List of New Course(s) Introduced

Department : *Zoology*

Programme Name : *B. Sc*

Academic Year : 2019-20

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	LS/ZOO/CC-301 L	Diversity of Chordates
02.	LS/ZOO/CC-302 L	Animal Physiology: Controlling and Coordinating systems
03.	LS/ZOO/CC-303 L	Fundamental of Biochemistry
04.	LS/ZOO/GE-301 L	Food Nutrition and Health
05.	LS/ZOO/SEC-301 L	Sericulture
06.	LS/ZOO/CC-401 L	Comparative anatomy of vertebrates
07.	LS/ZOO/CC-402 L	Animal Physiology: Life Sustaining Systems
08.	LS/ZOO/CC-403 L	Biochemistry of Metabolic Processes
09.	LS/ZOO/GE-401 L	Insect Vector and Diseases
10.	LS/ZOO/SE-401	Medical Diagnostics

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Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2019-20

School : *School of Studies of Life Sciences*

Department : *Zoology*

Date and Time : *July 06, 2018 – 4:00 PM*

Venue : *Department of Zoology*

The scheduled meeting of member of Board of Studies (BoS) of Department of Zoology, School of Studies of Life Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur was held to design and discuss the B. Sc. Hons (I to VI semesters) scheme and syllabi.

The following members were present in the meeting:

1. Prof. Sangeeta Shukla (External Expert Member BoS, Dept. of Zoology., Jiwaji University, Gwalior)
3. Dr. Monika Bhadauria (HOD, Associate Prof., Dept. of Zoology, GGV.-cum Chairman, BOS)
4. Dr. Rohit Seth (Member BoS, Associate Professor, Dept. of Zoology, GGV)
5. Dr. Santosh Singh (Member, Assistant Professor, Dept. of Zoolgy, GGV)

Following points were discussed during the meeting

1. The previous B.Sc. Zoology, Course (Session 2017-18) was scrutinized and changed as per CBCS scheme. The CBCS scheme was fully adopted as per UGC guidelines and courses were changed as per given syllabus by the UGC.
2. As per UGC CBCS guidelines the Generic elective, Skill Enhancement course and discipline specific electives were offered.
3. Total 14 core courses, 04 Generic elective, 02 Skill enhancement course, and 04 discipline specific elective were offered for I to VI semesters of B.Sc. Program.

The committee discussed and approved the scheme and syllabi. All courses were newly introduced in B. Sc Honors Zoology, (CBCS from III to IV semester).

List of new courses in 2018-19:

Sr. No.	Course Code	Name of the Course
01.	LS/ZOO/CC-301 L	Diversity of Chordates
02.	LS/ZOO/CC-302 L	Animal Physiology: Controlling and Coordinating systems
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10.	LS/ZOO/SE-401	Medical Diagnostics

Signature & Seal of HOD

Scheme and Syllabus

SCHEME AND SYLLABUS

2018–19

FOR

CHOICE BASED CREDIT SYSTEM (CBCS)

FOR B.Sc. HONOURS ZOOLOGY

DEPARTMENT OF ZOOLOGY

SCHOOL OF LIFE SCIENCES

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (CG)

6/7/18

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B.Sc. Hon's (Zoology): CBCS 2018-2019

