



**List of Courses Focus on Employability/ Entrepreneurship/
Skill Development**

Department : Zoology

Programme Name : B. Sc.

Academic Year : 2017-18

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	ZOO-CC-401	Basic and Applied Genetics
02.	ZOO-CC-403	Genetics Lab Course
03.	ZOO-CC-403	Animal Physiology Controlling and Coordinating Systems Lab Course
04.	ZOO-CC-501	Economic Zoology
05.	ZOO-CC-601	Microbiology and Parasitology
06.	ZOO-CC-603	Microbiology and Parasitology and Bio techniques Lab Course

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Department of Zoology
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Guru Ghasidas Vishwavidyalaya, Bilaspur

Signature & Seal of HoD



Scheme and Syllabus

Department of Zoology, GGV, Bilaspur (CG)

Semester III:

Course type	Course Code	Title of Course	Credits	Hrs/ Wk	Hrs/ Sem
Zoology (H)	ZOO-CC301	Animal Diversity: Chordates	2	2	
	ZOO-CC302	Animal Physiology: Life Sustaining Systems	2	2	
	ZOO-CC303 Practical	Lab Course (301+ 302)	2	4	
<i>Total Credits</i>			6		
Chemistry	CHEM				
	CHEM				
	Practical				
(optional) Botany/ Biotech.	BOT/ BT				
	BOT/BI				
	Practical				
Foundation course/ Ability Enhancement Compulsory Course (AECC)	EVS-I	Environment Science- I/ DM			

Semester IV:

Course type	Course Code	Title of Course	Credits	Hrs/ Wk	Hrs/ Sem
Zoology (H)	ZOO-CC401	Basic and Applied Genetics	2	2	
	ZOO-CC402	Animal Physiology: Controlling and Coordinating Systems	2	2	
	ZOO-CC403 Practical	Lab Course (401 +402)	2	4	
<i>Total Credits</i>			6		
Chemistry	CHEM				
	CHEM				
	Practical				
(optional) Botany/ Biotech.	BOT/ BT				
	BOT/BI				
	Practical				
Foundation course/ Ability Enhancement Compulsory Course (AECC)	EVS-II	Environment Science- I/ DM			

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Semester V:

Course type	Course Code	Title of Course	Credits	Hrs/ Wk	Hrs/ Sem
Zoology (H)	ZOO-501	Economic Zoology	3	3	
	ZOO-502	Ecology and Evolution	3	3	
	ZOO-503	Lab Course (501 + 502)	3	6	
	ZOO-504	Practical	3	6	
Discipline Specific Elective - I (DSE-I)	ZOO-505 (A/B/C/D/E)	Biostatistics and Computer Applications (Biochemistry/ Endocrinology/ Fish Biology/ Neuroscience/ Toxicology)	3	3	
	ZOO-506	Lab based on 504 and elective paper	3	6	
	ZOO-507	Seminar	3	3	
Total Credits			21		

Semester VI:

Course type	Course Code	Title of Course	Credits	Hrs/ Wk	Hrs/ Sem
Zoology (H)	ZOO-601	Microbiology and Parasitology	3	3	
	ZOO-602	Developmental Biology and Immunology	3	3	
	ZOO-603	Lab Course (601 + 602)	3	6	
	ZOO-604	Practical	3	6	
Discipline Specific Elective - II (DSE-II)	ZOO-DSE-2 (A/B/C/D/E)	Biotechniques (Biochemistry/ Endocrinology/ Fish Biology/ Neuroscience/ Toxicology)	3	3	
	ZOO-DSE-3	Seminar on the basis of published research articles relevant to the topics covered in the elective paper	6	6	
Total Credits			21		

Note:

- Groups offered by the Department for Integrated UG/ PG students at entry level
 - Group I: Zoology, Chemistry and Botany (ZCB)
 - Group II: Zoology, Chemistry and Biotechnology (ZCBT)
- Codes of special papers
A= Biochemistry; B= Endocrinology; C= Fish Biology; D= Neuroscience; E= Toxicology.

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Department of Zoology, GGV, Bilaspur (CG)

B.Sc. (Hon's) Zoology SEMESTER - IV

ZOO-CC: 401

BASIC AND APPLIED GENETICS

(Credits-02)

Unit 1: Mendelism and its extensions

(05 hrs)

Mendel's laws of inheritance; Chromosomal basis of inheritance; Application of laws of probability to Mendelian inheritance, Co-dominance, Incomplete dominance, multiple allelism; Lethal alleles; Pleiotropy; Epistasis, Polygenic inheritance; Cytoplasmic inheritance.

