

ZOOLOGY

FYBSc Sem I

Course I: Wonders of Animal world (USZO101)

Unit 1: Wonders of Animal World	CO 1	To describe uniqueness of mimicry, Bird migration and Brood parasitism.
	CO 2	To explain Breeding and Parental and Adaptation of desert animals.
	CO 3	To describe Echolocation, pearl formation, Bioluminescence, Regeneration and Coral formation.
Unit 2: Biodiversity and its Conservation	CO 1	To explain significance of biodiversity and conservation.
	CO 2	To interpret and discuss role & importance of biodiversity in daily life.
	CO 3	To evaluate, discuss biodiversity conservation and management at local and international level.
Unit 3: Footsteps to follow	CO 1	To summarise the work of scientists /philosophers/ entrepreneurs in biology.
	CO 2	To delineate and sketch biographies of Dr. Hargobind Khorana, Dr. Salim Ali
	CO 3	To critique and analyse White revolution, Water conservation, Biocon, Gadre fisheries, Anandvan.

Course II: Instrumentation and Biotechnology (USZO102)

Unit 1: Laboratory Safety, Units and Measurements	CO 1	To recognize hazard symbols and risks in Laboratory
	CO 2	To practice safety measures in Laboratory
	CO 3	To calculate concentrations e.g., molarity, normality, percentage etc
	CO 4	To convert SI system units, e.g., μg to g
	CO 5	To evaluate and compare sampling methods
	CO 6	To calculate measures of central tendency (mean, median, mode)
Unit 2: Animal Biotechnology	CO 1	To describe applications of BT in various fields
	CO 2	To draw flowcharts and describe some applications
	CO 3	To debate ethical issues in use of GM products
Unit 3: Instrumentation	CO 1	To identify instruments used in Biology
	CO 2	To draw diagrams for and explain principles of instruments
	CO 3	To delineate applications of instruments

Practical based on above two courses USZOP1

Practical I	CO 1	To mount and identify Foraminiferan shells from sand
	CO 2	To identify and describe examples of animal interactions, breeding, parental care
	CO 3	To identify and describe adaptations of reptiles
	CO 4	To identify and differentiate venomous and non-venomous snakes
	CO 5	To mount and identify fish scales
	CO 6	To identify types of feathers, beaks and feet in birds
	CO 7	To identify common birds
Field Report	CO	To choose project of interest
		To observe and record data (Blood group, Fish, Height etc)
		To analyse and represent data
		To write report of the project
Practical II	CO 1	To identify and describe hazard symbols
	CO 2	To calculate mean, median, mode
	CO 3	To identify transgenic and cloned animals
	CO 4	To extract fruit juice using enzyme pectinase
	CO 5	To determine pH using pH meter, pH paper and Red Cabbage indicator
	CO 6	To learn to use colorimeter and pH meter
	CO 7	To estimate concentrations using colorimeter
	CO 8	To learn technique of paper, adsorption and TL-Chromatography
	CO 9	To resolve and calculate R _f values of amino acids, lipids and pigments by chromatography
	CO 10	To analyse chromatogram
	CO 11	To study parts of microscope
	CO 12	To focus slide under low and high power (45X)

FYBSc Sem II

Course III: Biodiversity and Population Ecology (USZO201)

Unit 1 : Population Ecology	CO 1	To define and describe factors affecting population, e.g., density, natality, mortality etc
	CO 2	To draw and describe Age structure and survivorship curves
	CO 3	To interpret and explain growth curves
	CO 4	To discuss mechanisms regulating growth
	CO 5	To define and learn significance of life table
	CO 6	To describe procedure for census

