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 **115 E**

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

Əlavə:

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

2. **Villee, Walker & Barnes**. 1973. ***General Zoology.*** Saunders, Philadelphia.

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 nonchordates. Advancements of Chordata 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	18.09
II	**Mövzu № 2** *Subphylum Cephalochordata. Structure of lancelet. Embriological development of lancelet.* **Qısa icmalı:** General characters, affinities and systematic position, primitive, degenerate and specialized characters of branchiostoma	-	+	2	25.09

	(cephalochordata). Note that cephalochordates have all the typical chordate features. All of these features are shared with vertebrates. On the other hand? Cephalochordates lack features found in most or all true vertebrates: the brain is very small and poorly developed, sense organs are also poorly developed and there are n true vertebrae **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 630-636				
II	**Mövzu №3** ***Subphylum Urochordata – Tunicate.*** *Structure of* ***'sea squirt'.*** **Qısa icmalı:** Notochord is confined to the tail ; notochord is lost during metamorphosis into sessile adult ; possess pharyngeal slits; repro- sexual (hermaphroditic) & asexual (budding) general characters, classification, other urochordates. Free swimming larva; notochord present only in free swimming larva: **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 65-85,	-	+	2	28.09.
III	**Mövzu № 4** *Subphylum Vertebrata: Comparative anatomy (integument, musculoskeletal system)* **Qısa icmalı:** What are vertebrates? General characters of subphylum vertebrata Comparative anatomy of vertebrates. Integument, musculoskeletal system and an endoskeleton, which is much more economical in materials than the exoskeleton of invertebrates. The term *integument* is applied to the outermost protective covering of the animal body, the *skin*, and its various *derivatives*. Skin also includes the conjunctiva of eyeballs and external surface of eardrums. It is directly continuous with the mucous epithelial lining of mouth, rectum, nostrils, eyelids and urinogenital ducts**.** The hardened tissues of the body together form the *skeleton*. Organism will remain small and slow moving if there had been no skeleton for support and to serve as levers on which muscles can act. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 730-763	-	+	2	02.10.
IV	**Mövzu № 5** *Subphylum Vertebrata: Comparative anatomy digestive, respiratory and circulatory systems)* **Qısa icmalı:** The term *alimentary canal* or *digestive tract* in vertebrates refers to an internal tube, seldom straight and often tortuously coiled, running from an anterior mouth opening in head to a posterior anal or cloacal aperture at the base of tail. Depending on the type of medium, vertebrates have two principal types of respiratory organs: *gills* for aquatic respiration (in water) and *lungs* for terrestrial respiration (in air). The	-	+	2	09.10

	same animal may have both gills as well as lungs. *Accessory respiratory organs* are also present in some vertebrates. Blood vascular system has undergone some striking changes during the evolution of vertebrates. These are mostly correlated with shift from gills to lungs as the site for external respiration during transition from water to land, and with the development of an efficient, high pressure circulatory system necessary for an active terrestrial life. **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 753-782				
IV	**Mövzu № 6** **Subphylum Vertebrata**: *Comparative anatomy (Urinogenital, nervous systems and reseptor orqans)* **Qısa icmalı:** Urinary system of vertebrates includes *kidneys* and their ducts, while reproductive system includes male and female *gonads* and their ducts. The *nervous system* meant to perceive stimuli detected by the receptors, to transmit these to various body parts, and to affect responses through effectors. In vertebrates, it is highly specialized. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 784-810	-	+	2	12.10
V	**Mövzu № 7** *Class Cyclostomata.* **Qısa icmalı:** 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, 115-131	-	+	2	16.10
VI	**Mövzu № 8** Class Chondrichthyes. External features, Myotomes, Skeleton, digestive and respiratory systems of cartilaginous fishes. **Qısa icmalı:** Body is elongated. As in all the vertebrates, the skin consists of two layers: an outer ectodermal *epidermis* and an inner mesodermal *corium* or *dermis* Cartilage skeletons, Development of skull and vertebral column, skeleton of paired and unpaired fins and their girdles. Alimentary canal beings at mouth and terminates in anus. It is longer than the body and includes buccal cavity, pharynx, oesophagus, 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. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology	-	+	2	23.10

	vertebrates. P. 544-549, P. 135-146				
VI	**Mövzu № 9** *Class Chondrichthyes. - Blood-vascular, urinogenital, nervous systems and sense organs of cartilaginous fishes.* **Qısa icmalı:** The circulatory system comprises 4 parts- heart and pericardium, arteries, veins and blood. As in cyclostomes and other fishes, heart of *Scoliodon* receives venous blood only which it pumps into gills for aeration. Such a heart is called a *venous* or *branchial heart.* 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". In *Scoliodon,* the two *sexes* are separate. Brain of dogfish is more advanced than that of the sea lamprey. It lies enclosed within 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. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 146-162	-	+	2	26.10.
VII	**Mövzu № 10**. *Osteichthyes. General characters. Skeleton* **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. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 170-172, 550-555	-	+	2	30.10
VIII	**Mövzu № 11.** *Osteichthyes. . Internal organs* **Qısa icmalı:** 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	-	+	2	06.11

