - 10% of the final mark

mid semester examination - 10% of the final mark

final examination - 50% of the final mark

### References:

1. Cogălniceanu, D., 1999, *Managementul capitalului natural*, Ed. Univ. București
2. Cristea V., Denaeyer S., 2004, *De la biodiversitate la OGM-uri ?*, Ed. Eikon, Cluj-Napoca
3. Curtean – Bănăduc Angela, 2006, *Strategii si metode pentru conservarea biodiversității*, Ed. Universității „Lucian Blaga” din Sibiu.

## BIOPRODUCTIVITY

**Course coordinator:** Assoc. prof. eng. Mircea Octavian MICU Ph.D.

**Year, semester:** II/2

**No. hours course: no. hours seminary:** 1:1 (14/14)

**Discipline type:** A

**Prerequisites:** Plant Physiology, Botany, Meteorology, Ecopedology, Entomology, Phytopathology

**Aims:** Knowledge of the mechanism of vegetal biomass production. Harmonization of the demands of vegetal associations with vegetation factors. Increase of quantity and quality of biomass production, under environmental friendly conditions.

### **Content:**

Production and productivity. Theoretical fundamentals of biological productivity. Primary productivity; mechanism of vegetal material generation. Internal factors determining primary productivity. External factors. Primary productivity of terrestrial ecosystems in Romania. Primary productivity within waters. Productivity within agro-ecosystems.

### **Skills**

Ability to analyze the internal and external factors determining productivity; identification of the restrictive factors and actions for their harmonization in order to increase the vegetal biomass production.

### **Assessment:**

The final mark will be calculated based on :

Activity during seminars (%): 30

Final, written examination (%) : 70

### **References**

**Micu Mircea Octavian**, - 2004, Productivitate, Editura Alma Mater, Sibiu;

**Vadineanu A.**, - 1998, DEzvoltarea durabila – Teorie si practca, Editura Universitatii Bucuresti;

**Lieth, H.**, - 1975- Primary productivity of the biosphere, Ecological Studies 14 – Springer-Verlag- Berlin- Hedelberg, New York.

# IMMUNOLOGY

**Course coordinator** Lecturer Daniel Gheoca Ph.D.

**Year, semester:** III/VI

**No. hours course: no. hours seminary :** 14/28

**Discipline type:** Speciality,

**ECTS:** 6

**Prerequisites:** Animal cytology and histology, Animal physiology

## **Aims**

Acquiring knowledge regarding the antigens and antibodies, the origin of immune system and its functioning mode. Understanding of the terms tolerance, immunity, immunodeficiency

## **Content**

Introduction. Notion of antigen. Antibodies. Structure of lymphatic system. Immune system ontogeny. Antibodies' structure. The complement. Antibodies' genetics – isotypes, idiotypes, allotypes. Cellular and genetic basis of antibodies' diversity. Biosynthesis of immunoglobulin. Blood groups – ABO, Rh. T cells/ B cells co-operation in humoral immunity. Markers at the cell's surface – T lymphocytes, B cells and macrophages. Allergy – immediate hypersensitivity. Tolerance. Autoimmunity. Immunization and immunodeficiency.

## **Skills**

Ability of understanding and reproducing the terms, concepts and principles of immunology. Acquiring knowledge regarding antigens, antibodies and mechanisms of their interactions; immunity, autoimmunity, immunodeficiency.

## **Assessment:**

essay preparation (20%)

mid semester examination (15%)

final examination (65%)

## **References:**

Olinescu, Andrei, Imunologie, Ed. Didactica si pedagogica, Bucuresti, 1995

Vior, C., Raducanescu, H., Manolescu, N., Popoviciu A., 1980, Imunitatea si imunoprofilaxia la animale Ed, Ceres, Bucuresti

## ORNITOLOGY

**Course coordinator:** Prof.CIOCHIA VICTOR Ph.D.

**Year, semester:** III/VI

**No. hours course: no. hours seminary / laboratory:** 14/14

**Discipline type:** Speciality,

**ECTS:** 6

**Prerequisites:** Verterbrate zoology (I), Verterbrate zoology (II) , Comparative Anathomy

### **Aims:**

Acquiring knowledge on birds' taxonomy, origins and evolution, as well as their importance in different ecosystems. Highlighting the aspects regarding eco-physiology, ethology and population dynamics. Getting familiarized with the main study methods in ornithology. Acquiring abilities of visual and sound identification of birds.

### **Content**

Birds – definition, diversity, importance, taxonomy. Origin and evolution of birds. Principles of bird classification. Plumage: structure, origin and its role in flying. Aspects of bird physiology: metabolism and thermoregulation, excretion and osmo-regulation. Bird nutrition – morphological and anatomical adaptations. Organization of nervous system and sense organs – orientation capacity and visual memory, chemoreception and mechanic-reception, hearing, smelling. Visual communication. Circ-annual and circadian rhythms. Migrations – origin and their role. Migration routes; orientation means. Social behaviour – density and territoriality, sound communication, reproduction biology. Parasitism and population dynamics.

### **Skills**

Ability of understanding and reproducing specific terms, principles of bird taxonomy, and main aspects related to birds' eco-ethology. Capacity of identification of different species from Romania, of exploring birds in order to forecast local diversity based on own observations and experiments using methods and techniques specific to this field.

### **Assessment:**

The final mark will be calculated based on mid semester evaluations (15%), evaluation of independent activity consisting of essay preparation (20%), final written theoretical examination (65%).

### **References**

Ciochia V., Ornitologie, .....

Stugren, B., Coroiu, I., 1996, Sistemática filogenetică, anatomia comparată și zoologia vertebratelor, vol. I-II, Univ. "Babeș Bolyai", Cluj-Napoca