School of Life Sciences

Semester I				
Course Opted	**Course Code**	**Name of the course**	**Credit**	**H/week**
Core Course-1 Theory	LS/ZOO/CC-101 L	Non Chordates – I (Protista to Pseudocoelomate)	4	4
Core Course-1 Practical	LS/ZOO/CC-101 P	Lab Course	2	4
Core Course-2 Theory	LS/ZOO/CC-102 L	Principles of Ecology	4	4
Core Course-2 Practical	LS/ZOO/CC-102 P	Lab Course	2	4
Generic Elective-1 Theory	LS/ZOO/GE-101 L	Aquatic Biology	4	4
Generic Elective-1 Practical	LS/ZOO/GE-101 P	Lab Course	2	4
Ability Enhancement Compulsory Course-1	LS/ZOO/AE-101/EC	English Communication / MIL (Hindi Communication)	4*	4
Extracurricular activity		Tour, Field visit/ Industrial training/ NSS/ Swachhta/ Vocational Training/ Sports/ others	2	(2)
		TOTAL	**24**	**28**
Semester II				
Core Course-3 Theory	LS/ZOO/CC-201 L	Non Chordates – II (Coelomates)	4	4
Core Course-3 Practical	LS/ZOO/CC-201 P	Lab Course	2	4
Core Course-4 Theory	LS/ZOO/CC-202 L	Cell Biology	4	4
Core Course-4 Practical	LS/ZOO/CC-202 P	Lab Course	2	4
Generic Elective-2 Theory	LS/ZOO/GE-201 L	Environment and Public Health	4	4
Generic Elective-2 Practical	LS/ZOO/GE-201 P	Lab Course	2	4
Ability Enhancement Compulsory Course-2	LS/ZOO/AE-201/ES	Environmental Science	4*	4
Extracurricular activity		Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
		Total	**24**	**28**
Summer Internship: 15 days		Swayam Swachhta / NSS / Industrial/ others	**2**	**100**
Semester III				
Core Course-5 Theory	LS/ZOO/CC-301 L	Diversity of chordates	4	4
Core Course-5 Practical	LS/ZOO/CC-301 P	Lab Course	2	4
Core Course-6 Theory	LS/ZOO/CC-302 L	Physiology: Controlling and Coordinating systems	4	4
Core Course-6 Practical	LS/ZOO/CC-302 P	Lab Course	2	4
Core Course-7 Theory	LS/ZOO/CC-303 L	Fundamentals of Biochemistry	4	4
Core Course-7 Practical	LS/ZOO/CC-303 P	Lab Course	2	4
Generic Elective-3 Theory	LS/ZOO/GE-301 L	Food Nutrition and Health	4	4
Generic Elective-3 Practical	LS/ZOO/GE-301 P	Lab Course	2	4
Skill Enhancement Course-1	LS/ZOO/SEC-301 L	Sericulture	2	4
Skill Enhancement Course-1	LS/ZOO/SEC-301 P	Lab Course	2	4
		Total	28	34

Semester IV

Core Course-8 Theory	LS/ZOO/CC-401 L	Comparative anatomy of vertebrates	4	4
Core Course-8 Practical	LS/ZOO/CC-401 P	Lab Course	2	4
Core Course-9 Theory	LS/ZOO/CC-402 L	Physiology: Life Sustaining Systems	4	4
Core Course-9 Practical	LS/ZOO/CC-402 P	Lab Course	2	4
Core Course-10 Theory	LS/ZOO/CC-403 L	Biochemistry of Metabolic Processes	4	4
Core Course-10 Practical	LS/ZOO/CC-403 P	Lab Course	2	4
Generic Elective-4 Theory	LS/ZOO/GE-401 L	Insect Vectors and Diseases	4	4
Generic Elective-4 Practical	LS/ZOO/GE-401 P	Lab Course	4	4
Skill Enhancement Course-2	LS/ZOO/SE-401	Medical Diagnostics	2	2
Skill Enhancement Course-2	LS/ZOO/SE-401	Lab Course	2	4
		TOTAL	28	34
Summer internship: 15 days		**Swayam Swachhta / NSS / Industrial/ others**	2	100

