

DEPARTMENT OF ZOOLOGY
COURSE CURRICULUM & MARKING SCHEME

B.Sc. I, II, III, IV Semester

ZOOLOGY

(Based on Choice Based Credit System)

SESSION : 2023-24



ESTD : 1958

**GOVT. V.Y.T. PG AUTONOMOUS COLLEGE,
DURG, 491001 (C.G.)**

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

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B. Sc. WITH ZOOLOGY

[B.Sc (CBZ), B.SC (CZBe), B.Sc (CZBt), B.Sc (CZAn)
B.Sc(CZGI), B.Sc(CZlc)]

Appendix II

Table A Sample U.G.C. for Multidisciplinary Courses of Study

Semester	DSC	DSE	GE	AEC	SEC	Internship/ Apprenticeship / Project/ community outreach (2)	VAC	Total Credits
I	DSC A 1-4 DSC B 1-4 DSC C 1-4		Choose one from a pool of courses GE-1	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)		Choose one from a pool of courses	22 Credits
II	DSC A 1-4 DSC B 1-4 DSC C 1-4		Choose one from a pool of courses GE-1	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)		Choose one from a pool of courses	22 Credits
<i>Students on exit shall be awarded undergraduate certificate (in the Field of Multidisciplinary study) after securing the requisite 44 credits in semester I and II</i>								
III	DSC A 1-4 DSC B 1-4 DSC C 1-4	Choose one from a pool of courses DSE A,B,C (3) Or Choose one from a pool of courses GE-2 (4)		Choose one from a pool of AEC courses (2)	Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)		Choose one from a pool of courses	Total = 44 Credits 22 credits
IV	DSC A 1-4 DSC B 1-4 DSC C 1-4	Choose one from a pool of courses DSE A,B,C (3) Or Choose one from a pool of courses GE-2 (4)		Choose one from a pool of AEC courses (2)	Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)		Choose one from a pool of courses	22 credits
<i>Students on exit shall be awarded undergraduate Diploma (in the Field of Multidisciplinary study) after securing the requisite 88 credits on completion of semester IV</i>								
V	DSC A 1-4 DSC B 1-4 DSC C 1-4	Choose one from a pool of courses DSE A,B,C (3)	Choose one from a pool of courses GE-3		Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)			Total = 88 credits 22 credits
VI	DSC A 1-4 DSC B 1-4 DSC C 1-4	Choose one from a pool of courses DSE A,B,C (3)	Choose one from a pool of courses GE-3		Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)			22 credits
<i>Students on exit shall be awarded Bachelor of (in the Field of Multidisciplinary study) after securing the requisite 132 credits on completion of semester VI</i>								
VII	DSC A,B,C (4)	Choose three DSE (3) courses OR Choose two DSE (2x2) and one GE (1) course OR Choose one DSE and two GE (1+1) courses OR All three GE (1,1,1) & (total=3)					Dissertation (1)	Total = 132 credits 22 credits
VIII	DSC A,B,C (4)	Choose three DSE (3) courses OR Choose two DSE (2x2) and one GE (1) course OR Choose one DSE and two GE (1+1) courses OR All three GE (1,1,1) & (total=3)					Dissertation (1)	22 credits
<i>Students on exit shall be awarded Bachelor of (in the Field of Multidisciplinary study) (Honours or Honours with Academic Project/Entrepreneurship) after securing the requisite 176 credits on completion of Semester VIII</i>								
								Total = 176 credits

Note:

1. In 1st semester Hindi Language, 2nd semester English Language and Environmental studies in 3rd and 4th Semester will be offered as AECC.
2. Students are required to take Generic Specific courses (courses from other than A/B/C Disciplines)
3. DSC-1 to DSC-7 shall be core courses of either Discipline A or B or C.
4. If a student wishes to major in Discipline A, then he/she should earn at least 60 credits from DSCs and DSEs, Research Methodology of Discipline A and dissertation written on a topic of Discipline A.
5. Minor in a Discipline will be awarded to a student if he/she earns 24 credits from GEs (other than B and C) along with major in A.
6. Completion of core courses from host institute is mandatory.
7. Students may take up SEC, GEC and DSEC of equivalent credits from any other institute/ online platforms/MOOC/ ODL from UGC recognized organizations.

