GULBARGA UNIVERSITY
KALABURAGI

B.Sc. Zoology Syllabus for V 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 Onwards

GOVERNMENT OF KARNATAKA

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

5th Semester

Model Syllabus forB.Sc. in Zoology

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

COMPOSITION OF STATE SUBJECT EXPERT COMMITTEE MEMBERS

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6	**Dr. Renuka Khaple,** Asst. Professor Department of Zoology, Davanagere University, Davanagere.	External Member

Guidelines For Model Curriculum

1. The Universities shall promote Double Major model as prescribed in the Model Curriculum Table.
2. For Arts/Humanities/Social Science - V & VI sem, three core papers (DSC) to be selected in each semester.
   For Science – Ensure two core papers (DSC) should get minimum of 12 credits/or 2 major subjects of 24 credits (4+2 patterns)(1 hour of Lecture or 2 hours of practical/field work per week in a semester is assigned one credit and core subject theory courses/papers will have 4 credits, while practical are assigned 2 credits)
3. Formative assessment and summative assessment to be followed in the ratio of 40:60.
4. Selection of Open electives: The university shall follow curriculum and credit frame work for Undergraduate program of publishedby UGC.
   Open Electives – Courses from other Disciplines (9 Credits)
   - Students are not allowed to choose or repeat courses as open electives already undergone at the higher secondary level(12th class)
   - All UG students are required to undergo 3 introductory-level courses relating to any of the broad disciplines given below.

Natural and Physical Sciences	Mathematics, Statistics, & Computer Applications	Library, Information, and Media Sciences	Commerce and Management	Humanities and Social Sciences:
Students can choose basic courses from disciplines such as Natural Science, for example, Biology, Botany, Zoology, Biotechnology, Biochemistry, Chemistry,	Courses under this category will facilitate the students to use and apply tools and techniques in their major and minor disciplines. The course may include training in programming software like Python among others and applications software	Courses from this category will help the students to understand the recent developments in information and media science (journalism, mass media, and communication)	Courses include business management, accountancy, finance, financial institutions, fintech, etc.,	The courses relating to Social Sciences, for example, Anthropology, Communication and Media, Economics, History, Linguistics, Political Science, Psychology, Social Work, Sociology, etc. will enable students to understand the individuals and their social behavior, society, and nation. Students be introduced to survey methodology and available large-scale databases

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Physics, Biophysics, Astronomy and Astrophysics, Earth and Environmental Sciences, etc.	like STATA, SPSS, Tally, etc. Basic courses under this category will be helpful for science and social science in data analysis and the application of quantitative tools			for India. The courses under humanities include, for example, Archaeology, History, Comparative Literature, Arts & Creative expressions, Creative Writing and Literature, language(s), Philosophy, etc., and interdisciplinary courses relating to humanities. The list of Courses that can include interdisciplinary subjects such as Cognitive Science, Environmental Science, Gender Studies, Global Environment & Health, International Relations, Political Economy and Development, Sustainable Development, Women's and Gender Studies, etc. will be useful to understand society.

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B. Sc.-Science: Curriculum and Credit Framework for Undergraduate Programme

