

VI zoology



GULBARGA UNIVERSITY, KALABURAGI

B.Sc. Zoology Syllabus for VI SEM

To be implemented from 2023 – 2024 Academic year

For
UNDERGRADUATE PROGRAMME

Colleges Affiliated to
Gulbarga University, Kalaburagi

CHAIRMAN

Department of Studies and Research in Zoology

2023-24 Onwards



Government of Karnataka

**Curriculum Framework for Undergraduate Programme in Colleges and
Universities of Karnataka State.**



Model Syllabus for

6th Semester

Submitted to Vice-Chairman

Karnataka State Higher Educational Council

30, Prasanna Kumar, Bangalore City University Campus,
Bangalore, Karnataka- 560009


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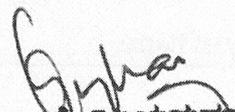
ಉಪಾಧ್ಯಕ್ಷರು ಹಾಗೂ ಮುಖ್ಯಸ್ಥರು
ಪಾಠಶಾಲೆ ವಿಭಾಗ
ಉಪನಿರ್ದೇಶಕರು, ಕಲಬುರಗಿ



Government of Karnataka

Composition of Subject Expert Committee Members

SN	Name & Organization	Designation
1	Prof. K Vijaykumar, Department of Zoology, Gulbarga University, Kalaburagi. 9480060508, katepaga63@gmail.com	Chairman
2	Prof. P M Basha, Department of Zoology, Bangalore University, Bengaluru. 9448701652, pmbashabub@rediffmail.com	Member
3	Prof. Vijaykumar B Malashetty, Department of Zoology, VSKUniversity, Ballari. 9343011567, vijaymalashetty@gmail.com	Member
4	Dr.S.Basavarajappa, Mysore University, Mysuru. 9449203241 ornithorajl1@gmail.com	Member
5	Prof. Nagaraj, Department of Zoology, Kuvempu University, Shivamogga. 9620485338 REPEATED	Member
6	Prof. B.Vasanthkumar, Department of Zoology, Sir M V Govt College, Bhadravathi, Shimoga	Member
7	Prof. B. K. Meera, Associate Professor, Maharani Cluster University, Bengaluru (9886409382)	Member
8	Smt. Kareemunnisa Syed, Associate professor, Dept. of Zoology, Nrupathunga University, Bengaluru (9964300991) REPEATED	Member
9	Dr. GangadharaRao, Associate Professor, Govt. Women's College, Kolar. 9448984956	Member
10	Prof. Shankarappa S. Hatti, Govt. College, Dept. of Zoology, SedamRoad, Kalaburgi. 9980391964	Member
11	Dr. Zeba Parveen Dept. of Zoology, BiBiRaza Women's DegreeCollege, Kalaburagi. 9448092786	Member
12	Dr. AsiyaNuzhath F.B, Associate Professor, Dept. of Zoology, Tumkurn University, Tumakuru. 9844029441	Member
13	Akshatha Chandra G R, Special Officer, KSHEC, Bengaluru. 9535487108	Member Convener


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ಹಿರಿಯ ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗೂ ಮುಖ್ಯಸ್ಥರು
ಪ್ರಾಣಿಶಾಸ್ತ್ರ ವಿಭಾಗ



Government of Karnataka

Model Curriculum

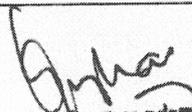
Program Name	B.Sc.	Semester	VI
Course Title	Evolutionary & Developmental Biology (Theory)		
Course Code:	ZOOC15-T	No. of Credits	4
Contact hours	60 Hours	Duration of SEA/Exam	3 hours
Formative Assessment Marks	40	Summative Assessment Marks	60

Course Pre-requisite(s):

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

- Understand that by biological evolution we mean that many of the organisms that inhabit the earth today are different from those that inhabited it in the past.
- Understand that natural selection is one of several processes that can bring about evolution, although it can also promote stability rather than change.
- Understand how the single cell formed at fertilization forms an embryo and then a full adult organism.
- Integrate genetics, molecular biology, biochemistry, cell biology, anatomy and physiology during embryonic development.
- Understand a variety of interacting processes, which generate an organism's heterogeneous shapes, size, and structural features.
- Understand how a cell behaves in response to an autonomous determinant or an external signal, and the scientific reasoning exhibited in experimental life science.