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG

DEPARTMENT OF ZOOLOGY

FOUR YEAR UG (B.Sc.) PROGRAMME WITH

ZOOLOGY

SEMESTER – I & II

SESSION 2022-23 & 2023-24

Program Specific Outcome (PSO): B. Sc. Zoology

The programme enables the students to:

- Acquire knowledge on the various aspects of life sciences, cell biology, genetics, taxonomy, physiology, applied zoology, general embryology and public health.
- Understand good laboratory practices and safety, Carry out experimental techniques and methods of Physiology, Cell biology, pathology, Genetics, Applied Zoology, Biological techniques, Toxicology, Entomology, Sericulture, Biochemistry, microtomy.
- Understand the applications of biological sciences in Biotechnology, Apiculture, Poultry, Fisheries, Aquaculture, Agriculture and vermiculture.
- Gained the knowledge to use modern sophisticated equipments and tools.
- Recognize the scientific facts behind natural phenomena.

GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE, DURG
DEPARTMENT OF ZOOLOGY
Four year UG (B.Sc.) Programme with Zoology
2022-23 & 2023-24

Approved syllabus for four year UG (B.Sc.) Programme with Zoology for semester-I and semester-II by the members of Board of Studies for the session 2022-23 & 2023-24

The syllabus with the paper combinations is as under:

B.Sc. Semester - I

Course	No. of Credits	Lab. Course	No. of Credits
DSC – BZO101 Animal Diversity – I	3	Lab Course I: Lab Course BZOL101	1
GEC Pool – (Choose any one) 01 – Animal Diversity – I	3	Demonstration in each GEC course	1
SEC Pool – (Choose any one) 01 – Good Laboratory Practices	1	Demonstration in each SEC course	1
VAC Pool – (Choose any one)01 – Sports	1	Demonstration in each SEC course	1
B.Sc. Semester – II			
DSC – BZO201 Animal Diversity – II	3	Lab Course II: Lab Course BZOL201	1
GEC Pool – (Choose any one) 01 – Animal Diversity – II	3	Demonstration in each GEC course	1
SEC Pool – (Choose any one) 01 – Vermicomposting	1	Demonstration in each SEC course	1
VAC Pool – (Choose any one) 01 – Yoga	1	Demonstration in each SEC course	1
B.Sc. Semester – III			
DSC – BZO301 Comparative Anatomy and Physiology of Vertebrates	3	Lab Course III: Lab Course BZOL301	1
GEC Pool – (Choose any one) 01 – Comparative Anatomy and	3	Demonstration in each GEC course	1

Physiology of Vertebrates			
SEC Pool – (Choose any one) 01 – Good Laboratory Practices in Zoology	1	Demonstration in each SEC course	1
VAC Pool – (Choose any one) 01 – Personality Development	1	Demonstration in each SEC course	1
B.Sc. Semester – IV			
DSC – BZO401 Cell Biology and Genetics	3	Lab Course IV: Lab Course BZOL401	1
GEC Pool – (Choose any one) 01 – Cell Biology and Genetics	3	Demonstration in each GEC course	1
SEC Pool – (Choose any one) 01 – Good laboratory Practices in Zoology	1	Demonstration in each SEC course	1
VAC Pool – (Choose any one) 01 – Indian History and Culture	1	Demonstration in each SEC course	1
B.Sc. Semester – V			
DSC – BZO501 Histology and Biochemistry	3	Lab Course V: Lab Course BZOL501	1
DSE Pool – (Choose any one from pool of A/B/C) 01 – Microbiology, Parasitology and Immunology	3	Demonstration in each GEC course	1
GEC Pool – (Choose any one) 01 – Histology and Biochemistry	3	Demonstration in each GEC course	1
SEC Pool – (Choose any one) 01 – Vermicomposting	1	Demonstration in each SEC course	1
B.Sc. Semester – VI			
DSC – BZO601 Developmental and Reproductive Biology	3	Lab Course IV: Lab Course BZOL601	1
DSE Pool – (Choose any one from pool of A/B/C)	3	Demonstration in each GEC course	1

01 – Biostatistics and Computer Applications			
GEC Pool – (Choose any one) 01 – Developmental and Reproductive Biology	3	Demonstration in each GEC course	1
SEC Pool – (Choose any one) 01 – Good laboratory Practices in Zoology	1	Demonstration in each SEC course	1

