

Class		B.Sc. Zoology
Year		II Year
Subject & Subject Code		Zoology - BZOOOL20Y201
Paper	English	Vertebrates and Evolution Paper - I
	हिन्दी	कशेरुकी ओर उद्विकास
Max. Marks		30 (ETE) + 20(IA) = 50
Credit		4
Total Credits		
L	T	
3	1	0

Course Objectives:

1. Students will understand the taxonomic status of the entire chordates and discussed the evolutionary model of the group.
2. Student will gain the knowledge on ecology of some important fishes, amphibians reptiles, birds and mammals.
3. student will understand comparative anatomy and development systems of chordates.
4. Student will be able to discuss some and very important phenomena in Chordates.
5. Student will Know about the conservation and management strategies of the chordate fauna.

Course Outcome:

At the end of the course, learners will be able to:

1. Understand the process of development of animals.
2. Understand the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta.
3. Know the inducer and inductor role in embryogenesis and knowledge about metamorphosis and the process of regeneration.
4. Understand the theories of evolution and highlighted the role of evidences in support of evolution
5. Describe the evolutionary knowledge through the concepts of coloration and mimicry

Student Learning Outcomes (SLO):

Students will:

1. Classify various animals in a given phylum of invertebrates and vertebrates.
2. Identify various larval stages and development in invertebrate and vertebrates groups.
3. Explain various modifications in these groups and the need of the modification for survival.
4. Explain various adaptations in insects including mimicry and metamorphosis.
5. Describe the morphology, habit and habitat, systematic position and various systems in Star fish and Scoliodon. State the outline of animal classification of non-chordates and chordates.
6. Classify the higher invertebrate and vertebrates groups.
7. Categorize the diversity found in the invertebrate groups of animals like Arthropoda, Mollusca and Echinodermata.
8. Categorize the diversity found in the vertebrate groups of animals like reptiles, birds and mammals.

Syllabus		Periods
----------	--	---------

Shama

Mehar Mayla

UNIT - I	<ol style="list-style-type: none"> 1. Origin of Chordates, Classification of phylum Chordate upto orders according to Parker and Haswell (Latest edition). 2. Urochordata-Type study of Herdmania 3. Cephalochordata-Type Study of Amphioxus, Affinities of Amphioxus 4. Comparison between Petromyzon and Myxine. 	15
UNIT - II	<ol style="list-style-type: none"> 1. रज्जुकियों की उत्पत्ति, रज्जुकियों का गण स्तर तक वर्गीकरण (पारकर एवं हेसवेल के नवीन संस्करण अनुसार) 2. यूरोकार्डेटा-हर्डमानिया का अध्ययन 3. सिफैलोकॉर्डेटा -एम्फीआक्सस का अध्ययन, एम्फीआक्सस की सजातियता 4. पेटोमाइजॉन एवं मिक्सीन की तुलना । 	15
UNIT - III	<ol style="list-style-type: none"> 1. Comparative account of integument 2. Comparative account of limb bones and girdles of vertebrates (Amphibia, Reptiles, Birds and Mammals). 3. Comparative account of digestive system (Amphibia, Birds and Mammals). 4. Comparative account of respiratory system (Amphibia, Reptiles, Birds and Mammals). 	15
UNIT - IV	<ol style="list-style-type: none"> 1. अध्यावरण का तुलनात्मक विवरण 2. कशेरुकी में पादअस्थियाँ तथा मेखला का तुलनात्मक विवरण (उभयचर, सरीसृप, पक्षी एवं स्तनीयों में) 3. पाचन तंत्र का तुलनात्मक विवरण (उभयचर, सरीसृप, पक्षी एवं स्तनीयों में) 4. श्वसन तंत्र का तुलनात्मक विवरण (उभयचर, सरीसृप, पक्षी एवं स्तनीयों में) 	15
	<ol style="list-style-type: none"> 1. Comparative account of aortic arches and heart. 2. Comparative account of brain. 3. Comparative account of Urinogenital system. 4. Placentation in Mammals. 	15
	<ol style="list-style-type: none"> 1. हृदय एवं एओर्टिक आर्चेस का तुलनात्मक विवरण 2. मस्तिष्क का तुलनात्मक विवरण 3. मूत्रजनन तंत्र का तुलनात्मक विवरण 4. स्तनी में जरायु विन्यास । 	15
	<ol style="list-style-type: none"> 1. Origin of Life -Modern Concepts only. 2. Lamarckism, Darwinism. 3. Modern Synthetic theories. Variations. Mutation, Isolation & Speciation 4. Adaptation and Mimicry 5. Micro, macro evolution and mega evolution. 	15
	<ol style="list-style-type: none"> 1. जीवन की उत्पत्ति- आधुनिक संकल्पना 2. लेमार्कवाद, डार्विनवाद 3. आधुनिक एवं अनुहरण 4. आधुनिक संश्लेषण सिद्धांत- विभिन्नताएँ, उत्परिवर्तन, पृथक्करण एवं जातीय उद्भव 5. माइक्रो, मेक्रो एवं मेगा उद्विकास 	15
	<ol style="list-style-type: none"> 1. Fossils, Methods of Fossilization, determination of age of fossils. 2. Study of extinct forms. Dinosaurs and Archaeopteryx. 3. Zoogeographical distribution. 4. Evolution of man. 5. Geological time scale and Insular fauna. 	

