AZƏRBAYCAN RESPUBLİKASI TƏHSİL NAZİRLİYİ
BAKI DÖVLƏT UNİVERSİTETİ

FƏNN SİLLABUSU

Təsdiq edirəm **prof. Nəcəfov C.Ə.**
(kafedra müdiri)

İmza: _____

Tarix: **14.09.2018**

Kafedra: Zoology

Fakültə: Biology

İxtisas: Biology

I. Fənn haqqında məlumat

Fənnin adı: **Zoology of vertebrata**

Tədris yükü (saat) cəmi: **75** mühazirə **30** (laboratoriya) **45**

Tədris ili 2017-2018 Semestr- 3 / Bölmə - English/ Şöbə-əyani qrup **115E**

Kredit sayı: 7

II. Müəllim haqqında məlumat

Asgarova Sabina Ali-Isa q

Məsləhət günləri və saatları: III, IV günlər saat 13^{00}-16^{00}

E-mail ünvanı: sabina_askerova@mail.ru

İş telefonu: 5390294

III. Tələb olunan dərsliklər və dərs vəsaitləri:

Əsas:

1. Kotpal R.L. 2010. **Modern textbook of zoology vertebrates** (Animal Diversity -II), third edition, 882 p.
2. Linzey. **Vertebrate Biology**. The McGraw−Hill Companies, 2003, 530 p.

Əlavə:

1. **Parker, T J . & Haswell, W.A**. 1967. ***A Textbook of Zoology,*** Vol. II. Revised by A.J. Marshall. Macmillan, London.

2. **Kenneth V.Kardong**, 2006, Vertebrates – Comparative Anatomy, Function, Evolution, fourth edition, 780 p.

IV. Fənnin təsviri və məqsədi:

Kursun qısa təsviri: Anatomy, classification, and natural history of the vertebrates; methods of collecting, preserving, and identifying local vertebrates. Classes and major orders of the extant vertebrates; evolutionary history and phylogenetic relationships of the major groups of vertebrates using cladistic methods; morphological adaptations of vertebrates for feeding, locomotion, reproduction, etc. in aquatic and terrestrial environments; physiological adaptations of vertebrates for homeostasis and reproduction in aquatic and terrestrial environments

Kursun məqsədi: The purpose of this course is to acquaint students with the identification, systematics, life history, anatomy, and adaptive strategies of the vertebrates and to expose them to field techniques used in their study.

Upon completion of this course, the successful student

Should know

- To characterize and understand the: classes and major orders of the extant vertebrates; evolutionary history and phylogenetic relationships of the major groups of vertebrates using cladistic methods; morphological adaptations of vertebrates for feeding, locomotion, reproduction, etc. in aquatic and terrestrial environments; physiological adaptations of vertebrates for homeostasis and reproduction in aquatic and terrestrial environments.

- Should do:

Justify the features of organ systems and their relationships

- Should learn

The basics of theoretical and practical knowledge of the Vertebrates' zoology

V. Fənnin təqvim planı:

Həftələr	Mövzunun adı və qısa icmalı	Mühazirə	Lab.	Saat	Tarix
I	**Mövzu № 1** *Classification and characteristics of phylum Chordata* **Qısa icmalı:** Chordate animals - diversity of chordates. Five fundamental chordate characters, characters common to chordates and higher non-chordates. Advancements of chordate over other phyla. Comparison (differences) of chordates with non-chordates. Origin and ancestry of Chordata. Major subdivisions of phylum Chordata. General characters of phylum Chordata. Brief classification of Chordata with characters. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 1-12	+	-	2	21.09
II	**Mövzu № 2** *Subphylum Cephalochordata and Urochordata* **Qısa icmalı:** General characters, affinities and systematic position, primitive, degenerate and specialized characters of branchiostoma	+	-	2	28.09