B.Sc. Semester – VII

DSC Pool – (Choose any one from pool of A/B/C) - BZO701 Ecology and wildlife conservation	3	Lab Course V: Lab Course BZOL701	1
DSE Pool – (Choose three DSE course or choose two DSE + one GEC course or choose one DSE course + 2 GEC course or all three GEC course from pool of A/B/C) DSE – BZO702 Aquatic Zoology	3	Lab Course V: Lab Course BZOL702	1
DSE – BZO703 Endocrinology, behaviour and Evolution	3	Lab Course V: Lab Course BZOL703	1
GEC Pool – (Choose any one) 01 – Ecology and wildlife conservation	3	Demonstration in each GEC course	1
Dissertation	6		

B.Sc. Semester – VIII

DSC – BZO801 Ichthyology	3	Lab Course VIII: Lab Course BZOL801	1
DSE Pool – (Choose three DSE course or	3	Lab Course VIII: Lab	1

choose two DSE + one GEC course or choose one DSE course + 2 GEC course or all three GEC course from pool of A/B/C) DSE – BZO802 Applied Zoology		Course BZOL802	
DSE – BZO 803 Ecology and wildlife conservation	3	Lab Course VIII: Lab Course BZOL804	1
GEC Pool – (Choose any one) GEC – BZO801 Icthyology	3	Lab Course VIII: Lab Course BZOL801	1
Dissertation	6		

Marking Scheme
4Yr UG Program
B.Sc.(Multidisciplinary) with Zoology
CBCS Pattern
Session - 2022-23 & 2023-24

B.Sc Semester I & II

Course Type	Course Code	Marks	
		Max	Min
DSC	BZO101	75	30
DSC	BZOL101	25	10
DSC	BZO201	75	30
DSC	BZOL201	25	10
SEC	BZOSC0 1	75	30
SEC	BZOSLC0 1	25	10

Absolute Grading System (for conversion of marks into grade points)

Letter Grade	Grade point	Zoo TH%	Zoo Lab %	SEC %
O (Outstanding) 10	10	90-100	95-100	95-100
A+(Excellent) 9	9	80-90	90-95	80-95
A(Very Good) 8	8	70-80	80-90	70-80
B+(Good) 7	7	60-70	70-80	60-70
B (Above Average) 6	6	50-60	60-70	50-60
C(Average) 5	5	40-50	50-60	40-50
P (Pass) 4	4	35-40	40-50	35-40
F(Fail) 0	0	0	0	0
Ab (Absent) 0	0	0	0	0

Sample Grade Sheet

Courses	Credit Ci	Marks ESE	Marks obtained	Internal	% Marks Obtained =80%ESE +Int	Grade Point Gi	CiGi	SGPA
Chm.	3	75	70	20	76/80 = 96%	10	30	8.09
Bot.	3	75	50	20	60/80 =75%	8	24	
Zool.	4	100	80	20	80	7	28	
Chem. Lab	1	25	20	-	80	8	8	
Bot. Lab	1	25	23	-	92	10	10	
Zool. Lab.	1	25	22	-	88	9	9	
GEC I (History eg)	4	100	70	15	71	8	32	
AEC (Hindi)	2	50	30	10	34/50=68%	7	14	
VAC (yoga/sports)	2	50	30	10	68%	7	14	
SECI	2	50	40	10	84%	9	18	
Total	22	450	280		560	62	178	

CGPA of an Academic Yr = SGPA1 +AGPA2/ 2 or (SGPA1 + SGPA2 +.....SGPAn)/n, n is total number of semesters

The syllabus of Semester - I and Semester - II for four year UG (B.Sc.) Programme with Zoology is hereby approved for the session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D ^c		Departmental members
University Nominee		1.
Subject Expert		2.
Subject Expert		3.
Representative from Industry/entrepreneur		4.
Student representative		5.
Other Prof. from Science faculty		6.
		7.
		8.

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG
DEPARTMENT OF ZOOLOGY

Syllabus and Marking Scheme for semester – I and semester – II for four year UG
(B.Sc.) Programme with Zoology for the Session 2022-23 & 2023-24

Semester	Course code/Title of the Paper	Marks Allotted in Theory	
		Max	Min
I	Core Course BZO101/Animal Diversity - I	75	30
	BZOL101: Lab. Course - I	25	10
	SEC Pool – (Choose any one) 01 – Good Laboratory Practices	25	10
	Lab. Demonstration	25	10
	Generic Elective BZO101/Animal Diversity – I	75	30
	BZOL101: Lab. Course – I	25	10
	Value Added – (Choose any one) 01 – Sports	25	10
Demonstration	25	10	
II	BZO201/ Animal Diversity - II	75	30
	BZOL201: Lab. Course - II	25	10
	GEC Pool – (Choose any one) 01 - Animal Diversity - II	75	30
	Lab. Demonstration	25	10
	SEC Pool – (Choose any one) 01 – Vermicomposting	25	10
	Lab. Demonstration	25	10
	Value Added – (Choose any one) Yoga	25	10
Demonstration	25	10	