Shams

Ra

Sham

Mehar

Megha

Class		B.Sc. Zoology	
Year		II Year	
Subject & Subject Code		Zoology - BZOO20Y202	
Paper	English	Animal Physiology and Biochemistry Paper - II	
	हिन्दी	जन्तु कार्यिकी एवं जैव रसायनिकी	
Max. Marks		30 (ETE) + 20 (IA) = 50	
Credit		Total Credits	
L	T	P	4
3	1	0	
Course Objectives:			
Students will understand about			
1. The composition of food and mechanism of digestion absorption and assimilation.			
2. The respiration and excretion and understood the mechanism of transport of gases and urine formation.			
3. The mechanism of circulation and composition of blood.			
4. The neuromuscular coordination and the mechanism of osmoregulation in animals and endocrine system and their function is attained.			
5. The menstrual cycle and the role of contraceptive in population control.			
Course Outcome:			
At the end of the course, learners will be able to:			
1. Get Knowledge of basic terms in physiology.			
2. Understand about the composition of food and mechanism of digestion absorption and assimilation.			
3. Understand the physiological processes in mammals.			
4. Explain the anatomy of various systems.			
5. Illustrate the reproductive cycles with hormonal control.			
6. Gain knowledge of working of kidney.			
Student Learning Outcomes (SLO):			
Students will:			
1. Comprehended the energy source, chemical bonds and the principles of thermodynamic			
2. Understand the importance of acid base balance.			
3. Attained the knowledge of macromolecule such as carbohydrates, protein and fat, their types and significance.			
4. Understand the knowledge of cholesterol and its biological significance.			
5. Described the enzymes, mechanism of enzyme action and factors affecting the enzyme activity.			
6. Understand the types and importance of vitamins.			
Unit	Syllabus		Periods