	(cephalochordata). Embriological development of lancelet. Urochordata: Notochord is lost during metamorphosis into sessile adult ; possess pharyngeal slits; repro-sexual (hermaphroditic) and asexual (budding) general characters, classification, other urochordates **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 65-85, 630-636				
III	**Mövzu № 3** *Subphylum Vertebrata* **Qısa icmalı:** What are vertebrates? General characters of subphylum vertebrata Diversity of vertebrates. Phylogeny or evolutionary history of vertebrates. Origin and ancestry of vertebrates (chordates).Comparative anatomy of vertebrates. Integument, musculoskeletal system and an endoskeleton, which is much more economical in materials than the exoskeleton of invertebrates. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 115-131	+	-	2	05.10
IV	**Mövzu № 4** *Comparative anatomy of vertebrates.* **Qısa icmalı:** Development of digestive, respiratory, circulatory, urinogenital, nervous, blood-vascular systems of Vertebrates. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 115-131	+	-	2	12.10
V	**Mövzu № 5.** *Cyclostomata.* **Qısa icmalı:** Distribution and habitat. Habits. External features. İnternal anatomy and physiology: musculature and locomation, skeleton, digestiv system and feeding, respiratory system, circulatory system, excretion, nervous sistem, sense organs, reproduction, development, ammocoete larva, metamorphosis, economic importance. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 99-110,	+	-	2	19.10
VI	**Mövzu № 6** *Class Chondrichtyes-Cartilaginous Fishes* **Qısa icmalı:** Skeleton, Digestive and respiratory systems. Nervous system and sensory organs. Blood-vascular and urinogenital systems. Cartilage skeletons stiff pectoral fins. Alimentary canal beings at mouth and terminates in anus. It is longer than the body and includes buccal cavity, pharynx, esophagus, stomach and intestine. Since dogfish is an aquatic animal, it depends wholly upon oxygen dissolved in sea water for respiration. Thus, respiration is *aquatic* and carried on entirely by vascular gills. Brain of dogfish is more advanced than that of the sea lamprey. It lies enclosed within	+	-	2	26.10

	the chondrocranium and is made of the same three basic parts of the vertebrate brain-forebrain, midbrain and hindbrain. Spinal cord extends from medulla oblongata almost to the end of tail, protected by the neural canal of vertebrae, showing an advance over the condition in cyclostomes. The main receptor or sense organs of dogfish include olfactory organs, eyes, ears, neuromasts or lateral line organs, and ampullae of Lorenzini. The circulatory system comprises 4 parts- heart and pericardium, arteries, veins and blood. The excretory and reproductive systems are so closely related to each other in vertebrates that they are considered together under the name of "urinogenital system". **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 135-159, 544-549				
VII	**Mövzu № 7** *Osteichthyes-Bony fishes* **Qısa icmalı:** Osteichthyes (Gr., *osteon,* Done + *ichthyes,*fish) comprises the true, bony, fishes, both freshwater and marine. They are the familiar and most successful living group of aquatic vertebrates. One half of all vertebrates are bony fishes belonging to well over 20,000 living species. Their scientific study is known as *Ichthyology*. They vary greatly in shape and proportions, but they are built on the same basic plan. They have a spindle-shaped, streamlined body covered by dermal scales, also have bony endoskeleton, swim by fins and breathe by gills. Respiration by 4 pairs of gills on bony gill arches, covered by a common operculum on either side. An air (swim) bladder often present with or without duct connected to pharynx. Lung-like in some (Dipnoi). Ventral heart 2-chambered (1 auricle + 1ventricle). Sinus venosus and conus arteriosus present. Aortic arches 4 pairs. Erythrocytes oval, nucleated. Temperature variable (poikilothermous). Adult kidneys mesonephric. Excretion ureotelic. Brain with very small olfactory lobes, small cerebrum and well developed optic lobes and cerebellum. Cranial nerves 10 pairs. Well developed lateral line system. Internal ear with 3 semicircular canals. Two subclasses are recognized: Sarcopterygii and Actinopterygii. Sarcopterygii popularly called *fleshy* or *lobe-finned,* or *air breathing fish.* Divided into 2 superorders or orders: Crossopterygii and Dipnoi. Actinopterygii popularly called ray-finned fishes. Divided into 3 infraclasses or superorders: Chondrostei, Holostei and Teleostei. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 170-172, 550-555	+	-	2	02.11
VIII	**Mövzu № 8.** *Amphibia; origin, characters, classification,*	+	-	2	09.11