Unit 2: Linkage and Crossing over

(04 hrs)

Linkage and crossing-over; Cytological basis of crossing over, Interference and coincidence.

Unit 3: Sex chromosome system

(04 hrs)

XX/XO, XX/XY, ZZ/ZW and haploidy/diploidy types and sex determination, Sex linkage

Unit 4: Human Genetics

(06 hrs)

Human karyotype, Banding, Nomenclature of chromosome subdivisions; Structural and numerical alterations of chromosome, Gene mutation; Disorders related to chromosomal and gene mutation (Down, Turner and Klinefelter syndromes, Chronic myeloid leukemia, "Cry of cat" syndrome, Cystic fibrosis); Introduction to pedigree analysis.

Unit 5: Transposable genetic elements

(6 hrs)

Transposons in bacteria, Ac-Ds elements in males and P element in Drosophila, Transposons in human

Books Recommended

Gardner et al: Principles of Genetics (2006, John Wiley)

Griffith et al: An Introduction to Genetic Analysis (2008, Freeman)

Hartl & Jones: Essential Genetics - A Genomic Perspective (2009, Jones & Bartlet)

Pierce: Genetics - A Conceptual Approach (W. H. Freeman, 12-Apr-2011)

Russell: Genetics (2009, Benjamin Cummings)

Snustad & Simmons: Principles of Genetics (2012, John Wiley)

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Department of Zoology, GGV, Bilaspur (CG)

B.Sc. (Hon's) Zoology SEMESTER IV

ZOO- CC: 403

Practical (Credits- 02): Lab Course (401 + 402)

GENETICS

1. Application of probability in the law of segregation with the coin tossing
2. Familiarization with techniques of handling *Drosophila*, identifying males and females; observing wild type and mutant (white eye, wing less) flies, and setting up cultures.
3. Study of structural chromosome aberrations (dicentric, ring chromosomes and inversions in polytene chromosomes) from prepared slides/photographs.
4. Study of human karyotypes and numerical alterations (Down, Klinefelter and Turner syndrome).
5. Preparation of temporary slide of Barr body by own cheek epithelium or hair root.

ANIMAL PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS

1. Study of histological slides of the following glands in rats: pituitary, thyroid, adrenal, endocrine pancreas, testis and ovary
2. Study of egg and tadpole of frog
3. Window preparation of fertilized egg
4. Study of whole mount preparations of chick embryos of 16-18, 24-28, 33-36 and 42-48 h of development.

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Department of Zoology, GGV, Bilaspur (CG)

B.Sc. (Hon's) Zoology SEMESTER - V

ZOO-CC: 501

ECONOMIC ZOOLOGY

(Credits- 02)

Unit 1: Aquaculture

(06 hrs)

Fish culture, Importance of fish and their by-products; Prawn culture; Pearl culture.

Unit 2: Sericulture

(06 hrs)

Species of silk worms, their host plants, and types of silk, Life cycle of silk worm, Mulberry silk worm culture; Appliances used in sericulture, Stifling, Disease.

Unit 3: Apiculture

(05 hrs)

Species of honey bees, Life history of honey bee, indigenous and modern techniques of apiculture, Bee products and their uses, Disease.

Unit 4: Lac culture

(04 hrs)

Morphology of Lac insect and its life cycle; Lac culture; Processing and uses of lac, Disease.

Unit 5: Animal husbandry and Poultry

(04 hrs)

Animal husbandry: Types of breeds of cows and buffaloes; Management of dairy animals.

Poultry: Types of breeds, Rearing methods, Diseases and control measures.

Books Recommended

1. Shukla and Upadhyaya : Economic Zoology (Rastogi Publishers, 1999-2000)
2. Shrivastava: Test book of Applied Entomology, Vol. I & II (Kalyani Publishers, 1991)
3. Mani: Insects, NBT, India, 2006.
4. Jabde: Text Book of Applied Zoology: Vermiculture, Apiculture, Sericulture, Lac culture, Agricultural Pests and their Control, 2005 Discovery Publishing House.
5. Jadhav U. Aquaculture Technology and Environment. PHI Learning. 2011.

