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List of Employability/ Entrepreneurship/ Skill Development Courses with Course Contents

Colour Codes		
Employability Contents	Green	
Entrepreneurship Contents	Light Blue	
Skill Development Contents	Pink	
Name of the Subjects/Related to all three Components (Employability/ Entrepreneurship/ Skill Development)	Yellow	



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

Department : Zoology

Programme Name : M. Sc

Academic Year : 2019-20

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	LZL 105: Lab Exercises	Cell Biology
02.	LZL 106: Lab Exercises	Mammalian Physiology
03.	LZL 205: Lab Exercises	Biochemistry, Molecular Biology and Regulatory Mammalian Physiology
04.	LZL 206: Lab Exercises	Bio-techniques and Bioinformatics

Dr. V. K. Bhaskar

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Scheme and Syllabus

NEW-2017-18

Department of Zoology, GGV, Bilaspur (CG)

Approved Scheme of Examination, 2017-18

M.Sc. Zoology

Semester-wise Theory Papers/ Practical/ Skill Component

Type of Course	Course Code	Title of the Course	Lecture-Tutorial-Practical/week	No. of credits	Continuous Comprehensive Assessment (CCA)	End-Semester Examination (ESE) [University-Examination]	Total
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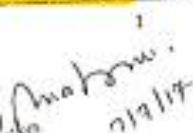
Semester - Ist

Core Course 1	LZT 101	Comprehensive Anatomy of Vertebrates	4	4	40	60	100	
Core Course 2	LZT 102	Cell Biology and Evolution	4	4	40	60	100	
Core Course 3	LZT 103	Reproduction and Developmental Biology	4	4	40	60	100	
Core Course 4	LZT 104	Basic Mammalian Physiology	4	4	40	60	100	
Core Course Practical 1	LZL 105	Lab. Exercises based on courses LZT 101 & 102	6	3	40	60	100	
Core Course Practical 2	LZL 106	Lab. Exercises based on courses LZT 103 & 104	6	3	40	60	100	
Skill Course 1	LZS 107	Scientific writing skills	2					
					22	240	360	600

Semester IInd

Core Course 5	LZT 201	Biochemistry and Molecular Biology	4	4	40	60	100
Core Course 6	LZT 202	Regulatory Mammalian Physiology	4	4	40	60	100
Core Course 7	LZT 203	Endocrinology	4	4	40	60	100
Core Course 8	LZT 204	Biotechniques and Bioinformatics	4	4	40	60	100
Core Course Practical 3	LZL 205	Lab. Exercises based on course LZT 201 and 202	6	3	40	60	100


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Core Course Practical 4	LZL 206	Lab. Exercises based on course LZT 203 and 204	6	3	40	60	100
Skill Course II	LZS 207	Scientific Presentation skill (Oral & Poster)	2				
				22	240	360	600
Semester IIIrd							
Core Course 9	LZT 301	Molecular Genetics	4	4	40	60	100
Core Course 10	LZT 302	Histological Techniques and Biostatistics	4	4	40	60	100
Discipline Specific Elective - <i>Biochemistry and Molecular Biology</i> (A) - 1	LZT 303 A	Biochemistry of Intermediary Metabolism	4	4	40	60	100
Discipline Specific Elective - <i>Biochemistry and Molecular Biology</i> (A) - 2	LZT 304 A	Molecular Biology of Information Pathway: Nucleic Acids	4	4	40	60	100
Discipline Specific Elective - <i>Mammalian Reproductive Physiology and Endocrinology</i> (B)- 1	LZT 303 B	Neuroendocrinology and Non- Classical Hormones	4	4	40	60	100

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LZL 105: LAB EXERCISES

(Based on papers LZT 101 and LZT 102)

Comparative anatomy of vertebrates

1. Study of histological slides of Pisces.
2. Study of histological slides of Amphibians.
3. Study of histological slides of Reptiles.
4. Study of histological slides of Birds.
5. Study of histological slides of Mammals.
6. Study of Afferent and efferent arteries of available fish/ amphibia
7. Study of Cranial nerve of fish

Evolutionary Biology

1. Study of quantitative inheritance in *Drosophila*: sternopleural bristle phenotypes in *D. melanogaster*
2. Demonstration of natural selection under laboratory conditions by making competition between red eyed and white eyed *D. melanogaster*
3. Demonstration of Hardy-Weinberg equilibrium in human populations by taking examples of MN and ABO blood group systems
4. Study of inversion polymorphism in *Drosophila*
5. Study of sexual isolation between two closely related and sympatric species of *Drosophila*: *D. bipectinata* and *D. malerkotliana*.