	skeleton. **Qısa icmalı:** In early Carboniferous period, some crossopterygian fishes developed into the first land vertebrates. These were primitive stem Amphibia called *Labyrinthodontia.* Some of them gave rise to modern amphibians, such as frogs, toads and salamanders. Although credited to be first land vertebrates, they are not fully adapted for a terrestrial existence like higher tetrapods. The name of the class *Amphibia* indicates that these animals live at different times in their life cycle in two environments—water and air or land. Thus, the class Amphibia represents a transitional groupbetween the strictly aquatic vertebrates and strictly terrestrial later vertebrates. The living amphibians are represented by about 2,500 species, a very much smaller number than that of other principal classes of vertebrates. However, these represent a mere shadow of the great amphibian radiations of the past, ranging from mid-Palaeozoic (Devonian) to early Mesozoic (Triassic). They dominated the World during Carboniferous, but most of them have become extinct since long. About 10 orders of extinct Amphibia are known only by fossil remains. The classification most generally followed now-a-days were provided by G, Kingslev Noble (1924). He recognized 3 orders of extinct and 3 orders of living amphibians. In the past, all extinct groups of Amphibia were placed under a single subclass *Stegocephalia* (Adam Sedgwick) and all living groups in another subclass *Lissamphibia.* divided into three orders. 1.Urodela "tailed ones": salamanders 2.Anura: "tailless ones" frogs, toads. 3.Gymnophiona ("naked snake"; previously Apoda "legless ones") caecilians. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 217-225, 556-567				
IX	**Mövzu № 9.** *Amphibia; internal organs.* **Qısa icmalı:** Mouth large. Upper or both jaws with small homodont teeth. Tongue often protrusible. Alimentary canal terminates into cloaca. Respiration by lungs, skin and mouth lining. Larvae with external gills which may persist in some aquatic adults. Heart 3-chambered (2 auricles+1 ventricle). Sinus venosus present. Aortic arches 1-3 pairs. Renal and hepatic portal systems well developed. Erythrocytes large, oval and nucleated. Body temperature variable (poikilothermous). Kidneys mesonephric. Urinary bladder large. Urinary ducts open into cloaca. Excretion ureotelic. Brain poorly developed. Cranial nerves 10 pairs. Nostrils connected to buccal cavity. Middle ear with a single rod-like ossicle, columella. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 227-252	+	-	2	16.11

X	**Mövzu № 10.** *Class Reptilia; origin, general characters. classification, skeleton* **Qısa icmalı:** Reptiles represent the first class of vertebrates fully adapted few life in dry places on land. They have no obvious diagnostic characteristics of their own that immediately "separate them from other classes of vertebrates. The characters of reptiles are in fact a combination of characters that are found in fish and amphibians on one hand and in birds and mammals on the other. The class name refers to the mode of locomotion (L„ *repere* or *reptum,* to creep or crawl), and the study of reptiles is called *Herpetology* (Gr., *herpeton,* reptiles). Endoskeleton bony. Skull with one occipital condyle (monocondylar). A characteristic T-shaped interclavicle present. Classification Order **Testudines (= Chelonia)** - tortoises, turtles 2.Order **Squamata ("scales")** - snakes, lizards 3.Order **Crocodilia** - alligators, crocodiles 4.Order **Sphenodonta** - only 2 species of the genus Sphenodon exist today (rest of order is extinct) - called tuatara **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 274-278, 568-581	+	-	2	23.11
XI	**Mövzu № 11.** *Class Reptilia; internal organs.* **Qısa icmalı:** Heart usually 3-chambered, 4-chambered in crocodiles. Sinus venosus reduced. 2 systemic arches present. Red blood corpuscles oval and nucleated. Cold-blooded. Respiration by lungs throughout life. Kidneys metanephric. Excretion uricotelic. Brain with better development of cerebrum than in Amphibia. Cranial nerves 12 pairs. Lateral line system absent. Jacobson's organs present in the roof of mouth, sexes separate. Male usually with muscular copulatory organ. Fertilization internal. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 279-295	+	-	2	30.11
XII	**Mövzu № 12** *Aves; classification, external features and skeleton* **Qısa icmalı:** *Aves* is first divided into two subclasses Archaeornithes.This sub-class includes a single order - Archaeopterygiformes Neornithes - is divisible into 4 super-orders: Odontognathae, Palaeognathae or Ratitae, Impennae and Neognathae or Carinatae. They possess a series of strongly marked characters such as distinguish hardly any other class. The diagnostic features of birds are: Feather-clad, air-breathing, warm-blooded, oviparous, bipedal flying vertebrates. *Limbs* are two pairs. Forelimbs are modified as *wings* for flying.	+	-	2	07.12

