



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

Department : Zoology

Programme Name : B. Sc

Academic Year : 2019-20

List of Courses Focus on Employability/ Entrepreneurship/Skill

Sr. No.	Course Code	Name of the Course
01.	LS/ZOO/CC-303 P	Fundamentals of Biochemistry (Practical)
02.	LS/ZOO/CC-402 P	Animal Physiology: Life Sustaining Systems (Practical)
03.	LS/ZOO/CC-403 P	Biochemistry of Metabolic Processes (Practical)
04.	LS/ZOO/GE-301 P	Food, Nutrition and Health (Practical)
05..	LS/ZOO/SEC-301 P	Sericulture (Practical)
06.	LS/ZOO/SEC-401 P	Medical Diagnostics (Practical)

A. V. K. Bhaskar

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Scheme and Syllabus

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 (Protozoa to Pseudocoelomates)	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	
Generic Elective-4 Theory	LS/ZOO/GE-401 L	Insect Vectors and Diseases	4	
Generic Elective-4 Practical	LS/ZOO/GE-401 P	Lab Course	4	
Skill Enhancement Course-2	LS/ZOO/SE-401	Medical Diagnostics	2	
Skill Enhancement Course-2	LS/ZOO/SE-401	Lab Course	2	
TOTAL			28	
Summer Internship: 15 days			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
Semester VI				
Core Course-13 Theory	LS/ZOO/CC-601 L	Developmental Biology	4	4
Core Course-13 Practical	LS/ZOO/CC-601 P	Lab Course	2	4
Core Course-14 Theory	LS/ZOO/CC-602 L	Evolutionary Biology	4	4
Core Course-14 Practical	LS/ZOO/CC-602 P	Lab Course	2	4
Discipline Specific Elective-3 Theory	LS/ZOO/DSE-601(A) L LS/ZOO/DSE-601(B) L LS/ZOO/DSE-601(C) L	A. Biology of Insects B. Fish and Fisheries C. Wild Life Conservation and Management	4	4
Discipline Specific Elective-3 Practical	LS/ZOO/DSE-601(A) P LS/ZOO/DSE-601(B) P LS/ZOO/DSE-601(C) P	Lab Course A Lab Course B Lab Course C	2	4
Dissertation/ Project work / Academic Visit followed by report submission and seminar	LS/ZOO/DW/PW/AV		5 + 1 = 6	8
TOTAL			24	32
TOTAL CREDITS			152 + 4 (81)	

As per UGC CBCS guidelines, University / departments have liberty to offer GE and SEC courses offered by any department to students of other departments. The No. of GE course is four. One GE course is compulsory in first 4 semesters each. In present scheme it is proposed to have minimum two GE courses (from one subject) in first two semester after which student shall change two GE for another subject in IIIrd and IVth semester, so that all the student can have exposure of one additional subject.
(Subject to approval by the competent authority)

Changela
External Expert

Rohit Seth
Dr. Rohit Seth

Santosh Singh
Dr. Santosh Singh

Mouli
Head of the Department

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Department of Zoology, School of Life Sciences, GGV, Bilaspur (CG)

CORE COURSE VII

LS/ZOO/CC-303 P

FUNDAMENTALS OF BIOCHEMISTRY

PRACTICALS

(Credits 2)

1. Qualitative tests of functional groups in carbohydrates: Benedict's test for reducing sugars, Iodine test for starch
2. Qualitative tests of proteins
3. Qualitative tests of lipids.
4. Paper chromatography of amino acids.
5. Action of salivary amylase under optimum conditions.
6. Effect of pH, temperature and inhibitors on the action of salivary amylase.
7. Structural study of DNA and RNA through models.

SUGGESTED READING

1. Cox, M.M and Nelson, D.L. (2008). *Lehninger's Principles of Biochemistry*, V Edition, W.H. Freeman and Co., New York.
2. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). *Biochemistry*, VI Edition, W.H. Freeman and Co., New York.
3. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). *Harper's Illustrated Biochemistry*, XXVIII Edition, International Edition, The McGraw-Hill Companies Inc.
4. Hames, B.D. and Hooper, N.M. (2000). *Instant Notes in Biochemistry*, II Edition, BIOS Scientific Publishers Ltd., U.K.
5. Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M. and Losick, R. (2008). *Molecular Biology of the Gene*, VI Edition, Cold Spring Harbor Lab Press, Pearson Pub.

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CORE COURSE IX

LS/ZOO/CC-402 P

ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

PRACTICALS

(Credits 2)

1. Determination of ABO Blood group
2. Enumeration of red blood cells and white blood cells using haemocytometer
3. Estimation of haemoglobin using Sahli's haemoglobinometer
4. Preparation of haemin and haemochromogen crystals
5. Recording of frog's heart beat under *in situ* and perfused conditions*
6. Recording of blood pressure using a sphygmomanometer
7. Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum liver, trachea, lung, kidney through permanent slides.

SUGGESTED READINGS

- Guyton, A.C. & Hall, J.E. (2006). Textbook of Medical Physiology. XI Edition. Hecourt Asia PTE Ltd. W.B. Saunders Company.
- Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition John Wiley & sons,
- Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functional correlations. XII Edition. Lippincott W. & Wilkins.
- Vander A, Sherman J. and Luciano D. (2014). Vander's Human Physiology: The Mechanism of Body Function. XIII Edition, McGraw Hills

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Handwritten signature: Anil

Handwritten signature: Sanjay Singh

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Handwritten signature: Dargal



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CORE COURSE X

LS/ZOO/CC-403 P

BIOCHEMISTRY OF METABOLIC PROCESSES

PRACTICALS

(Credits 2)

1. Estimation of total protein in given solutions by Lowry's method.
2. Estimation of carbohydrate by toluene method.
3. Detection of SGOT and SGPT or GST and GSH in serum/ tissue
4. Detection of GSH in serum/ tissue
5. To study the enzymatic activity of Trypsin and Lipase /SOD and Catalase
6. Study of biological oxidation (LPO) [Rat liver]
7. To perform the Acid and Alkaline phosphatase assay from serum/ tissue.