Unit 2:Ecosystem	CO 1	To describe components of ecosystem
	CO 2	To explain effect of temperature on biota
	CO 3	To draw and explain biogeochemical cycles
	CO 4	To explain fresh water ecosystems
	CO 5	To define terms lentic and lotic ecosystems
	CO 6	To describe ecological pyramids
	CO 7	To differentiate erect and inverted pyramids
	CO 8	To define and explain various types of food chains and food webs
	CO 9	To define and explain various types of food chains and food webs
	CO 10	To differentiate food chains and food webs
Unit 3 :National Parks, Sanctuaries of India	CO 1	To illustrate endangered, threatened and critically endangered animals
	CO 2	To analyse and describe reasons for threat to wildlife
	CO 3	To describe unique features (flora and fauna) of some national parks
	CO 4	To summarise role of wildlife
	CO 5	To describe Projects Tiger and Rhinoceros
	CO 6	To describe ecotourism with reference to conservation
	CO 7	To explain Biopiracy with reference to biological resources in India

FYBSc Sem II

Course IV: NUTRITION, PUBLIC HEALTH AND HYGIENE (USZO202)

Unit 1 : Nutrition and Health	CO 1	To define and describe balanced diet and essential nutrients of food.
	CO 2	To differentiate and describe healthy and unhealthy eating habits and lifestyles.
	CO 3	To interpret and calculate BMI.
Unit 2 : Public Health and Hygiene	CO 1	To question and discuss depleting water resource. To evaluate measurement of water footprint.
	CO 2	To define and explain sanitation and Hygiene
	CO 3	To describe WHO and its programs in India.
	CO 4	To explain and interpret effects of radiation
	CO 5	To describe and list methods to prevent addiction
	CO 6	To define and explain First Aid and Blood bank.
Unit 3 : Common Human Diseases and Disorders	CO 1	To discuss causes, symptoms and impact of stress related disorders.
	CO 2	To identify describe relevant solutions for positive attitude.

	CO 3	To describe cause, symptoms and precautions of infectious diseases.
	CO 4	To differentiate Communicable and Non –communicable diseases.

Practical based on above two courses USZOP2

Practical I	CO 1	To interpret survivorship curve, life table
	CO 2	To draw diagram representing age structure
	CO 3	To calculate sex ratio
	CO 4	To estimate population density by capture recapture method
	CO 5	To calculate natality, mortality from data
	CO 6	To draw and interpret sigmoid growth curve
	CO 7	To construct food chains and food webs
	CO 8	To distinguish erect and inverted pyramids
	CO 9	To estimate free CO ₂ and hardness from water samples
	CO 10	To identify endangered and critically endangered animals
Field Trip	CO 1	To locate national parks and sanctuaries on India map
		To locate and observe and photograph marine fauna
		To record unique features
		To write report of the field trip
Practical II	CO 1	To estimate semi-quantitatively Vitamin C by iodometric method
	CO 2	To identify and distinguish some human parasites
	CO 3	To estimate protein content in two varieties of eggs
	CO 4	To estimate moisture content in biscuits
	CO 5	To estimate maltose content in two varieties of bread
	CO 6	To screen level of hemoglobin using CuSO ₄ method
	CO 7	To separate and locate starch granules from cereals
	CO 8	To measure and do demographic survey for BMI
	CO 9	

SYBSc Sem III

Course V: Genetics (USZO301)

Unit 1 : Fundamentals of Genetics	CO 1	To define and explain basic terms in genetics.
	CO 2	To discuss and analyse Mendelian principles of inheritance
	CO 3	To solve problems in Inheritance patterns
	CO 4	To describe multiple alleles, multiple genes, linkage and crossing

		over.
Unit 2 : Chromosomes and Heredity	CO 1	To draw and describe types and classification of chromosomes.
	CO 2	To analyse and interpret sex determination, sex influenced and sex limited genes.
	CO 3	To analyse inheritance of sex linked disorders.
Unit 3 :Nucleic acids	CO 1	To describe experiments proving DNA as the genetic material.
	CO 2	To explain the structure of nucleic acid and central dogma of molecular biology.
	CO 3	To describe regulation of gene expression.

