



"ISMAIL QEMALI" UNIVERSITY, VLORE
FACULTY OF TECHNICAL AND NATURAL SCIENCES
DEPARTMENT OF BIOLOGY

APPROVED
Head of the Biology Department
Dr. Aurora BAKAJ

COURSE PROGRAM BIO 375 Comparative anatomy

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| SUBJECT: | Comparative anatomy |
| Head/Teacher of the subject: | PhD. Ina Nasto |
| Charge: | 2 hours of lecture / 1 hour of seminar / 1 hour of laboratory |
| Subject typology: | Of the characteristic formation of the program |
| Academic year/semester when it takes place: | Year III Semester I / Autumn, 2020 |
| Subject type: | Mandatory |
| Study program: | Bachelor |
| Credits: | 6 credits |
| Subject code: | BIO 375 |
| E-mail address of the holder/pedagogue: | ina.nasto@yahoo.com / ina.nasto@univlora.edu.al |

summary AND LEARNING OUTCOMES:

Comparative anatomy has as its object of study the treatment of the anatomical systems of the body of Vertebrates, in their evolutionary progress, based on homology, from one class to another. This way of treating the anatomical systems of building the body of vertebrates facilitates the learning of the subject by the students, since the systems are treated in their dynamics, making logical learning prevail over the one by memory.

BASIC CONCEPTS:

- 1 Comparison of anatomical structures of vertebrates
- 2 Anatomical and embryological evidence supporting the theory of evolution
- 3 Anatomy of vertebrates ranging from fish to mammals

COURSE TOPICS:

Topics to be covered in the lectures:

Topic 1 Entry. Skin. Skin functions. Epidermis. The skin. Cutaneous glands. Skin pigments.

Topic 2 Skin appendages. Dermal skeletal formations. Skin of vertebrates. The skeleton. Vertebrae, ribs and sternum.

Topic 3 The ribs. The skeleton of the head. Neurocranium, origin. Ossification center of the neurocranium.

Topic 4 Splanchnocranium (facial skeleton). Contradictions, osteities. cyclostomates, tetrapods. The skeleton of the joints and limbs.

Topic 5 Flight adaptations. Adaptations for running. Digestive. Mouth space. Lips. Heaven. Language. The teeth.

Topic 6 Oral glands. Pharynx. Esophagus. Stomach. Gut, general structure. Liver and pancreas. Cloaca.

Topic 7 Respiratory apparatus. Branchial respiratory apparatus. External branches. Internal branches. Lungs of Tetrapods.

Topic 8 Other respiratory structures. Skin. Blood circulation apparatus. Heart. The origin of the heart.

Topic 9 Structural evolution of the heart. Heart of Cyclostomas and Pisces. Heart of Dipneusts and Amphibians. Amniote heart.

Topic 10 Aortic arches of Tetrapods. Apparatus of lymphatic circulation. Urogenital apparatus. Urinary apparatus. Basic structure of the kidney.

Topic 11 The three successive renal structures of Vertebrates. Bladder. Genital apparatus.

Topic 12 Nervous apparatus. The origin and differentiation of the nervous system. Functional components of the nervous

Topic 13 Central nervous system. Spinal cord. Brain. Peripheral nervous system. Spinal nerves. Autonomic nervous system.

Topic 14 Sense organs. Stato-acoustic organ (Ear). Origin of the inner ear. Inner ear.

Topic 15 The middle ear. The outer ear. Sight apparatus - lateral eyes. The origin and development of the eye. Shape and structure of the eyeball. Median eyes.

Topics to be covered in the seminars:

Topic 1 Entry. Skin. Skin functions. Epidermis. The skin. Cutaneous glands. Skin pigments.

Topic 2 Skin appendages. Dermal skeletal formations. Skin of vertebrates. The skeleton. Vertebrae, ribs and sternum.

Topic 3 The ribs. The skeleton of the head. Neurocranium, origin. Ossification center of the neurocranium. Dermatocranium.

Topic 4 Splanchnocranium (facial skeleton). Contradictions, osteihties. cyclostomates, tetrapods. The skeleton of the joints and limbs.

Topic 5 Flight adaptations. Adaptations for running. Digestive. Mouth space. Lips. Heaven. Language. The teeth.

Topic 6 Oral glands. Pharynx. Esophagus. Stomach. Gut, general structure. Liver and pancreas. Cloaca.

Topic 7 Respiratory apparatus. Branchial respiratory apparatus. External branches. Internal branches. Lungs of Tetrapods.

Topic 8 Other respiratory structures. Skin. Blood circulation apparatus. Heart. The origin of the heart.

Topic 9 Structural evolution of the heart. Heart of Cyclostomas and Pisces. Heart of Dipneusts and Amphibians. Amniote heart.

Topic 10 Aortic arches of Tetrapods. Apparatus of lymphatic circulation. Urogenital apparatus. Urinary apparatus. Basic structure of the kidney.

Topic 11 The three successive renal structures of Vertebrates. Bladder. Genital apparatus.