SUGGESTED READINGS

1. Cox, M.M and Nelson, D.L. (2008). *Lehninger Principles of Biochemistry*, V Edition, W.H. Freeman and Co., New York.
2. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). *Biochemistry*, VI Edition, W.H. Freeman and Co., New York.
3. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). *Harper's Illustrated Biochemistry*, XXVIII Edition, International Edition, The McGraw-Hill Companies Inc.
4. Hames, B.D. and Hooper, N.M. (2000). *Instant Notes in Biochemistry*, II Edition, BIOS Scientific Publishers Ltd., U.K.

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GENERIC ELECTIVE COURSES

LS/ZOO/GE-301 P

FOOD, NUTRITION AND HEALTH

PRACTICALS

(Credits 2)

1. To detect adulteration in a) Ghee b) Sugars c) Tea leaves and d) Turmeric
3. Estimation of Lactose in milk
4. Ascorbic acid estimation in food by titrimetry
5. Estimation of Calcium in foods by titrimetry
6. Study of the stored grain pests from slides/ photograph (*Sitophilus oryzae*, *Trogoderma granarium*, *Callosobruchus chinensis* and *Tribolium castaneum*): their identification, habitat and food sources, damage caused and control. Preparation of temporary mounts of the above stored grain pests.
7. Project- Undertake computer aided diet analysis and nutrition counseling for different age groups.

OR Identify nutrient rich sources of foods (fruits and vegetables), their seasonal availability and price

OR Study of nutrition labeling on selected foods

SUGGESTED BOOKS

- Mudambi, SR and Rajagopal, MV. Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Ed; 2007; New Age International Publishers
- Srilakshmi B. Nutrition Science; 2002; New Age International (P) Ltd.
- Srilakshmi B. Food Science; Fourth Ed; 2007; New Age International (P) Ltd.
- Swaminathan M. Handbook of Foods and Nutrition; Fifth Ed; 1986; BAPPCO.
- Bamji MS, Rao NP, and Reddy V. Text Book of Human Nutrition; 2009; Oxford & IBH Publishing Co. Pvt Ltd. • Wardlaw GM, Hampl JS. Perspectives in Nutrition; Seventh Ed; 2007; McGraw Hill. • Lakra P, Singh MD. Textbook of Nutrition and Health; First Ed; 2008; Academic Excellence. • Manay MS, Shadaksharaswamy. Food-Facts and Principles; 1998; New Age International (P) Ltd. • Gibney et al. Public Health Nutrition; 2004; Blackwell Publishing

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SKILL ENHANCEMENT COURSES

LS/ZOO/SEC-301 P

SERICULTURE

PRACTICALS

(Credits 2)

1. Study of different specimen and cocoons.
2. Study of mouth parts and silk gland.
3. Study of insect wings and their venation in adult worm.
4. Study of various diseases.
5. Study of any three beneficial insects and their products.

SUGGESTED READINGS

- Manual on Sericulture; Food and Agriculture Organisation, Rome 1976
- Handbook of Practical Sericulture: S.R. Ullal and M.N. Narasimhanna CSB, Bangalore
- Silkworm Rearing and Disease of Silkworm, 1956, Ptd. By Director of Ptg., Stn. & Pub. Govt. Press, Bangalore
- Appropriate Sericultural Techniques; Ed. M. S. Jolly, Director, CSR & TI, Mysore.
- Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan 1972.
- Manual of Silkworm Egg Production; M. N. Narasimhanna, CSB, Bangalore 1988.
- Silkworm Rearing; Wupang—Chun and Chen Da-Chung, Pub. By FAO, Rome 1988.
- A Guide for Bivoltine Sericulture; K. Sengupta, Director, CSR & TI, Mysore 1989.
- Improved Method of Rearing Young age silkworm; S. Krishnaswamy, reprinted CSB, Bangalore, 1986.

SUGGESTED ACTIVITY

Visit to local sericulture units.

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Dangal



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SKILL ENHANCEMENT COURSES

LS/ZOO/SEC-401 P

MEDICAL DIAGNOSTICS

PRACTICAL

(Credits 2)

1. Determination of ABO Blood group
2. Enumeration of red blood cells and white blood cells using haemocytometer
3. Estimation of haemoglobin using Sahli's haemoglobinometer
4. Preparation of haemin and haemochromogen crystals
5. Estimation of D.L.C., E.S.R., P.C.V.
6. Platelet count using haemocytometer, Erythrocyte
7. Recording of frog's heart beat under *in situ* and perfused conditions
8. Recording of blood pressure using a sphygmomanometer

SUGGESTED READINGS

- Park, K. (2007), *Preventive and Social Medicine*, B.B. Publishers
- Godkar P.B. and Godkar D.P. *Textbook of Medical Laboratory Technology*, II 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*, VIII Edition, Saunders
- Prakash, G. (2012), *Lab Manual on Blood Analysis and Medical Diagnostics*, S. Chand and Co. Ltd.

SUGGESTED ACTIVITY

Visit to local hospital units.