Sem.	Discipline Specific Courses - Core (DSC), Elective (DSE)(Credits) (L+T+P)	Minor/ Multidisciplinary/ Open Elective (OE) Courses(Credits) (L+T+P)	Ability Enhancement Courses (AEC)(Credits)(L+T+P) (Languages)	Skills Enhancement Courses (SEC) (Credits) (L+T+P)/ Value Added Courses (Credits) (L+T+P) (common for all UG Programs)/ Summer Internship.		Total Credits
I	DSC-A1(4), A2(2) DSC-B1(4), B2(2)	OE-1 (3)	L1-1(3), L2-1(3) (4 hrs each)	**SEC-1**: Digital Fluency (2) (1+0+2)/ Env. Studies (3)	Health, Wellness & Yoga (2) (1+0+2)	25/26
II	DSC-A3(4), A4(2), DSC-B3(4), B4(2)	OE-2 (3)	L1-2(3), L2-2(3) (4 hrs each)	Env. Studies (3)/ SEC-1: Digital Fluency (2)(1+0+2)	Sports/NCC/NSS/R&R(S&G) / Cultural (2) (0+0+4)	26/25
Students exiting the programme after securing 46 credits will be awarded UG Certificate in Disciplines A and B provided they secure 4 credits in work based vocational courses during summer term or internship/Apprenticeship in addition to 6 credits from skill-based courses earned during the first year.						
III	DSC-A5(4), A6(2), DSC-B5(4), B6(2)	OE-3 (3)/ India and Indian Constitution (3)	L1-3(3), L2-3(3) (4 hrs. each)	**SEC-2**:AI/Cyber Security/Finan **c**ial Edu. & Inv. Aw. (2)(1+0+2)	Sports/NCC/NSS/R&R(S&G) /Cultural (2) (0+0+4)/ SEC (2)	25
IV	DSC-A7(4), A8(2), DSC-B7(4), B8(2)	India and Indian Constitution (3) / OE-3(3)	L1-4(3), L2-4(3) (4 hrs. each)	**SEC-3**: Financial Edu. &Inv. Aw. /AI /Cyber Security (2) (1+0+2)	Sports/NCC/NSS/R&R(S&G)/ Cultural (2) (0+0+4)/ SEC (2)	25
Students exiting the programme after securing 92 credits will be awarded UG Diploma in Disciplines A and B provided they secure additional 4 credits in skill based vocational courses offered during first- or second-year summer term.						
V	DSC-A9 (4), A10 (2), A11(4), A12 (2)	DSC-B9(4), B10(2), B11(4), B12(2)		**SEC-4**: Employability/ Skills/Cyber Security (3) (2+0+2)		27
VI	DSC-A13(4), A14(2), A15(4), A16(2);	DSC-B13(4), B14(2), B15(4), B16(2)		Internship (2)		26
Students exiting the programme after 3-years will be awarded UG Degree in Disciplines A and B as double majors upon securing 136 credits and satisfying the minimum credit requirements under each category of courses prescribed.						

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Gulbarga University, Kalaburagi

B.Sc. in Zoology

Effective from 2023-24

Sem.	Type of Course	Theory/ Practical	Course Code	Course Title	Instruction hour/ week	Total hours /sem	Duration of Exam	Marks			Credits
								Formative	Summative	Total	
V	DSCC-9	Theory	**ZOO C9T**	Non-Chordates and Economic Zoology	04hrs	60	02 hrs	40	60	100	04
	DSCC-10	Practical	**ZOO C10P**	Non-Chordates and Economic Zoology	04 hrs	60	03 hrs	25	25	50	02
	DSCC-11	Theory	**ZOO C11T**	Chordates and Comparative Anatomy	04hrs	60	02 hrs	40	60	100	04
	DSCC-12	Practical	**ZOO C12P**	Chordates and Comparative Anatomy	04 hrs	60	03 hrs	25	25	50	02
	Other subject										04
	Other subject										02
	Other subject										04
	Other subject										02
	SEC-3	Practical	**ZOO SE C03T**	Employability	04hrs	60	03 hrs	40	60	100	03
	Total										**27**
VI	DSCC-13	Theory	**ZOO C-13T**	Evolutionary and Developmental Biology	04hrs	60	02 hrs	40	60	100	04
	DSCC-4	Practical	**ZOO C-14P**	Evolutionary and Developmental Biology	04 hrs	60	03 hrs	25	25	50	02
	DSCC-15	Theory	**ZOO C-15T**	Environmental Biology, Wildlife Management and Conservation	04hrs	60	02 hrs	40	60	100	04
	DSCC-16	Practical	**ZOO C-16P**	Environmental Biology, Wildlife Management and Conservation	04 hrs	60	03 hrs	25	25	50	02
	Other subject										04
	Other subject										02
	Other subject										04
	Other subject										02
	Internship-1	Practical		Internship				25	25	50	02
	Total										**26**