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Department of Zoology, GGV, Bilaspur (CG)

4. B.Sc. (Hon's) Zoology SEMESTER V

ZOO- CC: 503

Practical (Credits- 02): Lab course based on 501 and 502

ECONOMIC ZOOLOGY

1. Study of permanent slides of different larvae of insects.
2. Study of specimens and models relevant to theory paper.
3. Study of life cycle of insects through chart/specimens
4. Study of external morphology of honey bee and dissection of sting apparatus of honey bee
5. Study of different types of antenna.
6. Field visit

ENVIRONMENTAL BIOLOGY

1. Ecological comments on charts/material (as per syllabus).
2. Collection and preservation of water and soil samples (Field Practical)
3. Determination of Total Hardness (Ca & Mg) from water.
4. Estimation of the Moisture Content & Water Holding Capacity of soil
5. Study of Animal Adaptations under various ecological conditions.
6. Preparation of field report based on the survey of local fauna

EVOLUTION

7. Frequency of following genetic trait in human attached ear lobe, widow's peak, dimple in chin, mid-digital Hair, Thumb, hypertrichosis, color blindness, PTC (phenyl thiocarbamide)
8. Study of mode of inheritance of the following traits by pedigree charts - attached ear lobe, widow's peak

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B.Sc. (Hon's) Zoology SEMESTER - VI
ZOO-CC: 601

MICROBIOLOGY AND PARASITOLOGY

Unit 1: Microbiology

(05 hrs)

Introduction to microbes: Viruses, Bacteria and Eukaryotic microorganisms; classification of bacteria based on shape and size, nutrition and staining methods, beneficial and harmful interactions of microbes with human.

Unit 2: Viruses

(04 hrs)

General structure, properties, classification and replication, lytic cycle, lysogeny. Virions, Prions, Virulence factor and toxins.

Unit 3: Techniques in microbiology

(05 hrs)

Media preparation, culture and growth of microorganisms, Applied microbiology: production of antibiotics, biopesticides, biopolymers; Dairy Microbiology; fermentation and fermentable microbes.

Unit 4:

(5 hrs)

Protozoa and Diseases: Life cycle of Protozoans parasites: *Entamoeba histolytica*, *Leishmania donovani*, *Trypanosoma gambiense*, *Plasmodium*- pathogenesis, treatment and prevention.

Unit 5:

(5 hrs)

Life cycle of Parasitic Helminths: *Echinococcus granulosus*, *Schistosoma haematobium* and *Wuchereria bancrofti*, Ancylostoma- pathogenesis, treatment and prevention.

Books Recommended

1. Madigan, Martinko and Parker: Brock Biology of Microorganisms (12th ed. 2009, Pearson/Benjamin Cummings)
2. Stanier, Ingraham, Wheelis and Painter: General Microbiology (5th ed. 2005, Mc Millan)
3. Tortora, Funke and Case: Microbiology: An introduction (2008)
4. Willey, Sherwood and Woolverton: Prescott, Harley and Klein's Microbiology (7th ed. 2008, McGraw Hill Higher Education)

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B.Sc. (Hon's) Zoology SEMESTER - VI

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Department of Zoology, GGV, Bilaspur (CG)

B.Sc. (Hon's) Zoology SEMESTER VI

ZOO- CC: 603

Practical (Credits- 03): Lab course based on 601 and 602

MICROBIOLOGY

Identification of gram positive and gram negative bacteria through temporary slides.

1. Study of bacterial growth curve.
2. Study of microflora of milk.
3. Study of leguminous bacteria.
4. Study of different lymphoid organ of rat.
5. Differential counting of blood immune cells.
6. Cell imprinting of thymus and spleen.
7. Identification of Blood Group

PARASITOLOGY

7. Identification protozoan parasites from permanent slides.
8. Identification and characterization of helminth parasites from permanent slides
9. Study of permanent slides of different larvae of insects and helminthes.
10. Study of specimens and models relevant to theory paper.
11. Study of life cycle of insects through chart/specimens

BIOTECHNIQUES

1. Principle and working of Centrifuges.
2. Principle and working of Chromatography (Paper chromatography)
3. Principle and working of colorimeter and spectrophotometer
4. Cell counting using haemocytometer (by using suitable stain)
5. Working and principle of flow cytometry
6. Measuring of pH using a pH meter
7. Gel electrophoresis: Nucleic acid and Protein electrophoresis.