Course VI: Animal Physiology (USZO302)

Unit 1 : Nutrition and Excretion	CO 1	To compare, draw and explain nutritional apparatus in Amoeba, Hydra, Cockroach, Amphioxus, Pigeon, Ruminants
	CO 2	To define and explain physiology of digestion in humans
	CO 3	To classify animals on basis of excretory products
	CO 4	To compare and draw excretory apparatus of Amoeba, Planaria, Cockroach
	CO 5	To describe and explain physiology of human digestion and excretion
Unit 2 :Respiration and Circulation	CO 1	To describe and compare respiratory structures of Earthworm, Spider, Fish, Frog; describe significance of air sacs of birds
	CO 2	To compare single and double circulation; open and closed circulation
	CO 3	To describe and compare circulatory fluids- lymph, blood, coelomic fluid
	CO 4	To compare, draw and describe hearts of Cockroach, Earthworm, Shark, Frog, Crocodile and Pigeon
	CO 5	To describe and explain physiology of human respiration and heart
Unit 3 :Control & Coordination, Locomotion & Reproduction	CO 1	To draw and describe nervous systems in Paramecium, Hydra and Earthworm
	CO 2	To explain with diagram physiology of conduction of nerve impulse across axon and synapse
	CO 3	To describe and explain locomotion and organs with reference to Amoeba, Cilia, Cockroach, starfish
	CO 4	To describe and compare different types of asexual reproduction
	CO 5	To describe and explain with diagrams- gametogenesis, structures of gametes
	CO 6	To describe types of fertilization and delivery

Course VII-A: Ethology, Parasitology, Economic Zoology (USZOE303A)

Unit 1 : Ethology	CO 1	To define behavior; to differentiate innate and learned behaviors. To explain classical conditioning and instrumental learning.
	CO 2	To describe communication, mimicry, displacement, schooling and territoriality in animals with respect to behaviour
	CO 3	To explain significance of social behaviours in primates
Unit 2 Parasitology	CO 1	To define and describe parasitism and its relationship in the environment.
	CO 2	To explain modes of transmission of parasites.
	CO 3	To discuss epidemiology of parasites that effect humans.
	CO 4	To describe with reasons preventive measures against parasites.
	CO 5	To explain the life cycles of parasites, symptoms and treatment of diseases.
Unit 3 Economic Zoology	CO 1	To describe rearing methods, economic significance of Apiculture, Vermiculture and dairy science.
	CO 2	To describe modern techniques in animal husbandry.
	CO 3	To explain dairy processing and to describe milk products

Practical based on above three courses USZOP3

Practical I	CO 1	To extract and identify DNA and RNA.
	CO 2	To mounting, identify and observe Barr bodies.
	CO 3	To study polytene chromosomes
	CO 4	To make temporary mounting of onion root tips to observe and study stages of mitosis.
	CO 5	To detect blood groups and Rh factor.
	CO 6	To solve problems in Genetics related to Monohybrid/Dihybrid cross, X-linked inheritance, and Multiple alleles.
	CO 7	To study chromosome morphology using photographs.
	CO 8	To analyse and identify Pedigree.
	CO 9	To solve problems in Molecular biology.
Project, Field trip	CO 1	To observe and set-up vermiculture project
	CO 2	To diagnose and solve practical difficulties with vermiculture
	CO 3	To observe bee hives, bees in natural condition
	CO 4	To write project and field report detailing steps involved
Practical II	CO 1	To test and confirm normal and abnormal constituents of urine
	CO 2	To detect presence of ammonia from pond water
	CO 3	To detect presence of uric acid from bird excreta
	CO 4	To observe & differentiate striated and non-striated muscles

	CO 5	To identify and describe nutritional apparatus in different animals
	CO 6	To identify and describe locomotory organs from different animals
	CO 7	To identify and describe hearts of different animals
	CO 8	To identify and describe slides of reproduction
Practical III	CO 1	To extract and qualitatively identify casein from Milk.
	CO 2	To prepare and weigh paneer from Milk.
	CO 3	To measure density of milk samples using Lactometer.
	CO 4	To draw and describe honey bee with respect to Mouthparts, legs, sting apparatus, life cycle.
	CO 5	To identify, describe parasites - Protozoan and Helminths.
	CO 6	To identify and describe parasitic adaptations in Tapeworm
	CO 7	To identify and describe ectoparasites - Leech, Tick, Mite.