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Government of Karnataka

Model Curriculum

Program Name	**B.Sc.**	**V Semester**	
Course Title	**Non-Chordates and Economic Zoology (Theory)**		
Course Code:	**ZOO C-9 T**	No. of Credits	**4**
Contact hours	**60 Hours (4 hrs/week)**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) /(POs)	**ZOO C9T**	**ZOO C10P**	**ZOO C11T**	**ZOO C12P**	**ZOO C13T**	**ZOO C14P**	**ZOO C15T**	**ZOO C16P**	**ZOO C17T**	**ZOO C18P**
I Core competency	X									
II Critical thinking	X									
III Analytical reasoning	X									
IV Research skills	X									
V Team work	X									

Course Pre-requisite(s):

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

CO1. Group animals on the basis of their morphological characteristics/ structures.

CO2. Demonstrate comprehensive identification abilities of Non-Chordate diversity.

CO3. Explain structural and functional diversity of Non-Chordates

CO4. Develop understanding on the diversity of life with regard to protests, non-chordates and chordates.

CO 5. Examine the diversity and evolutionary history of a taxon through the constructionof a basic phylogenetic/ cladistics tree.

Contents	60 Hrs
Unit-I	**15**
1. Protozoa to Coelenterate - General Characters and Classification up to classes with examples. • Protozoa-*Paramecium* (Morphology and Reproduction) • Porifera - *Sycon* (Canal System) • Coelenterata – *Obelia* (Morphology and Reproduction), Coral reefs in brief.	
2. Ctenophora to Nematheiminthes - General Characters and Classification up to classes with examples. • Ctenophora – Salient feature • Platyhelminthes- *Taenia* (Tape worm) (Morphology and Reproduction) • Nemathelminthes-*Ascaris lumbricoides* (Morphology and Reproduction)	
Unit-II	**15**
3. Annelida - General Characters and Classification upto classes with examples. • Annelida – *Hirudinaria* (Leech) (Morphology and Reproduction)	
4. Arthropoda - General Characters and Classification up to classes with examples. • Arthropoda – *Palaemon* (Prawn) Morphology, Appendages, Nervous System and Reproduction)	
Unit-III	**15**
5. Mollusca to Echinodermata - General Characters and Classification up to classes with examples. • Mollusca – *Pila* (Morphology, Shell, Respiration, Nervous System and Reproduction • Echinodermata – *Pentoceros* (Morphology and Water Vascular System)	
Unit-IV	**15**
6. Economic Zoology :Vectors and Pests • Life cycle and their control of following pests: Gundhi bug, Sugarcane leafhopper, Rodents. Termites and Mosquitoes and their control • Lac-culture, Vermiculture and Poultry.	

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

Course Title	**Non-Chordates and Economic Zoology (Practical)**	Practical Credits	**2**
Course Code	**ZOO C10-P**	Contact Hours	**4 hrs/week**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand basics of classification of non-chordates.
2. Learn the diversity of habit and habitat of these species.
3. Develop the skills to identify different classes and species of animals.
4. Know uniqueness of a particular animal and its importance
5. Enhancement of basic laboratory skill like keen observation and drawing.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) /(POs)	**ZOO C9T**	**ZOO C10P**	**ZOO C11T**	**ZOO C12 P**	**ZOO C13T**	**ZOO C14P**	**ZOO C15T**	**ZOO C16P**	**ZOO C17T**	**ZOO C18P**
I Core competency		X								
II Critical thinking		X								
III Analytical reasoning		X								
IV Research skills		X								
V Team work		X								