Marks Distribution

Core course	-	75
Lab. Course (Core Course)	-	25
Generic Elective Course	-	75
Lab. Course (Generic Elective Course)	-	25
Skill Enhancement Course	-	25
Lab. Demonstration (SEC)	-	25
Value Added Course	-	25
Demonstration (VAC)	-	25
Total Marks	-	300

The syllabus and marking scheme for Four year UG (B.Sc.) Programme with Zoology Semester - I and semester – II is hereby approved for the session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2.
Subject Expert		3.
Representative from Industry/entrepreneur		4.
Student representative		5.
Other Prof. from Science faculty		6.
		7.
		8.

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)

SESSION 2022-23 & 2023-24

LEARNING OUTCOME BASED CURRICULAM
FOR 4YR UG (B.SC) PROGRAM WITH ZOOLOGY
SEMESTER-I, PAPER -I, Course Code – BZO101

Animal Diversity – I

Max. Marks: 75

Min. marks: 30

UNIT - I

- A. General Characteristics and Classification of phylum protozoa up to class
Protozoa – Type study: Paramecium
- B. General Characteristics and Classification of phylum porifera up to class
Porifera-
Type study: Sycon

UNIT - II

- A. General Characteristics and Classification of phylum Coelenterata up to class
Coelenterata – Type study: Obelia
- B. General Characteristics and Classification of phylum Platyhelminthes up to class
Platyhelminthes - Type study: Fasciola

UNIT - III

- A. General Characteristics and Classification of phylum Nematelminths up to class
Nematelminths – Type study: Ascaris:
- B. General Characteristics and Classification of phylum Annelida up to class
Annelids- Type study: Pheretima

UNIT - IV

1. General Characteristics and Classification of phylum Arthropoda up to class
Arthropods- Type study: Palaemon
2. General Characteristics and Classification of phylum Mollusca up to class
Mollusea- Type study: Pila

UNIT - V

1. General Characteristics and Classification of phylum Echinodermata up to class
Echinodermata- Type study: Asterias (Starfish)
2. General Characteristics and Classification of phylum Hemichordata up to class
Hemichordata – Type study: Balanoglossus

Recommended readings

- Barnes, R. S. K.; Calow, P.; Olive, P. J. W.; Golding, D. W.; Spicer, J. I. (2002) *The Invertebrates: a Synthesis*, Blackwell Publishing.
- Holland, P. (2011) *The Animal Kingdom: A Very Short Introduction*, Oxford University Press.
- Kardong, K.V. (2006) *Vertebrates: Comparative Anatomy, Function, Evolution* (4th edition), McGraw- Hill.
- Barrington, E.J.W. (1979) *Invertebrate Structure and Functions*. II Edition. E.L.B.S. and Nelson.
- Boradale, L.A. and Potts, E.A. (1961) *Invertebrates: A Manual for the use of Students*. Asia Publishing Home.
- Bushbaum, R. (1964) *Animals without Backbones*. University of Chicago Press.

Course Outcomes:

After successful completion the student would be able to:

- CO1: Explain the importance of classification of invertebrate animals and classifies them effectively using the six levels of classification.
- CO2: Understand the Systematic position, habit and habitat, morphology and various systems in type animals from each phylum of invertebrate.
- CO3: Comprehend and analyze the adaptive changes that have occurred in invertebrates.
- CO4: Explain the affinities and inter-relationship between two phyla.

The syllabus for Four year UG (B.Sc.) Programme with Zoology Semester - I is hereby approved for the session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2.
Subject Expert		3.
Representative from Industry/entrepreneur		4.
Student representative		5.
Other Prof. from Science faculty		6.
		7.
		8.

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2022-23 & 2023-24
4YR UG (B.SC) PROGRAM WITH ZOOLOGY
SEMESTER-I,
Lab. Course - I, Course Code – BZOL101

The practical work in general shall be based on the syllabus prescribed. The students will be required to show the knowledge of the following:

1. Study of the representative examples of the different non-chordates through specimens and permanent slides.
2. Dissection of Earthworm, Palemone and Pila by alternative method.
3. Study of different larval forms of Invertebrates.
4. Study of Economically Important Invertebrate.