Shama

Mohan
Nagya

UNIT - I	<p>Nutrition and Metabolism</p> <ol style="list-style-type: none"> 1. Physiology of digestion in Mammals 2. Protein Metabolism: Deamination, Decarboxylation. Transamination of amino acid, and Ornithine cycle. 3. Carbohydrate metabolism- Glycogenesis, glycogenolysis, Glycolysis, The Citric acid cycle. Gluconeogenesis . 4. Lipid Metabolism- Beta oxidation of fatty acids. 	15
	<p>पाचन एवं कार्बिकी</p> <ol style="list-style-type: none"> 1. स्तनधारियों में पाचन की कार्बिकी 2. प्रोटीन उपापचय- निअमोनीकरण, विकारबोक्सीलेशन अमीनो अम्ल का अमाइनी अनुअंतरण एवं आर्निथिन चक्र 3. कार्बोहाइड्रेट उपापचय - ग्लाइकोजेनेसिस, ग्लाइकोजिनोलाइसिस, ग्लाइकोलाइसिस साइट्रिक अम्ल चक्र ग्लाइकोनियोजेनेसिस 4. वसा उपापचय - वसीय अम्ल का बीटा ऑक्सीकरण । 	
UNIT - II	<p>Respiration, Excretion and Immune System</p> <ol style="list-style-type: none"> 1. Mechanism and Physiology of respiration in mammals (transport of Gases, chloride shift) 2. Physiology of Excretion - Urea and urine Formation in Mammals. 3. Innate and acquired immunity. Immune cells and Lymphoid system. immune response: Cellular and humoral immunity 	15
	<p>वसन उत्सर्जन एवं प्रतिरक्षा तंत्र</p> <ol style="list-style-type: none"> 1. स्तनधारियों में श्वसन तंत्र की कार्बिकी एवं क्रियाविधि, (वायवीय परिवहन एवं क्लोराइड शिफ्ट) 2. उत्सर्जन की कार्बिकी- स्तनधारियों में यूरिया तथा यूरिन की निर्माण विधि 3. सहज एवं अर्जित प्रतिरक्षा प्रणाली, प्रतिरक्षा कोशाएं तथा लिम्फोइड तंत्र, प्रतिरक्षा प्रतिक्रिया, कोशिकीय, तथा ह्यूमोरल प्रतिरक्षा 	
UNIT - III	<p>Regulatory Mechanisms of Enzymes and role of vitamins</p> <ol style="list-style-type: none"> 1. Thermoregulation 2. Definition and nomenclature of enzymes. Classification of Enzymes. 3. Mechanism of enzyme action. 4. Co-enzymes 5. Vitamins 	15
	<p>एन्जाइम्स की नियमन क्रियाविधि तथा एवं विटामिन्स के कार्य</p> <ol style="list-style-type: none"> 1. तापनियमन 2. एन्जाइम की परिभाषा, नामकरण एवं वर्गीकरण 3. एन्जाइम की क्रियाविधि 4. सह-एन्जाइम 5. विटामिन्स 	
	<p>Neuromuscular Co-Ordination</p> <ol style="list-style-type: none"> 1. Types of Neurons and Glial cells 2. Physiology of nerve impulse conduction 3. Types and Structure of Muscles 4. Theory of Muscle contraction and its biochemistry. 	

Shama

Mehar
Mehar

Class			B.Sc. Zoology
Year			II Year
Subject & Subject Code			Practical Zoology- BZOOL20Y203
Paper			Paper I and Paper II, Practical
Max. Marks			50= (30+20) (ETE+IA)
Credit		Total Credits	
L	T	P	2
0	0	2	

PRACTICALS

- 1 Dissections of commercially available species of locally available Fishes (Efforts may be done to use computer simulation technique).
- 2 Study of museum specimens (Vertebrates).
- 3 Study of specimens of evolutionary importance Viz living fossils, connecting links , extinct animals , fossils: Limulus , Latimeria , Dianosaurs, Asiatic chital , Archeopteryx, Peripatus etc.
- 4 Osteology: Limb bones and girdle bones of Frog, Varanus, Pigeon and Rabbit.
- 5 Detection of Protein , Carbohydrate and Lipid/ Study of Human salivary enzyme activity in relation to pH.
- 6 Hematological Experiment – RBC and WBC counting / Blood grouping in blood samples/ Estimation of Hemoglobin and sugar in blood samples.
- 7 Histological study of various endocrine glands – T.S . of Thyroid. T.S. of Pituitary gland, T.S. of Adrenal gland, T.S. of Testis , T.S. of Ovary .
- 8 Histological study of Digestive an Visceral organs – T.S. of Stomach, T.S. of Intestine, T.S. of Pancreas T.S. of Liver, T.S of lungs and L.S. of Kindny

Shams

[Signature]

[Signature]

Mehar

[Signature]

Class		B.Sc. Zoology (Honours)	
Year		II Year	
Subject & Subject Code		Zoology - BZOOL20Y204	
Paper		Food, Nutrition and Health Paper - III	
Max. Marks		30 (ETE) + 20 (IA) = 50	
Credit		Total Credits	
L	T	P	4
3	1	0	
<p>Course Objectives: The course "Fundamentals of Food and Nutrition" aims at developing basic understanding about nutrition, its effect on human health and newer advances in food technology. This course encompasses physiological, biochemical and social aspects of food and discusses relationship between metabolites and human health.</p>			
<p>Course Outcome: At the end of the course, learners will be able to:</p> <ol style="list-style-type: none"> 1. Learn the programme provides basic understanding of the correlation between food and health. 2. Learn Basically this is an interdisciplinary programme with knowledge of human anatomy, their role in relation to food and health. 3. Provides indepth understanding of the role of food under specific diseased conditions. 4. Understand the basic concepts behind food science and food preparation. 5. Learn Food and Water borne infections. 			
<p>Student Learning Outcomes (SLO): Students will:</p> <ol style="list-style-type: none"> 1. Able to interpret and apply nutrition concepts to evaluate and improve the nutritional health of communities. 2. Able to identify and apply food principles to food and nutrition systems. 3. Able to integrate knowledge and skills in food and nutrition with professional issues affecting the nutrition and/or dietetics fields. 4. Understand definition and concept of health Major nutritional Deficiency diseases. 5. Understand causes of food spoilage and their preventive measures. 			
Unit	Syllabus		Periods