Practical Content

1. Preparation and observation of protozoan culture.
2. **Protozoa**: Systematics of *Amoeba, Euglena, Noctiluca, Paramecium* and *Vorticella, Plasmodium* (Permanent slides).
3. **Porifera:** Systematics of *Sycon, Euplectella, Hyalonema, Spongilla* and *Euspongia* (Specimens). Study of permanent slides of T.S of *Sycon*, spicules and gemmules.
4. **Cnidaria:** Systematics of *Aurelia* and *Metridium* (Specimens). Slides of *Hydra, Obelia*-polyp and medusa, and *Ephyra* larva, T.S. of *Metridium* passing through mesenteries.
5. **Study of Corals**-*Astraea, Fungia, Meandrina, Corallium, Gorgonia, Millepora* and *Pennatula.*
6. **Helminthes:** Systematics of *Planaria, Fasciola hepatica* and *Taenia solium*, Ascaris- Male and female (Specimens). Slides of T.S. of *Planaria*,T.S of male and female Ascaris.
7. **Annelida:** Systematics of *Nereis, Heteronereis, Sabella, Aphrodite* (Specimens). Slide of T.S. of Earth worm through typhlosole.
8. **Arthropoda**: Systematics of *Panaeus, Palaemon, Astracus*, Scorpion, Spider, *Limulus, Peripatus, Millipede, Centipede,* Praying mantis, Termite Queen, Moth, Butterfly, Dung beetle/Rhinocerous beetle (Any six specimens).Slide of Larvae- Nauplius, Zoea, Mysis.
9. **Mollusca:** Systematics of *Chiton, Mytilus, Aplysia, Pila, Octopus, Sepia* (Specimens) and Glochidium larva (Slide).
10. **Shell Pattern**-*Unio, Ostrea, Cypria, Murex, Nautilus, Patella, Dentalium,* Cuttle bone.
11. **Echinodermata**: Systematics of Sea star, Brittle star, Sea Urchin, Sea cucumber, Sea lilly (Specimens).Slides of Bipinnaria larva, Echinopluteus larva and Pedicellaria.
12. **Harmful Nonchordates:** Soil Nematodes. Agricultural, veterinary and human pests of Arachnida and Arthropoda.
13. **Beneficial Nonchordates:**
    - **Sericulture:** Life cycle of *Bombyx mori*, Uzi fly, Cocoon, Raw silk.
    - **Apiculture**: Any 2 Species of honey bee and bee wax.
    - **VermiCulture**: Earthworm & Vermicompost.
14. **Virtual Dissection/Cultured specimens: Earthworm**-Digestive system & Nervous system**.**
15. **Virtual Dissection/Cultured specimens: Cockroach**- Salivary Apparatus, Digestive system & Nervous system.

Pedagogy: Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests

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**
Formative Assessment as per guidelines are compulsory	

References	
1	Barnes, R.S.K.; Calow,P.; Olive,P.J.W.; Golding,D.W.; Spicer, J.I.(2002) The Invertebrates: Synthesis, Blackwell Publishing.
2	Hickman,C.; Roberts,L.S.; Keen,S.L.; Larson, A. and Eisenhour, D. (2018) Animal Diversity, Mc Graw-Hill.
3	Holland, P.(2011) The Animal Kingdom: A Very Short Introduction, Oxford University Press.
4	Kardong, K.V.(2006) Vertebrates: Comparative Anatomy, Function, Evolution (4thedition) Mc Graw-Hill.
5	Barrington, E.J.W. (1979) Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
6	Boradale, L.A. and Potts, E.A. (1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.
7	Bushbaum, R.(1964) Animals without Backbones. University of Chicago Press.
8	R.L Kotpal Rastogi Publication.
9	P.S. Dhami & J.K. Dhami Chand Publication
10	Jordan & Verma S.Chand Publication

Government of Karnataka

Model Curriculum

Program Name	**B.Sc.**	Semester	**V**
Course Title	**Chordates and Comparative Anatomy (Theory)**		
Course Code:	**ZOO C-11-T**	No. of Credits	**4**
Contact hours	**60 Hours (4 hrs/week)**	Duration of SEA/Exam	**2 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:

CO1. To demonstrate comprehensive identification abilities of chordate diversity

CO2. Able to explain structural and functional diversity of chordate diversity

CO3. To understand evolutionary relationship amongst chordates

CO4. To take up research in biological sciences.