	Exoskeleton is epidermal and horny, represented by *feathers* forming a nonconducting body covering for warmth, *scales* on the legs, similar to those of reptiles, claws on the toes, and *sheaths* on the beaks. *Skin* is dry and devoid of glands except the *oil* or *preen gland* at the root of tail. *Pectoral muscles* of flight are well developed. *Endoskeleton* fully ossified, light but strong and without epiphyes. Long bones pneumatic or hollow and have no marrow. Usually, there is a fusion of bones. *Skull* smooth and *monocondylic,* bearing a single occipital condyle. Cranium large and dome-like. *Sutures* indistinct. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P.339-350, 582-596				
XIII	**Mövzu № 13** *Aves; Internal organs* **Qısa icmalı:** Oesophagus is frequently dilated into a crop for quick feeding and storage. Stomach divided into a glandular *proventriculus* and muscular *gizzard.* Junction of small intestine and rectum marked by a pair of *rectal caeca.* A three-chambered *cloaca* present. *Heart* completely 4-chambered. There is neither sinus venosus nor truncus arteriosus. Only *right aortic (systemic) arch* persists in adult. *Renal portal system* vestigial. Red blood corpuscles nucleated. Birds are the first vertebrates to have *warm blood.* Body temperature is regulated *(homoiothermous).* Respiration by compact, spongy, nondistensible *lungs* continuous with thin-walled *air-sacs*. *Larynx* without vocal cords, A sound box or *syrinx,* producing voice, lies at or near the junction of trachea and bronchi. *Kidneys* metanephric and 3-lobed. *Ureters* open into cloaca. *Urinary bladder* absent. Birds are *urecotelic*. Excretory substance of urates eliminated with faeces. *Brain* large but smooth. Cerebrum, cerebellum and optic lobes greatly developed. *Cranial nerves* 12 pairs. *Olfactory organs* poor. Middle ear contains a single ossicle. *Eyes* large and possess nictitating membranes. *Sexes* separate. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P.354-378	+	-	2	14.12
XIV	**Mövzu № 14** *Mammalia; origin, classification, external features and skeleton*. **Qısa icmalı:** Divided into 2 subclasses: *Prototheria* and *Theria*. Prototheria (Gr., *protos,* first + *therios,* beast). Primitive, reptile-like, oviparous or egg-laying mammals. Theria (Gr., *ther,* animal) Modern or typical viviparous mammals that give birth to living young. Theria are subdivided into 2 living infraclasses Hair-clad, mostly terrestrial, air-reathing, warm-blooded, viviparous, tetrapod vertebrates.	+	-	2	21.12

	Body distinctly divisible into head, neck, trunk and tail. Limbs 2 pairs, pentadactyle, each with 5 or fewer digits. Exoskeleton includes lifeless, horny, epidermal hairs, spines, scales, claws, nails, hoofs, horns, bony dermal plates, etc. Skin richly glandular Endoskeleton thoroughly ossified. Skull dicondylic. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P.423-429, 597-611				
XV	**Mövzu № 15** *Mammalia;* Internal organs **Qısa icmalı:** Alimentary canal terminates by anus, there being no cloaca. Buccal cavity separated from nasal passage by a hard palate, formed by premaxillae, maxillae and palatines. Teeth are of several types (heterodont), borne in sockets (thecodont) and represented by two sets (diphyodont). Respiration always by lungs (pulmonary).Glottis protected by a fleshy and cartilaginous epiglottis. Larynx contains vocal cords. Heart, 4-chambered with double circulation.Only the left aortic arch present. Renal portal system absent. R.B.C. small, circular andnon-nucleated. Body temperature regulated (homoiothermous). Kidneys metanephric. Brain highly evolved. Cranial nerves 12 pairs. Senses well developed. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P.430-460	+	-	2	28.12

VI. Sərbəst işlərin mövzuları və təhvil vermə tarixləri:

NN	Mövzunun adı	Təhvil verilmə tarixi
1.	Characteristics of Chordates, Cephalochordata and Urochordata	25.09 – 20.10
2.	Comparative anatomy of Vertebrates. Skin, Endoskeleton and muscular system	
3.	Comparative anatomy of Vertebrates. İnternal organs and nervous system	
4.	General characters and classification of Cyclostomata	23.10 – 24.11
5.	General characters and classification of Chondrychthyes	
6.	General characters and classification of Osteicthyes	
7.	General characters and classification of Amphybians	
8.	General characters and classification of Reptilia	27.11 – 27.12
9.	General characters and classification of Aves	
10.	General characters and classification of Mammalia	

VII. İmtahanın keçirilməsi forması -yazılı

VIII. Semestr ərzində qiymətləndirmə və bal bölgüsü:

Balların maksimum miqdarı – 100 bal.

***A) Semestr ərzində toplanan maksimum bal* – 50**

Dərsə davamiyyətə görə	10 bal
Tələbələrin sərbəst işinə (referat, prezentasiya, tədqiqat işi və s.) görə	10 bal
Laboratoriya dərslərinin nəticələrinə görə	30 bal

***B) Semestr imtahanı nəticəsinə görə* - maksimum 50 bal**

Hər biletdə – 5 sual, hər suala – 10 bal verilir

Qeyd: Tələbənin imtahandan topladığı balın miqdarı 17-dən az olmamalıdır.

C) Semestr nəticəsinə görə qiymətləndirmə (imtahan və imtahana qədər toplanan ballar əsasında):

91 – 100 bal	**əla**	**A**
81 – 90 bal	**çox yaxşı**	**B**
71 – 80 bal	**yaxşı**	**C**
61 – 70 bal	**kafi**	**D**
51 – 60 bal	**qənaətbəxş**	**E**
51 baldan aşağı	**qeyri-kafi**	**F**

Müəllim: Əsgərova Səbinə Əli-İsa q. **İmza:**_____

Tarix: 14.09.18