Cell Biology

1. Preparation of permanent slide to demonstrate
 - DNA by Feulgen reaction
 - DNA and RNA by MGP
 - Mucopolysaccharides by PAS reaction
 - Proteins by Mercurobromophenol blue/Fast green
2. Study of mitosis in onion root tip
3. Study of meiosis in grasshopper testis

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LZL 106: LAB EXERCISES

(Based on papers LZT 103 and LZT 104)

Developmental Biology

1. Study of frog embryonic development through models
2. Collection of frog spawns and observation of different developmental stages
3. Study of spiral cleavage in eggs of snail
4. Effect of vitamin A in tadpole tail regeneration
5. Study of embryonic development in chick through slides
6. Window preparation to study chick embryo development
7. Whole mount preparation of chick embryos at various stages of development
8. Study of expression of developmental genes in larval imaginal discs.

Mammalian Physiology:

1. Total and differential leucocytes counting in blood
2. Erythrocyte counting
3. Determination of blood groups (ABO and Rh factor)
4. Estimation of ascorbic acid content in lemon extract using titration method
5. Preparation of casein from milk
6. Glucose estimation
7. Study of histological slides

LZS 107: SCIENTIFIC WRITING SKILLS

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LZL 205: LAB EXERCISES

(Based on papers LZT 201 and LZT 202)

Biochemistry:

1. Preparation of extract for enzyme assay (alkaline phosphatase)
2. Study of alkaline phosphatase activity
3. Standard curve preparation
4. Effect of enzyme concentration and determination of total and specific activity
5. Effect of temperature on enzyme activity
6. Effect of time on enzyme activity
7. Effect of substrate concentration on enzyme activity
8. Determination of K_m and V_{max} by Michaelis-Menten and Lineweaver-Burk Plot

Molecular Biology

1. DNA isolation
2. RNA isolation
3. Reverse transcriptase polymerase chain reaction
4. Western blotting
5. Northern blotting

Regulatory Mammalian Physiology

1. Total and differential leucocytes counting in blood
2. Study of histological slides
3. Study of axial and appendicular skeleton
4. Study of brain by model/chart

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LZL 206: LAB EXERCISES

(Based on papers LZT 203 and LZT 204)

Endocrinology

1. Handling, sexing, numbering and maintenance of rat
2. General survey of endocrine glands in rat
3. Study of vaginal smear preparation in rat
4. Demonstration of the following surgical operations in rat: orchidectomy, ovariectomy
5. Study of histological slides of the following endocrine glands in rat: pituitary, thyroid, adrenal, endocrine pancreas, testis and ovary Demonstration of endocrine glands in cockroach
6. Demonstration of frog metamorphosis by models and charts

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 Ocular micrometer
6. Measuring of pH using a pH meter
7. Electrophoresis: Nucleic acid and Protein electrophoresis

Bioinformatics

1. Familiarization with computer operations and TCP/IP
2. Data archiving systems: FASTA format, BankIT, Accession and GI numbers
3. Use of search engines (Google, Altavista, Dogpile, Meta-crawler)
4. Demonstration of web-pages related to biological information (NCBI, ExPasy)
5. Hands on practice to features of following databases GenBank, PDB, DIP, PubMed, Toxnet, OMIM, Fly Base, AccDB, MGDB, HGMD, LSD, KEGG, RNAdb
6. Hands on practice to features of following software packages/tools: BLAST, Clustal-W, PHYLIP, M-fold

LZS 207: SCIENTIFIC PRESENTATION SKILLS (ORAL AND POSTER)

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