CO5. To realize that very similar physiological mechanisms are used in very diverse organisms.

CO6. To Get a flavor of research by working on project besides improving their writing skills. It will further enable the students to think and interpret individually.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) /(POs)	ZOO C9T	ZOO C10P	ZOO C11T	ZOO C12 P	ZOO C13T	ZOO C14P	ZOO C15T	ZOO C16P	ZOO C17T	ZOO C18P
I Core competency			X							
II Critical thinking			X							
III Analytical reasoning			X							
IV Research skills			X							
V Team work			X							

Contents	60 Hrs
Unit-I	**15 hrs**
Chapter 1: Chordates: Origin of Chordates. **Basic characters of chordates and classification up to classes.** **Chapter 2: Hemichordata:** Type Study of *Balanoglossus* – Habit and Habitat, Morphology, Coelom. Tornaria larva and its affinities. Affinities and systematic position of Hemichordata. **Chapter 3:Urochordata :** Type Study of *Herdmania*-Habit and Habitat, Morphology, Ascidian tadpole- structure and its retrogressive metamorphosis. **Chapter 4: Cephalochordata :** Type Study of *Branchiostoma* (*Amphioxus*)-Habit and Habitat, Morphology, Digestive system, Feeding mechanism, excretory and circulatory system. **Chapter 5: Agnatha:** General characters of Agnatha and classification upto classes. Salient features of Cyclostomata and Ostracodermi with orders and examples. Ammocoete larva and its significance.	
Unit-II	**15**
6. Chapter 6: Vertebrates: General characters and Classification of different classes of vertebrates (Pisces, Amphibia, Reptilia, Aves, Mammalia) up to the order with five characters for eachorder citing examples. General characters of Chondrichthyes and Osteichthyes. Interesting features and evolutionary significance of Dipnoi. Salient features of Placodermi with examples. Interesting features of *Sphenodon*, and Archaeopteryx. Salient features of Class Aves with examples. Interesting features of mammalian orders (Insectivora, Carnivora, Chiroptera, Cetacea, Proboscidia, Ungulata – Perissodactyla and Artiodactyla, and Primates –Platyrhini and Catarhini) with examples.	
Unit-III	**15**
Chapter 7. General account of Chordates: Types of caudal fins, scales and swim bladder in fishes. Origin of Amphibia. Neoteny and Paedogenesis. Adaptive radiation in extinct reptiles with suitable examples. Temporal fossae in reptiles. Poison apparatus and biting mechanism in snakes. Parental care in Pisces and Amphibians. Flight adaptations in birds. Dentition in mammals. Evolution of Molar tooth. Migration in Pisces, Birds. Mammals.	

Unit-IV	14
Comparative Anatomy of Vertebrates: **Chapter 8. Integumentary System:** Structure of skin and its derivatives. **Chapter 9. Skeletal System** • Comparative account of Axial Skeletal system in vertebrates; Skull - Amphibian (Frog), Reptiles (Lizard). • Comparative account of appendicular skeletal system in vertebrates; Pectoral and Pelvic girdles of Aves (Pigeon) and Mammals (Man). **Chapter-10 Respiratory system** • Comparative account of respiratory system in vertebrates: Pisces (Scoliodon), Amphibian (Frog). **Chapter-11 Circulatory System** • Comparative account of heart and aortic arches in vertebrates: Pisces (Scoliodon), Amphibian(Frog) **Chapter-12 Excretory System** • Succession of kidney in vertebrates. **Chapter-13 Nervous system** • Comparative account of brain in vertebrates: Aves (Pigeon) and Mammals (Man).	