Topic 12 Nervous apparatus. The origin and differentiation of the nervous system. Functional components of the nervous system.

Topic 13 Central nervous system. Spinal cord. Brain. Peripheral nervous system. Spinal nerves. Autonomic nervous system.

Topic 14 Sense organs. Stato-acoustic organ (Ear). Origin of the inner ear. Inner ear.

Topic 15 The middle ear. The outer ear. Sight apparatus - lateral eyes. The origin and development of the eye. Shape and structure of the eyeball. Median eyes.

Topics to be covered in the laboratories:**Topic 1** Familiarity with laboratory techniques of vertebrate dissection.**Topic 2** Fishes with cartilaginous skeletons (Chondrichthyes). The study of the external morphology of pigeon fish (*Mustelus mustelus*).**Topic 3** Fishes with cartilaginous skeletons (Chondrichthyes). Internal construction (dissection) of pigeon fish (*Mustelus mustelus*).**Topic 4** Fishes with a bony skeleton (Osteichthyes). The study of the external morphology of the ear (*Mugil cephalus*).**Topic 5** Fishes with a bony skeleton (Osteichthyes). Internal construction (dissection) of the skull (*Mugil cephalus*).**Topic 6** Class of amphibians. The study of the external morphology of the common frog (*Rana balcanica*).**Topic 7** Internal construction (dissection) of the common frog (*Rana balcanica*).**Topic 8** Class of Reptiles (Reptilia). The study of the external morphology of the green grasshopper (*Lacerta viridis*).**Topic 9** Internal construction (dissection) of green grass (*Lacerta viridis*).**Topic 10** 10. Class of Reptiles (Reptilia). The study of the external morphology of the land turtle (*Testudo hermani*).**Topic 11** Class of birds (Aves). The study of the external morphology of the homing pigeon (*Columbia livia p. domestica*).**Topic 12** Internal construction (dissection) of the homing pigeon (*Columbia livia p. domestica*).**Topic 13** Class of mammals (Mammalia). The study of the external morphology of the rabbit (*Lepus europaeus*).**Topic 14** 14. Internal construction (dissection) of the rabbit (*Lepus europaeus*).**Topic 15** 15. Comparative anatomical study of all classes of vertebrates.**FORM OF KNOWLEDGE CONTROL**

| control | | Percentage rating |
|-----------------------|-----------------------|-------------------|
| First partial control | | 25% |
| Annual assessment | Attendance / Seminars | 5% |
| | Laboratories | 10% |
| Final check | | 60% |

Grading is based on the conversion of the total grade to %, grade 5-10 progressively 41-100%.

| Grading | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------|-----|-------|-------|-------|-------|-------|--------|
| ASSESSMENT | -40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |

ATTENDANCE:

The student, who results in less than 75% attendance for the period that belongs to each partial exam, the period for which he will be tested, will not be included in the relevant exam, will be evaluated with M.

If the student has attended the course, but does not appear in the next exam, he is assessed NP (Did Not Appear).

COURSE FORMAT:

The subject will be evaluated on the basis of two partial exams, assignments and the final exam. Points earned will be cumulative. The exams will not be repeated, for any reason. If you miss an exam without any major reason, then you will lose points for that exam that you did not appear for.

COMMUNICATION:

Homework exercises, course assignments and any other announcements will be given in class or at the official address of the

Email: It is the duty of every student to check e-mail regularly. There will be tasks and notifications will be given only via e-mail.

HONESTY CODE:

Students are encouraged to work in groups for the exercises and tasks that are given to them. Copying from one another in exams, course assignments, homework, etc. is not allowed. Violation of this rule will be accompanied by punitive measures up to the expulsion of the student from the university.

LITERATURE**a)Mandatory basic literature:**

Ina Nasto - Comparative anatomy Lecture cycle 2020-2021

b) Recommended literature:

o Comparative Anatomy of vertebrates, University of Wisconsin
<http://www.zoology.wisc.edu/courses>

o Basic literature: Text - N. PEJA. COMPARATIVE ANATOMY. Tirana, 2005.

o Comparative vertebrate anatomy, University of Washington.
<http://courses.washington.edu>

Baldaccini NE et al. – 1996. Comparative Anatomy. Antonio Delfino Editore

FINAL REMARKS FROM THE SUBJECT TEACHER

Homework exercises, coursework and any other notices will be given in class. The student should check the e-mail regularly because there will be assignments and notifications that will be given via e-mail. Students in this course must read, complete the tasks that will be checked regularly. Homework will be evaluated not only in terms of quantity but also in terms of the quality of their solution. Students are also encouraged to work in groups for the homework exercises. Attendance at seminars and lectures is required up to 75% of the hours. The number of absences above 25% excludes students from participating in the exam. Attendance in the laboratory must be 100%. Absences in the laboratory exclude students from participating in the exam. The use of mobile phones and smoking in the auditorium is not allowed.

SUBJECT TEACHER

PhD. Ina Nasto

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