Scheme of Practical Exam

Time- 3.30 Hrs.

Max. M - 25

Min. M. - 10

SN	Practical	Marks
1.	Major Dissection	05
2.	Minor Dissection	03
3.	Larval forms/Economically Important Invertebrate	03
4.	Spotting	08
5.	Viva-voce	02
6.	Sessional	04








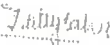




Course Outcomes

After successful completion of these courses the student would be able to:

- CO1: gain knowledge of importance of classification of invertebrate animals and classifies them effectively using the six levels of classification
- CO2: Remember the structure and function of different functional system of vertebrates.
- CO3: Understand the importance of conservation
- CO4: Explain the need of adaptation in different groups of invertebrate animals.

The syllabus and marking scheme for Four year UG (B.Sc.) Programme with Zoology semester – I practical is hereby approved for the session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2. 
Subject Expert		3. 
Representative from Industry/entrepreneur		4. 
Student representative		5. 
Other Prof. from Science faculty		6. 
		7.
		8. 

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2022-23 and 2023-24
LEARNING OUTCOME BASED CURRICULAM
FOR 4YR UG (B.SC) PROGRAM
WITH ZOOLOGY
SEMESTER-II
PAPER -I, Course Code – BZO201
Animal Diversity – II

Max. Marks: 75

Min. marks: 30

UNIT - I

- A. Primitive chordates and their affinities.
- B. General Characteristics and Classification of Protochordata
- C. Type study: Amphioxus

UNIT – II

- A. General Characteristics and Classification of Cyclostomes
 - Affinities of cyclostome
 - Comparative account of Petromyzon and Myxine
- B. General Characteristics, Classification and Basic organization of Pisces.
 - Migration in fishes
 - Parental care in fishes

UNIT – III

- A. General Characteristics and Classification of Amphibia
- B. Origin of Tetrapoda
- C. Parental care in amphibia
- D. Adaptability to dual mode of life

UNIT – IV

- A. General Characteristics and Classification of Reptilia
- B. Adaptive radiation in reptiles
- C. Poisonous and non-poisonous snake, Poison apparatus, biting mechanism and snake venom

UNIT – V

- A. General Characteristics and Classification of Aves
 - Archaeopteryx
 - Adaptation for aerial mode of life
 - Migration in birds
- B. General Characteristics and Classification of Mammalia
 - Origin of Mammals
 - Comparative account of Prototheria, Metatheria and Eutheria

Recommended readings

- Barnes, R. S. K.; Calow, P.; Olive, P. J. W.; Golding, D. W.; Spicer, J. I. (2002) The Invertebrates: a Synthesis, Blackwell Publishing.
- Hickman, C.; Roberts, L.S.; Keen, S.L.; Larson, A. and Eisenhour, D. (2018) Animal Diversity, McGraw-Hill.
- Holland, P. (2011) The Animal Kingdom: A Very Short Introduction, Oxford University Press.
- Kardong, K.V. (2006) Vertebrates: Comparative Anatomy, Function, Evolution (4th edition), McGraw- Hill.
- Barrington, E.J.W. (1979) Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
- Boradale, L.A. and Potts, E.A. (1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.
- Bushbaum, R. (1964) Animals without Backbones. University of Chicago Press.















Course Outcomes

After successful completion the student would be able to:

- CO1: Learn the importance of classification of vertebrate animals and classifies them effectively using the six levels of classification.
- CO2: Understand the Systematic position, habit and habitat, morphology and various systems in type animals from each phylum of vertebrate.
- CO3: Comprehend and analyze the adaptive changes that have occurred in vertebrates.
- CO4: Explain the process of adaptation to a specific habitat and types of parental care in vertebrates.

The syllabus for Four year UG (B.Sc.) Programme with Zoology and semester – II is hereby approved for the session 2022-23 and 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2. 
Subject Expert		3. 
Representative from Industry/entrepreneur		4. 
Student representative		5. 
Other Prof. from Science faculty		6. 
		7. 
		8. 

