Kavayitri Bahinabai Chaudhari

NORTH MAHARASHTRA UNIVERSITY

JALGAON 425001, INDIA

SYLLABUS UNDER

FACULTY OF SCIENCE & TECHNOLOGY

UNDER CBCS

FOR COURSES RELATED TO SUBJECT

ZOOLOGY

S.Y.B.Sc. (Semester I and II)

WITH EFFECT FROM

ACADEMIC YEAR 2019-2020

KBC NORTH MAHARSHTRA UNIVERSITY, JALGAON

Syllabus for SYBSc ZOOLOGY under CBCS Pattern

(wef June 2019)

Examination Pattern 60:40

Semester	Core Course	Structure	Code & Title of the paper	Credit
III	DSC 1-C CC A-III	Theory	ZOO 301 Physiology	02
		Theory	ZOO 302 Biochemistry	02
		Practical	ZOO 303 Physiology & Biochemistry	02
	SE Course I	Section I	SEC I Apiculture	02
	AEC III	Section I	English/Marathi Communication (2 periods per week)	02
IV	DSC 1-D CC A-IV	Theory	ZOO 401 Genetics	02
		Theory	ZOO 402 Evolutionary Biology	02
		Practical	ZOO 403 Genetics & Evolutionary Biology	02
	SE Course II	Section II	SEC II Medical Diagnostics	02
	AEC IV	Section II	English/Marathi Communication (2 periods per week)	02
Total Credits Sem III & IV= 16+4=20				

DSC = Discipline selective course
SEC= Skill Enhancement Course
AEC = Ability Enhancement course
Credit 2= 2 hrs/ week = 30 periods per semester

CORE COURSE III

SYBSc Zoology Semester III

ZOO 301 PHYSIOLOGY

THEORY **(CREDITS 2)**

Unit 1: Nerve and muscle (5)
Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres, Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction

Unit 2: Digestion (3)
Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids

Unit 3: Respiration (5)
Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood

Unit 4: Excretion (4)
Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism

Unit 5: Cardiovascular system (5)
Composition of blood, Hemostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle

Unit 6: Reproduction and Endocrine Glands (8)
Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle, Structure and function of pituitary, thyroid, Parathyroid, pancreas and adrenal

ZOO 302 BIOCHEMISTRY

THEORY **(CREDITS 2)**

Unit 1: Carbohydrate Metabolism (8)
Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain

Unit 2: Lipid Metabolism (6)
Biosynthesis and β oxidation of palmitic acid, Lipogenesis, Lipolysis

Unit 3: Protein metabolism (8)
Biosynthesis of amino acid, Transamination, Deamination, Decarboxylation and Urea Cycle

Unit 4: Enzymes (8)
Introduction, Classification of Enzymes, Mechanism of action, Enzyme Kinetics, Factors affecting rate of enzyme mediated reactions, Inhibition and Regulation

ZOO 303 PHYSIOLOGY AND BIOCHEMISTRY

PRACTICAL **(CREDITS 2)**

1. Preparation of hemin and hemochromogen crystals
2. Study of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland
3. Study of permanent slides of spinal cord, duodenum, liver, lung, kidney, bone, cartilage
4. Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose)
5. Estimation of total protein in given solutions by Lowry's method.
6. Study of activity of salivary amylase under optimum conditions

SUGGESTED READINGS

- Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.
- Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI Edition., McGraw Hill
- Guyton, A.C. and Hall, J.E. (2011). T*extbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
- Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H Freeman and Co.
- Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.
- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper's Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.
- Prakash S.Lohar (2008)Endocrinology:Hormones and Human Health, MJP Publshers , A unit of Tamilnadu Book House, Triplicane, Chennai

Skill Enhancement Course I (Section I)

SEC I

Apiculture

Credit 2

Unit 1: Biology of Bees (4)

History, Classification and Biology of Honey Bees, Social Organization of Bee Colony

Unit 2: **Rearing of Bees** (12)

Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth Bee Pasturage Selection of Bee Species for Apiculture, Bee Keeping Equipment Methods of Extraction of Honey (Indigenous and Modern)

Unit 3: **Diseases and Enemies** (5)

Bee Diseases and Enemies Control and Preventive measures

Unit 4: **Bee Economy** (4)

Products of Apiculture Industry and its Uses (Honey, Bees Wax, Propolis, Pollen, etc)

Unit 5: **Entrepreneurship in Apiculture** (5)

Bee Keeping Industry – Recent Efforts, Modern Methods in employing artificial Beehives for cross pollination in horticultural gardens

SUGGESTED READINGS

- Prost, P. J. (1962). Apiculture. Oxford and IBH, New Delhi.
- Bisht D.S., Apiculture, ICAR Publication.
- Singh S., Beekeeping in India, Indian council of Agricultural Research, NewDelhi.