SYBSc Sem IV

Course VIII: Origin and Evolution of Life (USZO401)

Unit 1 : Origin and Evolution of Life	CO 1	To describe origin of life
	CO 2	To explain and analyse Miller- Urey experiments and Oparin theory
	CO 3	To describe origin of pro and eukaryotic cell
	CO 4	To interpret evidences for evolution
	CO 5	To discuss theories of evolution
Unit 2 : Population Genetics	CO 1	To interpret Hardy Weinberg equilibrium with respect to non-random mating
	CO 2	To discuss and interpret genetic drift with examples
	CO 3	To discuss natural selection
	CO 4	To explain genetic basis of evolution – recombination and mutation
	CO 5	To explain types of variations
	CO 6	To define and discuss speciation and isolating mechanisms
Unit 3: Scientific Method, Writing Ethics in Scientific Research	CO 1	To discuss role of thinking and reasoning as scientific method
	CO 2	To identify and describe components in scientific method
	CO 3	To differentiate methods of disseminating research
	CO 4	To describe method of scientific writing
	CO 5	To discuss ethics in scientific research
	CO 6	To define and discuss plagiarism

Course IX: Cell Biology (USZO402)

Unit 1 : Cell Biology	CO 1	To differentiate prokaryotic and eukaryotic cell
	CO 2	To draw, describe and explain organization and functions of nucleus, membrane
	CO 3	To draw and explain components and functions of cytoskeleton
Unit 2 : Endomembrane system	CO 1	To draw, describe and explain organization and functions of Endoplasmic reticulum,
	CO 2	To draw, describe and explain organization and functions of Golgi complex, Lysosomes and Mitochondria
Unit 3: Biomolecules	CO 1	To classify, explain molecular structures of carbohydrates, proteins and lipids
	CO 2	To describe biological roles and functions of carbohydrates, lipids and proteins
	CO 3	To describe biological roles and clinical significance of vitamins A, C, D and B12

Course X-A: Comparative Embryology, Aspects of Human Reproduction, Pollution (USZOE403A)

Unit 1 Comparative Embryology	CO 1	To classify and describe types of eggs, sperm, developmental stages
	CO 2	To discuss types and formation of coelom
Unit 2 Aspects of Human Reproduction	CO 1	To draw and describe human reproductive systems and their hormonal regulation
	CO 2	To discuss types, merits and demerits of contraception
	CO 3	To interpret causes of infertility and describe disorders related to infertility
	CO 4	To describe role of endocrine disruptors
	CO 5	To discuss and explain different methods of infertility
Unit 3 Pollution	CO 1	To describe sources, types and effects of air, water, soil and sound pollution
	CO 2	To describe methods of control measures
	CO 3	To analyse relationship of global warming and climate change

Practical based on above three courses USZOP4

Practical I	CO 1	To estimate population density by line transect and Quadrant method
	CO 2	To differentiate gram +ve and –ve cells by Gram staining
	CO 3	To identify different cells in blood by differential staining
	CO 4	To identify and describe fossils
	CO 5	To identify and describe types of speciation

	CO 6	To write an abstract of the given paper
	CO 7	To make a PPT from the given scientific paper
Practical II	CO 1	To identify and explain osmotic process in blood cells
	CO 2	To measure cell diameter using occulometer
	CO 3	To identify and classify carbohydrates, proteins and lipids using biochemical tests
	CO 4	To estimate rancidity of lipids
	CO 5	To identify and describe micrographs of cell organelles
	CO 6	To identify and describe clinical disorders
Practical III	CO 1	To identify and describe air microflora
	CO 2	To estimate dissolved Oxygen, salinity and conductivity from the given samples
	CO 3	To measure soil parameters-pH, temperature and organic content
	CO 4	To identify and describe stages of reproduction
	CO 5	To write a review of media program/film
Field Trip		To locate and observe and photograph marine fauna
		To record unique features
		To write report of the field trip