GOVT.V.Y.T, PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2022-23 & 2023-24
4YR UG (B.SC) PROGRAM WITH ZOOLOGY
SEMESTER-II
Lab. Course - II, Course Code – BZOL201

The practical work in general shall be based on the syllabus prescribed. The students will be required to show the knowledge of the following:

1. Study of the representative examples of the different chordates through specimens
2. Study of the representative examples of the different chordates through permanent slides.
3. Preparation of Permanent mounts.
4. Study of aerial, aquatic and terrestrial adaptation.
5. Study of Morphological Characteristics of snake.

Scheme of Practical Exam

Time- 3.30 Hrs.

Max. M - 25

Min. M. - 10

SN	Practical	Marks
1.	Spotting	08
2.	Experiment based on Adaptation	03
3.	Snake Identification	03
4.	Identification of connecting links	03
5.	Viva-voce	03
6.	Sessional	05

List of Experiments

1. Study of the representative examples of the different chordates through specimens and slides.
2. Study of aerial, aquatic and terrestrial adaptation.
3. Identification of poisonous and non-poisonous snakes.
4. Study of representatives of the connecting links between two phyla.

Course Outcomes

After successful completion of these courses the student would be able to:

- CO1: Gain knowledge of importance of classification of vertebrate animals and classifies them effectively using the six levels of classification
- CO2: Remember the structure and function of different functional system of vertebrates.
- CO3: Understand the importance of conservation
- CO4: Explain the need of adaptation in different groups of vertebrate animals.

The syllabus and marking scheme for Four year UG (B.Sc.) Programme with Zoology semester – II practical is hereby approved for the session 2022 – 23 & 2023-24.

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2.
Subject Expert		3.
Representative from Industry/entrepreneur		4.
Student representative		5.
Other Prof. from Science faculty		6.
		7.
		8.

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2023-24
LEARNING OUTCOME BASED CURRICULAM
FOR 4YR UG (B.SC) PROGRAM
WITH ZOOLOGY
SEMESTER-III,
PAPER -I, Course Code – BZO301
Comparative Anatomy and Physiology of Vertebrates

Max. Marks: 75

Min. marks: 30

UNIT-1

1. Integument and its derivatives: Structure of Scales, Hair and Feathers
2. Alimentary canal and Digestive glands in Vertebrates
3. Physiology of digestion

UNIT- 2

1. Endoskeleton –
 - (a) Axial Skeleton: Skull and vertebrae
 - (b) Appendicular skeleton: Limbs and Girdles

UNIT – 3

1. Respiratory organs: Gills and lungs, Air sac in birds
2. Mechanism and control of breathing
3. Circulatory System-Evolution of Heart and Aortic Arches
4. Cardiac cycle

UNIT – 4

1. Urino-genital System –Kidney and Excretory ducts
2. Physiology of excretion and osmoregulation
3. Nervous system –General plan of Brain and Spinal Cord
4. Physiology of Nerve conduction and Synaptic transmission

UNIT -5

1. Gonads and Genital ducts
2. Ear and Eye of human: Structure and function
3. Physiology of muscle contraction

Recommended readings

- Animal Physiology (W.H. Freeman) Eckest,R:
- Analysis of Vertebrate structure, Hildbrand;
- Outline of Comparative anatomy (Central Book Depot), Kingsley:
- The Vertebrate body (Saunders), Rouer & Parsons:
- Biology of the Vertebrates (Mac-Milan), Walta & Gyles
- Holland, P. (2011) The Animal Kingdom: A Very Short Introduction, Oxford University Press.
- Kardong, K.V. (2006) Vertebrates: Comparative Anatomy, Function, Evolution (4th edition), McGraw- Hill.





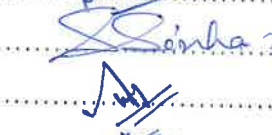




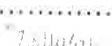



Course Outcomes

After successful completion the student would be able to:

- CO1: To learn and analyze the adaptive changes that have occurred in different group of vertebrates
- CO2: To comprehend the process of development in different organ systems during the evolution in vertebrates
- CO3: To explain the comparative anatomy of various organ systems of vertebrates
- CO4: To evaluate the physiological functioning of different organs.

The syllabus for Four year UG (B.Sc.) Programme with Zoology and semester – III is hereby approved for the session 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1. 
Subject Expert		2. 
Subject Expert		3. 
Representative from Industry/entrepreneur		4. 
Student representative		5. 
Other Prof. from Science faculty		6. 
		7.
		8.