Contents	60 Hrs
Unit-I	16
1. Theories of Evolution: Origin of Life, Historical review of evolutionary concept: Lamarckism, Darwinism (Natural, Sexual and Artificial selection), Modern synthetic theory of evolution, Adaptive radiations: Patterns of evolution (Divergence, Convergence, Parallel & Co-evolution)	8
2. Population Genetics: Microevolution and Macroevolution: allele frequencies, genotype frequencies, Hardy- Weinberg equilibrium and conditions for its maintenance, Forces of evolution: mutation, selection, genetic drift.	8
Unit-II	14
3. Direct Evidences of Evolution: Types of fossils, Incompleteness of fossil record, Dating of Fossils, Phylogeny of horse.	7


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4. Species Concept and Extinction: Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric), Mass extinction (Causes, Names of five major extinctions).	7
Unit-III	14
5. Introduction: Scope & theories of developmental biology; Gametogenesis –types & Vitellogenesis. Fertilization-types and process. Monospermy and Polyspermy. Early development in frog upto Gastrula. Patterns of cleavage, fate maps and Morphogenetic movements and their types.	6
6. Developmental Genes: General concepts of organogenesis, Introduction to genetic basis of embryonic development and Developmental control genes (Homeobox genes)	8
Unit-IV	16
7. Embryonic membranes & Early development of chick: Development and function of extra embryonic membranes, structure of hens egg, origin of primitive streak, structure of 18,24,36,48 hrs of chick embryo.	8
8. Placentation- Classification of placenta, Morphological & histological with examples and functions. Mammalian female reproductive cycles, estrous cycle and menstruation, Aging: the biology of senescence.	8

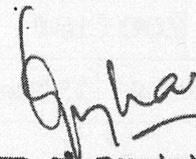
Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Attendance	10
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	10
Classroom Performance/Participation	10
Total	40 Marks
<i>Formative Assessment as per guidelines are compulsory</i>	

Course Title	Evolutionary & Developmental Biology (Practical)	Practical Credits	2
Course Code	ZOO C16-P	Contact Hours	4 Hours/week
Formative Assessment	25 Marks	Summative Assessment	25 Marks
Practical Content			
1. Study of fossils from models/pictures.			
2. Study of homology and analogy from suitable specimens			
3. Study and verification of Hardy-Weinberg Law by chi square analysis.			
4. Graphical representation and interpretation of data of height/ weight of a sample of 100 humans in relation to their age and sex.			
5. Types of eggs based on quantity and distribution of yolk: Sea urchin, insect, frog, Chick.			
6. Study of development of chick embryo through incubated chick eggs upto 48 hrs.			
7. Study of adaptive radiations in feet of birds and mouth parts of insects.			

Signature

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Attendance	05
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	05
Class room Performance/Participation	05
Total	25 Marks
<i>Formative Assessment as per guidelines are compulsory</i>	

References	
1	Ridley, M (2004) Evolution (3 rd edition) Blackwell Publishing
2	Hall, B.K. and Hallgrimson, B (2008) Evolution (4 th edition) Jones and Barlett Publishers
3	Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). Evolution. Cold Spring, Harbour Laboratory Press.
4	Campbell, N. A. and Reece J. B. (2011). Biology. IX Edition, Pearson, Benjamin, Cummings.
5	Douglas, J. Futuyma (1997). Evolutionary Biology. Sinauer Associates.
6	Developmental Biology: T. Subramaniam, (Reprint), Narosa Publishing House Pvt. Ltd., New Delhi
7	Balinsky B.I An Introduction to Embryology
8	Rajani Arora & Anitha Grover Developmental Biology Principles and Concepts
9	Developmental Biology: Michael J. F. Barresi, Scott F. Gilbert, Oxford University Press. (2019).



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 *ಲಿಯ ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗೂ ಮುಖ್ಯಸ್ಥರು
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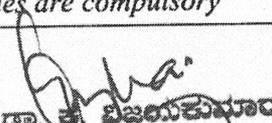
4. Wildlife Management and Conservation: In-situ and ex-situ conservation: Wildlife sanctuaries, National parks, Biosphere reserves, Project Tiger, Project Elephant, Project Lion, Zoological Gardens and Captive breeding. Wildlife Protection Act, 1972, IUCN Red list categories, CITES (Convention on International Trade in Endangered species of Wildlife Flora & Fauna, CBD (Convention on Biological Diversity).
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Formative Assessment for Theory	
Assessment Occasion/ type	Marks
Attendance	10
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	10
Classroom Performance/Participation	10
Total	40 Marks
<i>Formative Assessment as per guidelines are compulsory</i>	

Course Title	Environmental Biology, Wildlife Management & Conservation (Practical's)	Practical Credits	2
Course Code	ZOO C-18-P	Contact Hours	4 Hours/week
Formative Assessment	25 Marks	Summative Assessment	25 Marks

Practical Content	
1. Water quality parameters assessment: Collection of water sample, Dissolved Oxygen (O ₂), Carbon dioxide (CO ₂), Biological Oxygen Demand (BOD) Chemical Oxygen Demand (COD), chlorides and salinity estimation in water.	
2. Analysis of physico-chemical parameters of soil: pH, soil moisture, soil temperature, organic matter in soil.	
3. Visit of pond and lakes: Collection and identification of flora and fauna of selected ecosystems. Collection, preservation and estimation of zooplanktons.	
4. Demonstration of field equipments used in wildlife census: Compass, Binoculars, Spotting scope, Range Finders, Global Positioning System, Various types of cameras and lenses.	
5. Identification wild animals: Wild animal's pugmarks, hoof marks scats, pellet groups, nest, antlers. Demonstration of field techniques for wild flora and fauna.	