Shama

Shama

Shama

Shama

Shama

UNIT - I	Basic concept of food and nutrition Food Components and food-nutrients. Concept of a balanced diet, nutrient needs and dietary pattern for various groups- adults, pregnant and nursing mothers, infants, school children, adolescents and elderly	15
UNIT - II	Nutritional Biochemistry: Carbohydrates, Lipids, Proteins- Definition, Classification, their dietary source and role. Vitamins- Fat-soluble and Water-soluble vitamins- their dietary source and importance. Minerals- Iron, calcium, phosphorus, iodine, selenium and zinc: their biological functions.	15
UNIT - III	Health - Introduction to health- Definition and concept of health Major nutritional Deficiency diseases- Protein Energy Malnutrition (kwashiorkor and marasmus), Vitamin A deficiency disorders, Iron deficiency disorders, Iodine deficiency disorders- their causes, symptoms, treatment, prevention and government programmes, if any.	15
UNIT - IV	Life style related diseases- hypertension, diabetes mellitus, and obesity- their causes and prevention through dietary and lifestyle modifications. Social health problems- smoking, alcoholism, drug dependence and Acquired Immuno Deficiency Syndrome (AIDS) - their causes, treatment and prevention. Common ailments- cold, cough, and fevers, their causes and treatment	15
UNIT - V	Food hygiene: Potable water- sources and methods of purification at domestic level . Food and Water borne infections: Bacterial infection: Cholera, typhoid fever, dysentery; Viral infection: Hepatitis, Poliomyelitis, Protozoan infection: amoebiasis, giardiasis; Parasitic infection: taeniasis and ascariasis their transmission, causative agent, sources of infection, symptoms and prevention. Brief account of food spoilage: Causes of food spoilage and their preventive measures	15

Text Books-

- 1 Srilakshmi B. Nutrition Science; 2002; New Age International (P) Ltd.
- 2 Srilakshmi B. Food Science; Fourth Ed; 2007; New Age International (P) Ltd.
- 3 Swaminathan M. Handbook of Foods and Nutrition; Fifth Ed; 1986; BAPPCO.
- 4
- 5 Gibney et al. Public Health Nutrition; 2004; Blackwell Publishing

Reference Books-

- 1 Lakra P, Singh MD. Textbook of Nutrition and Health; First Ed; 2008; Academic Excellence.
- 2 Manay MS, Shadaksharaswamy. Food-Facts and Principles; 1998; New Age International (P) Ltd.
- 3 Mudambi, SR and Rajagopal, MV. Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Ed; 2007; New Age International Publishers

Class		B.Sc. Zoology (Honours)	
Year		II Year	
Subject & Subject Code		Practical Zoology Honours- BZOOL20Y205	
Paper		Paper III, Practical	
Max. Marks		50= (30+20) (ETE + IA)	
Credit		Total Credits	
L	T	P	1
0	0	1	

PRACTICALS

- 1 To detect adulteration in a) Ghee b) Sugars c) Tea leaves and d) Turmeric
- 2 Estimation of Lactose in milk
- 3 Ascorbic acid estimation in food by titrimetry
- 4 Estimation of Calcium in foods by titrimetry
- 5 Study of the stored grain pests from slides/ photograph (Sitophilus oryzae, Trogoderma granarium, Callosobruchus chinensis and Tribolium castaneum): their identification, habitat and food sources, damage caused and control. Preparation of temporary mounts of the above stored grain pests.
- 6 Project- Undertake computer aided diet analysis and nutrition counseling for different age groups.

OR

Identify nutrient rich sources of foods (fruits and vegetables), their seasonal availability and price

OR

Study of nutrition labeling on selected foods

Shama

[Signature]

Neha

Maya