CORE COURSE IV
SYBSc Zoology Semester IV

ZOO 401 GENETICS

THEORY **(CREDITS 2)**

Unit 1: Introduction to Genetics (4)
Mendel's work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information

Unit 2: Mendelian Genetics and its Extension (10)
Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and co dominance, Polygenic inheritance, Multiple alleles, Lethal genes, Epistasis, Pleiotropy, sex linked inheritance, extra-chromosomal inheritance

Unit 3: Linkage, Crossing Over and Chromosomal Mapping (6)
Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, definition of gene mapping.

Unit 4: Mutations (6)
Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations

Unit 5: Sex Determination (4)
Chromosomal mechanisms and methods

ZOO 402 EVOLUTIONARY BIOLOGY

THEORY **(CREDITS 2)**

Unit 1: History of Life (2)
Major Events in History of Life

Unit 2: Introduction to Evolutionary Theories (4)
Lamarckism, Darwinism, Neo-Darwinism

Unit 3: Direct Evidences of Evolution (4)
Types of fossils, Incompleteness of fossil record, Dating of fossils, Phylogeny of horse

Unit 4: Processes of Evolutionary Change (8)
Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection

Unit 5: Species Concept (4)
Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric)

Unit 6: Macro-evolution (4)
Macro-evolutionary Principles (example: Darwin's Finches)

Unit 7: Extinction (4)
Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution

ZOO 403 GENETICS AND EVOLUTIONARY BIOLOGY

PRACTICAL **(CREDITS 2)**

1. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test.
2. Study of Linkage, recombination, gene mapping using the data.
3. Study of Human Karyotypes (normal and abnormal).
4. Study of fossil evidences from plaster cast models and pictures
5. Study of homology and analogy from suitable specimens/ pictures
6. Study of Picture/Charts with reference to:
   a) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors
   b) Darwin's Finches with diagrams/ cut outs of beaks of different species
7. Visit to Natural History Museum and submission of report

SUGGESTED READINGS

- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley India.
- Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics*. X Edition. Benjamin Cummings.
- Russell, P. J. (2009). *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
- Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
- Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
- Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). *Evolution*. Cold Spring, Harbour Laboratory Press.
- Hall, B. K. and Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
- Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
- Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates

Skill Enhancement Course II (Section II)

SEC II

Medical Diagnostics

THEORY **Credit 2**

Unit 1: **Introduction to Medical Diagnostics and its Importance** (2)

Unit 2: **Diagnostics Methods Used for Analysis of Blood** (10)

Blood composition, Preparation of blood smear and Differential Leucocyte Count (D.L.C) using Leishman's stain, Platelet count using haemocytometer, Erythrocyte Sedimentary Rate (E.S.R), Packed Cell Volume (P.C.V.)

Unit 3: **Diagnostic Methods Used for Urine Analysis** (6)

Urine Analysis: Physical characteristics, normal and abnormal constituents

Unit 4:**Non-infectious Diseases** (6)

Causes, types, symptoms, complications, diagnosis and prevention of Diabetes (Type I and Type II), Hypertension (Primary and secondary), Testing of blood glucose using Glucometer/ diagnostic kit

Unit 5: **Infectious Diseases** (3)

Causes, types, symptoms, diagnosis and prevention of Tuberculosis and Hepatitis

Unit 6: **Tumours** **(**3)

Types (Benign/Malignant), Detection and metastasis; Medical imaging: X-Ray of Bone fracture, PET, MRI and CT Scan (using photographs).

SUGGESTED READINGS

- Park, K. (2007), Preventive and Social Medicine, B.B. Publishers
- Godkar P.B. and Godkar D.P. Textbook of Medical Laboratory Technology
- Edition, Bhalani Publishing House Cheesbrough M., A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses
- Guyton A.C. and Hall J.E. Textbook of Medical Physiology, Saunders
- Robbins and Cortan, Pathologic Basis of Disease, VIIIEdition, Saunders
- Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.