Formative Assessment for Practical	
Assessment Occasion/ type	Marks
Attendance	05
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	05
Classroom Performance/Participation	05
Total	25 Marks
<i>Formative Assessment as per guidelines are compulsory</i>	


 Dr. H. Srinivasan
 Head of Department
 Department of Zoology
 Government College, Bangalore

References	
1	Colinvaux, P.A.(1993)Ecology(2 nd edition) Wiley, John and Sons ,Inc.
2	Goutum Kumar, S.S Mujumdar: Wildlife Biology An Indian Perspective.
3	Odum, E.P.,(2008) Fundamentals of Ecology. Indian Edition. Brooks/Cole.(3 rd Edition) Blackwell Sci.
4	P.D. Sharma, Ecology And Environment & Environment Biology
5	Caughley, G., and Sinclair, A.R.E. (1994) Wildlife Ecology and Management. BlackwellScience.
6	A.G. Agarwal: Environmental Biology
7	Basara .G: Wildlife In India
8	Sutherland, W.J. (2000) The Conservation Handbook: Research, Management and Policy. Blackwell Sciences
9	Hunter M.L.,Gibbs,J .B .and Sterling, E.J.(2008) Problem solving in Conservation Biology and Wildlife Management: Exercises for Class, Field, and Laboratory.Blackwell Publishing

Internship for graduate Programme (As Per UGC & AICTE)

Course title	Internship Discipline specific
No of contact hours	90
No credits	2
Method of evaluation	Presentations/Report submission/Activity etc.,

- ❖ Internship shall be Discipline Specific of 90 hours (2 credits) with duration 4-6 weeks.
- ❖ Internship may be full-time/part-time (full-time during semester holidays and part-time in the academic session)
- ❖ Internship mentor/supervisor shall avail work allotment during 6th semester for a maximum of 20 hours.
- ❖ The student should submit the final internship report (90 hours of Internship) to the mentor for completion of the internship.
- ❖ The detailed guidelines and formats shall be formulated by the universities separately as Prescribed in accordance to UGC and AICTE guidelines.


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 ಪ್ರಾಣಿಶಾಸ್ತ್ರ ವಿಭಾಗ
 ಎಂ.ಆರ್. ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಸಂದೂರು

DSC, DSEC & OEC

Paper Code:	Paper Title:		
Duration of Exam	2 Hours	Max Marks	60
Instruction:	Answer all the sections(Equal distribution of Marks for all the Units)		

Section-A

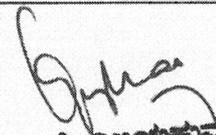
Instructions	Marks
1. Answer all the sections 2. Draw diagram wherever necessary.	
I. Answer any Five of the following questions (5x2=10)	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Section-B

.....	Marks
II. Answer any Four of the following questions (4X5=20)	
8.	
9.	
10.	
11.	
12.	
13.	

Section-C

.....	Marks
III. Answer any THREE of the following questions (3X10=30)	
14.	
15.	
16.	
17.	
18.	


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ವಾಣಿಜ್ಯ ವಿಭಾಗ
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕಲಬುರಗಿ



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No:GUK/ZOOL/BOS/2023-24/

Date:

Proceedings of the meeting of Board of Studies in Zoology (Under Graduate) were held on 26.09.2023 for the academic year 2023-24.

Members Present

- | | | |
|-----------------------------|---|-----------------|
| 1. Prof. K. Vijaykumar | - | Chairman |
| 2. Dr. Neelakanth S. Wali | - | Member |
| 3. Dr. B. Ramkrishna Reddy | - | Member |
| 4. Prof. S. Basavarajappa | - | External member |
| 5. Prof. Shashikanth Majagi | - | External Member |
| 6. Prof. Renuka Khaple | - | External member |

Proceedings:

1. Reviewed the UG Model curriculum for Zoology Syllabus as per the KSHEC, Bangalore.
2. Reviewed the performance of the Zoology students in the proceeding examinations. Members were satisfied about the performance of the students in the examination.
3. Question papers were reviewed suggested to concern about typographical errors.
4. Finalized and approved the panel of Examiners for the academic year 2023-24.
5. Chairman thanked all the members for smooth conduct of BOS meeting.

Dr. K. Vijaykumar

Senior Professor and Chairman (BOS)
Department of Studies and Research in Zoology
Gulbarga University, Kalaburagi

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ಹಿರಿಯ ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗೂ ಮುಖ್ಯಸ್ಥರು

ಪ್ರಾಣಿಶಾಸ್ತ್ರ ವಿಭಾಗ

ಕರ್ನಾಟಕ ವನ್ಯಜೀವಿಶಾಸ್ತ್ರ ವಿಭಾಗ, ಕಲಬುರಗಿ