Course Title	**Chordates and Comparative Anatomy Zoology (Practical)**	Practical Credits	**2**
Course Code	**ZOO C12-P**	Contact Hours	**4 hrs/week**
Formative Assessment	**25 Marks**	Summative Assessment	**25 Marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) /(POs)	**ZOO C9T**	**ZOO C10P**	**ZOO C11T**	**ZOO C12 P**	**ZOO C13T**	**ZOO C14P**	**ZOO C15T**	**ZOO C16P**	**ZOO C17T**	**ZOO C18P**
I Core competency				X						
II Critical thinking				X						
III Analytical reasoning				X						
IV Research skills				X						
V Team work				X						

Practical Content
1. **Protochordata**: Balanoglossus and its T. S through proboscis Ascidian/ *Herdmania* and *Amphioxus,* T.S. of *Amphioxus* through pharynx and intestine. **2. Cyclostomata:** -*Petromyzon*, Ammocoete larva and *Myxine.* 3. **Pisces**: *4.* Cartilaginous Fishes – *Narcine, Trygon, Pristis, Myolobaties* 5. Bony Fishes –Zebra fish, Hippocampus, Muraena, Ostracion, Tetradon, Pleuronectus, Diodon, Echeneis. (Any six). **6. Ornamental fishes:** Siamese, Koi, Oscar, Betta Sp., Neon tetra, Guppies, Gold fish, Angle fish, Rainbow fish, Mollies (Any four). **7. Accessory respiratory organs** – *Saccobranchus, Clarias* and *Anabas.* **8. Amphibia**: -*Rana, Bufo, Ambystoma, Axolotl larva, Necturus and Ichthyophis.* **9. Reptilia**: -Turtle, Tortoise, *Mabuya, Calotes*, Chameleon, *Varanus*. snakes –Dryophis, Rat snake, Brahmini, Cobra, Krait, Russell's viper and Hydrophis; 10. **Aves:** Beak and feet modifications in the following examples: Duck, Crow, Sparrow,Parrot, Kingfisher, Eagle or Hawk. 11. **Mammalia**: Mongoose, Squirrel, Pangolin, Hedge Hog, Rat and Loris. **12. Virtual Dissection/Cultured specimens:** Shark/Bony fish: Afferent and efferent branchial systems, Glossopharyngeal and Vagus nerves. **13. Virtual Dissection/Cultured specimens:** Rat: Dissection (only demonstration) – Circulatory system (arterial and venous), urinogenital system. 14. **Skeletal System in man:** Skull, vertebrae, girdles and limb bones (Except hands and feet) 15. **Comparative account** of Skin in shark, frog, Calotes, Pigeon and Man. 16. **Comparative account** of Heart in Calotes, Pigeon and Man. 17. **Comparative account** of Brain in Shark, Frog and Calotes.

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**
Formative Assessment as per guidelines are compulsory	

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**
Formative Assessment as per guidelines are compulsory	

References	
1	Colbert *et al*: Colbert's Evolution of the Vertebrates: A history of the backboned animals through time. (5th Ed 2002, Wiley – Liss).
2	Hildebrand: Analysis of Vertebrate Structure (4thed 1995, John Wiley)
3	Kenneth V. Kardong (20015) Vertebrates: Comparative Anatomy, Function, Evolution McGrawHill
4	McFarland *et al.,*: Vertebrate Life (1979, Macmillan publishing)
5	Parker and Haswell: Text Book of Zoology, Vol. II (1978, ELBS)
6	Romer and Parsons: The Vertebrate Body (6thed 1986, CBS Publishing Japan)
7	Young: The Life of Vertebrates (3rded 2006, ELBS/Oxford)
8	Weichert C.K. and William Presch (1970). Elements of Chordate Ana tomy, Tata McGraw Hills
9	R.L Kotpal Rastogi Publication.
10	P.S. Dhami & J.K. Dhami Chand Publication
11	Jordan & Verma S.Chand Publication

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 6^{th} 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.

DSC Question Paper Pattern for UG V & VI Semester DSC

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

Section-B

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

Section-C

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

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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.