Semester V

Core Course-11 Theory	LS/ZOO/CC-501 L	Molecular Biology	4	4
Core Course-11 Practical	LS/ZOO/CC-501 P	Lab Course	2	4
Core Course-12 Theory	LS/ZOO/CC-502 L	Principles of Genetics	4	4
Core Course-12 Practical	LS/ZOO/CC-502 P	Lab Course	2	4
Discipline Specific Elective-1 Theory	LS/ZOO/DSE-501(A) L LS/ZOO/DSE-501(B) L LS/ZOO/DSE-501(C) L	A. Basics of Neuroscience B. Endocrinology C. Immunology	4	4
Discipline Specific Elective-1 Practical	LS/ZOO/DSE-501(A) P LS/ZOO/DSE-501(B) P LS/ZOO/DSE-501(C) P	Lab Course A Lab Course B Lab Course C	2	4
Discipline Specific Elective-2 Theory	LS/ZOO/DSE-502(A) L LS/ZOO/DSE-502(B) L LS/ZOO/DSE-502(C) L	A. Animal Behavior and Chronobiology B. Parasitology C. Reproductive Biology	4	4
Discipline Specific Elective-2 Practical	LS/ZOO/DSE-502(A) P LS/ZOO/DSE-502(B) P LS/ZOO/DSE-502(C) P	Lab Course A Lab Course B Lab Course C	2	4
		TOTAL	24	32

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CORE COURSE V

LS/ZOO/CC-301 L

DIVERSITY OF CHORDATA

THEORY **(Credits 4)**

Unit 1: Introduction and origin of Chordates **5**

General characteristics and outline classification, Dipleurula concept and the Echinoderm theory of origin of chordates, Advanced features of vertebrates over protochordates.

Unit 2: Zoogeography **8**

Zoogeological time scale, Zoogeographical realms, Theories pertaining to distribution of animals, Plate tectonic and Continental drift theory, Distribution of vertebrates in different realms.

Unit 3: Protochordata **8**

General characteristics of Hemichordata, Urochordata and Cephalochordata, Study of larval forms in Protochordates, Retrogressive metamorphosis in Urochordata.

Unit 4: Agnatha and Pisces **10**

General characteristics and classification of cyclostomes up to orders; General characteristics of Chondrichthyes and Osteichthyes and Classification up to orders, Migration, Osmoregulation and Parental care in fishes.

Unit 5: Amphibia and Reptilia **13**

Origin of *Tetrapoda* (Evolution of terrestrial ectotherms), General characteristics and classification of Amphibia up to orders, Parental care in Amphibians; General characteristics and classification of Reptilia up to orders, Affinities of *Sphenodon*, Poison apparatus and Biting mechanism in snakes.

Unit 6: Aves and Mammalia **16**

General characteristics and classification of Aves up to orders, *Archaeopteryx*- a connecting link; Principles and aerodynamics of flight, Flight adaptations, and Migration in birds; General characters and classification of Mammalia up to orders, Affinities of Prototheria, Adaptive radiation in mammals with reference to locomotory appendages.

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CORE COURSE VI

LS/ZOO/CC-302 L

ANIMAL PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS

THEORY **(Credits 4)**

Unit 1: Tissues **6**

Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue

Unit 2: Bone and Cartilage **4**

Structure and types of bones and cartilages, Ossification, bone growth and resorption

Unit 3: Muscle **12**

Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction; Characteristics of muscle twitch; Motor unit, summation and tetanus

Unit 4: Nervous System **10**

Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and, Neuromuscular junction; Reflex action and its types - reflex arc; Physiology of hearing and vision.

Unit 5: Endocrine System **18**

Histology of endocrine glands - pineal, pituitary, thyroid, parathyroid, pancreas, adrenal; hormones secreted by them and their mechanism of action; Classification of hormones; Regulation of their secretion; Mode of hormone action, Signal transduction pathways for steroidal and non-steroidal hormones; Hypothalamus (neuroendocrine gland) - principal nuclei involved in neuroendocrine control of anterior pituitary and endocrine system; Placental hormones

Unit 6: Reproductive System **10**

Histology of testis and ovary; Physiology of male and female reproduction; Puberty, Methods of contraception in male and female

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CORE COURSE VII

LS/ZOO/CC-303 L

FUNDAMENTALS OF BIOCHEMISTRY

THEORY **(Credits 4)**

Unit 1: Biomolecules 4

Chemistry of Living system: Scope and importance; Biomolecules: Organizational principle, Configuration and confirmation; Water as a biological solvent.