	developed optic lobes and cerebellum. Cranial nerves 10 pairs. Well developed lateral line system. Internal ear with 3 semicircular canals. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 172-178				
VIII	**Mövzu № 12.** Amphibia. External features, Myotomes, Skeleton. **Qısa icmalı:** Shape and size, skin and colour, head, trunk, limbs. Three types of muscle fibers occur in a vertebrate—smooth, cardiac and striated—which differ in mictoscopic structure and physiology. Smooth or *involuntory muscles* occur in visccral organs. There is practically no *exoskeleton* in modem Amphibia. The *endoskeleton* of frog is well developed and consists largely of bone and cartilage. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 217-225, 556-567	-	+	2	09.11
IX	**Mövzu № 13** *Digestiv, respiratory and blood-vascular systems of Amphibia* **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). **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 227-240	-	+	2	13.11
X	**Mövzu № 14.** *Nervous system and sensory organs; Urinogenital system of amfibians.* **Qısa icmalı:** Brain poorly developed. Cranial nerves 10 pairs. Nostrils connected to buccal cavity. Middle ear with a single rod-like ossicle, columella. Kidneys mesonephric. Urinary bladder large. Urinary ducts open into cloaca. Excretion ureotelic. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 241-252	-	+	2	20.11
X	**Mövzu № 15.** *Class Reptilia. General characters. classification, external features, endoskeleton* **Qısa icmalı:** Reptiles represent the first class of vertebrates fully adapted to 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	-	+	2	23.11.

	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). Unlike that of amphibians, the skin of reptiles has no respiratory functions. Reptilian skin is thick, dry, and keratinized. Scales may be modified for various functions. Endoskeleton is bony. Skull with one occipital condyle (monocondylar). A characteristic T-shaped interclavicle present. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. 274-278, 568-581				
XI	**Mövzu № 16.** *Digestiv, respiratory and blood-vascular systems of Reptilia* **Qısa icmalı:** The digestive system comprises the *alimentary canal* and the associated *digestive glands.* Respiration in reptiles in general is exclusively pulmonary, that is, taking place only by lungs. The blood vascular or circulatory system of is closed and consists of: the heart, arterial system, venous, blood. Heart usually 3-chambered, 4-chambered in crocodiles. Sinus venosus reduced. 2 systemic arches present. Red blood corpuscles oval and nucleated. Cold-blooded. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P. *278-289*	-	+	2	27.11
XII	**Mövzu № 17** *Nervous system and sensory organs; Urinogenital system of Reptilia* **Qısa icmalı:** The brain of reptiles is similar to the brains of other vertebrates. The cerebral hemispheres are somewhat larger than those of amphibians. This increased size is associated with an improved sense of smell. The optic lobes and the cerebellum are also enlarged, which reflects increased reliance on vision and more refined coordination of muscle functions. The lateral line system, characteristic of fishes, is absent in reptiles. Other sense organs are better developed than those of Amphibia. 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	04.11
XII	**Mövzu № 18** *Aves. Classification. External features of birds* **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,	-	+	2	07.11

	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. *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. **Oxu materialları:** Kotpal R.L. 2010.Modern textbook of zoology vertebrates. P.339-350				
XIII	**Mövzu № 19** *Endoskeleton of birds* **Qısa icmalı:** *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. 582-596	-	+	2	11.12
XIV	**Mövzu № 20** *Internal organs of birds* **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	18.12

XIV	**Mövzu № 21** *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. 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	-	+	2	21.12
XV	**Mövzu № 22** *Internal organs of Mammalia* **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. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P.430-456	-	+	2	25.12
XV	**Mövzu № 23** *Nervous sistem and sensory organs of mammals* **Qısa icmalı:** The proportion of brain to body size is usually greater in mammals than in other vertebrates. In mammals, the sense of touch is well developed. Cranial nerves 12 pairs. Receptors are associated with the bases of hair follicles and are stimulated when a hair is displaced. Olfaction was apparently an important sense in early mammals, because fossil skull fragments show elongate snouts, which would have contained olfactory epithelium. Senses well developed. **Oxu materialları:** **Kotpal R.L**. 2010.Modern textbook of zoology vertebrates. P.430-472	-	+	1	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