Unit 2: Carbohydrates 8

Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides and Glycoconjugates

Unit 3: Lipids 8

Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Tri-acylglycerols, Phospholipids, Glycolipids, Steroids

Unit 4: Proteins 14

Amino acids: Structure, Classification and General properties of α-amino acids; Physiological importance of essential and non-essential α-amino acids Proteins: Bonds stabilizing protein structure; Levels of organization in proteins; Denaturation; Introduction to simple and conjugate proteins

Unit 5: Nucleic Acids 12

Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleic acids Cot Curves: Base pairing, Denaturation and Renaturation of DNA Types of DNA and RNA

Unit 6: Enzymes 14

Nomenclature and classification; Cofactors; Specificity of enzyme action; Mechanism of enzyme action; Enzyme kinetics; Factors affecting rate of enzyme-catalyzed reactions; Derivation of Michaelis-Menten equation, Concept of Km and Vmax, Lineweaver-Burk plot; Enzyme inhibition; Allosteric enzymes and their kinetics; Regulation of enzyme action

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CORE COURSE VIII

LS/ZOO/CC-401 L

COMPARATIVE ANATOMY OF VERTEBRATES

THEORY **(Credits 4)**

Unit 1: Integumentary and Skeletal System 14

Structure, functions and derivatives of integument; Overview of axial and appendicular skeleton; Jaw suspensorium; Visceral arches; Vertebrae

Unit 2: Digestive and Respiratory System 14

Alimentary canal and associated glands; dentition; Skin, Gills, Lungs and air sacs; Accessory respiratory organs

Unit 3: Circulatory System 8

General plan of circulation; Evolution of heart and aortic arches; Portal systems

Unit 4: Urinogenital System 8

Succession of kidney; Evolution of urinogenital ducts; General plan of gonads; Accessory reproductive organs; Types of mammalian uteri

Unit 5: Nervous System 8

Comparative account of brain; Autonomic nervous system; Spinal cord; Cranial nerves in mammals;

Unit 6: Sense Organs 8

Classification of receptors, Brief account of visual and auditory receptors in human

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CORE COURSE IX

LS/ZOO/CC-402 L

ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

THEORY **(Credits 4)**

Unit 1: Integumentory system **6**

Cell junction, epithelial and connective tissue, structure, type and function of skin, accessory structure of skin

Unit 2: Digestion **14**

Structural organization and functions of gastrointestinal tract and associated glands; Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; Hormonal control of secretion of enzymes in Gastrointestinal tract.

Unit 3: Respiration **10**

Histology of trachea and lung; Mechanism of respiration, Pulmonary ventilation; Respiratory volumes and capacities; Transport of oxygen and carbon dioxide in blood; Respiratory pigments, Dissociation curves and the factors influencing it; Carbon monoxide poisoning; Control of respiration

Unit 4: Renal Physiology **12**

Structure of kidney and its functional unit; Mechanism of urine formation; Regulation of water balance; Regulation of acid-base balance

Unit 5: Blood **8**

Components of blood and their functions; Structure and functions of haemoglobin

Haemostasis: Blood clotting system, Complement system and fibrinolytic system, Haemopoiesis Blood groups: Rh factor, ABO and MN

Unit 6: Physiology of Heart **10**

Structure of mammalian heart; Coronary circulation; Structure and working of conducting myocardial fibers. Origin and conduction of cardiac impulses Cardiac cycle; Cardiac output and its regulation, Frank-Starling Law of the heart, nervous and chemical regulation of heart rate. Electrocardiogram, Blood pressure and its regulation

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CORE COURSE X

LS/ZOO/CC-403 L

BIOCHEMISTRY OF METABOLIC PROCESSES

THEORY **(Credits 4)**

Unit 1: Bioenergetics 4

ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors

Unit 2: Overview of Metabolism 6

Catabolism *vs* Anabolism, Stages of catabolism, Compartmentalization of metabolic pathways, Shuttle systems and membrane transporters; intermediary metabolism and regulatory mechanisms

Unit 3: Carbohydrate Metabolism 16

Sequence of reactions and regulation of glycolysis, Citric acid cycle, Phosphate pentose pathway, Gluconeogenesis, Glycogenolysis and Glycogenesis

Unit 4: Lipid Metabolism 14

β-oxidation and omega -oxidation of saturated fatty acids with even and odd number of carbon atoms; Biosynthesis of palmitic acid; Ketogenesis

Unit 5: Protein Metabolism 10

Catabolism of amino acids: Transamination, Deamination, Urea cycle; Fate of C-skeleton of Glucogenic and Ketogenic amino acids

Unit 6: Oxidative Phosphorylation 10

Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System

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GENERIC ELECTIVE COURSES

LS/ZOO/GE-301 L

FOOD, NUTRITION AND HEALTH

THEORY **(Credits 4)**

Unit 1: Basic concept of food and nutrition **5**

Food Components and food-nutrients Concept of a balanced diet, nutrient needs and dietary pattern for various groups

Unit 2: Nutritional Biochemistry: **15**

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

Unit 3: Health-I **10**

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

Unit 4: Health-II **10**

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

Unit 5: Food Hygiene-I **10**

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,

Unit 6: Food Hygiene-I **10**

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

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GENERIC ELECTIVE COURSES

LS/ZOO/GE-401 L

INSECT VECTORS AND DISEASES

THEORY **(Credits 4)**

Unit I: Introduction to Insects **6**

General Features of Insects, Morphological features, Head – Eyes, Types of antennae, Mouth parts w.r.t. feeding habits.

Unit II: Insect Vectors **14**

Brief introduction of Carrier and Vectors (mechanical and biological vectors), Reservoirs, Host-vector relationship, Vectorial capacity, Adaptations as vectors, Host Specificity; Classification of insects up to orders, detailed features of orders with insects as vectors – Diptera, Siphonaptera, Siphunculata, Hemiptera.

Unit III: Diptera as Disease Vectors **24**

Dipterans as important insect vectors – Mosquitoes, Sand fly, Houseflies; Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis; Control of mosquitoes; Study of sand fly-borne diseases – Visceral Leishmaniasis, Cutaneous Leishmaniasis, Phlebotomus fever; Control of Sand fly; Study of house fly as important mechanical vector, Myiasis, Control of house fly.

Unit IV: Siphonaptera as Disease Vectors **6**

Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases – Plague, Typhus fever; Control of fleas.

Unit V: Siphunculata as Disease Vectors **4**

Human louse (Head, Body and Pubic louse) as important insect vectors; Study of louse-borne diseases –Typhus fever, Relapsing fever, Trench fever, Vagabond's disease, Phthiriasis; Control of human louse.

Unit VI: Hempitera as Disease Vectors **6**

Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Control and prevention measures.

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SKILL ENHANCEMENT COURSES

LS/ZOO/SEC-301 L

SERICULTURE

THEORY **(Credits 4)**

Unit 1: Introduction 5

Sericulture: Definition, history and present status; Types of silkworms: Exotic and indigenous species. Mulberry and non-mulberry sericulture.

Unit 2: Biology of Silkworm 10

Life cycle of *Bombyx mori;* Structure of silk gland and secretion of silk.

Unit 3: Rearing of Silkworms 15

Selection of mulberry variety and establishment of mulberry garden; Rearing house and rearing appliances. Disinfectants: Formalin, bleaching powder, RKO. Silkworm rearing technology: Early age and Late age rearing, Types of mountages, Spinning, harvesting and storage of cocoons.

Unit 4: Silkworm Genetics and Breeding 10

Genetic variability in mulberry – sources of variability Wilde species – hybrids. Popular varieties of India - chromosomal variations. Selection – characters and importance of a) pure line selection b) clonal selection c) mass selection.

Unit 5: Pests and Diseases 10

Pests of silkworm: Uzi fly, dermestid beetles and vertebrates. Protozoan, viral, fungal and bacterial diseases. Control and prevention of pests and diseases.

Unit 6: Entrepreneurship in Sericulture 10

Prospects of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture.

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SKILL ENHANCEMENT COURSES

LS/ZOO/SEC-401 L

MEDICAL DIAGNOSTICS

THEORY **(Credits 4)**

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; 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/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).