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2023-24
4YR UG (B.SC) PROGRAM WITH ZOOLOGY
SEMESTER-III,
Lab. Course - III, Course Code – BZOL301

The practical work in general shall be based on the syllabus prescribed. The students will be required to show the knowledge of the following:

1. Major dissection –Study of cranial nerves and efferent branchial arteries in Scoliodon
2. Minor dissection –Study of Afferent branchial arteries and Internal ear in scoliodon
3. Permanent mounting of fish scale
4. Spotting: Study of permanent slides and bones based on theory syllabus

Scheme of Practical Exam

Time- 3.30 Hrs.

Max. M - 25

Min. M. - 10

SN	Practical	Marks
1.	Major Dissection	05
2.	Minor Dissection	03
3.	Permanent Mounting	02
4.	Spotting	08
5.	Viva-voce	02
6.	Sessional	05

List of Experiments

1. Major dissection –Study of Cranial Nerves and efferent branchial arteries in Scoliodon by alternative method
2. Minor dissection –Study of Afferent branchial arteries and Internal ear in scoliodon by alternative method
3. Permanent mounting of fish scale (Placoid, Cycloid, and Ctenoid Scale)
4. Spotting: Study of permanent slides and bones of vertebrates based on theory syllabus








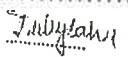

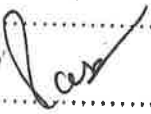



Course Outcomes

After successful completion of these courses the student would be able to:

- CO1: To learn and analyze the adaptive changes that have occurred in different group of vertebrates
- CO2: Remember the structure and function of different system of vertebrates.
- CO3: Understand the importance of different body systems in vertebrates
- CO4: Explain the need of adaptation in different groups of vertebrate animals.

The syllabus and marking scheme for Four year UG (B.Sc.) Programme with Zoology semester – III practical is hereby approved for the session 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
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Student representative		5. 
Other Prof. from Science faculty		6. 
		7. 
		8. 

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2023-24
LEARNING OUTCOME BASED CURRICULAM
FOR 4YR UG (B.SC) PROGRAM
WITH ZOOLOGY
SEMESTER-IV,
PAPER -I, Course Code – BZO401
Cell Biology and Genetics

Max. Marks: 75

Min. marks: 30

UNIT-I

Prokaryotic and Eukaryotic cell

Structure and functions of cell organelles: Plasma membrane, Endoplasmic reticulum, Golgi body, Mitochondria, Lysosome, Ribosomes Structure and functions of Nucleus- Nuclear membrane, Nucleolus, Chromosome structure, Polytene chromosome, Lamp brush chromosome, Euchromatin, Heterochromatin, Barr body

UNIT-II

Cell cycle and cell division

Cell Transformation – Characteristic of malignant cell, Types of Cancer, Factors responsible for cancer formation, Oncogenes, Tumour suppressor gene, symptoms and treatment of cancer

UNIT III

Linkage and Linkage Maps, Sex determination, Crossing over, Mutation

Mendel's law and Gene interaction- Incomplete dominance and Codominance, Supplementary gene, Complementary gene, Epistasis, Multiple alleles

Chrosomal Abberation– Down Syndrome, Edward syndrome, Patau syndrome, Turner syndrome, Klinefilter syndrome.

Single Gene Disorders- Alkaptonuria, Phenylketonuria, Sickle cell anaemia, albinism, colourblindess, haemophilia.

UNIT- IV

Structure of DNA and RNA,

Replication of DNA

Concept of gene (Fine structure of the Gene- Cistron, muton and recon.)

UNIT V

Gene regulation: Concept of operon - Lac operon

Gene expression- Transcription and post transcriptional modifications, (methylation, polyadenylation, RNA splicing.)

Translation (Genetic code and its properties; process of translation Initiation, elongation and termination. Post-translational modifications of proteins)

Recommended readings

- Unified Zoology by V.K. Tiwari
- Unified Zoology by H.N. Baijal
- Cell Biology by C.B. Powar

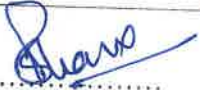






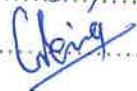
Course Outcomes

After successful completion the student would be able to:

- CO1: To learn the importance of cell as a structural and functional unit of life
CO2: To understand the difference between prokaryotic and eukaryotic system
CO3: To comprehend the structure and function of different cell organelles with cell division
CO4: To understand the general idea about cellular immunity and cell transformation

The syllabus for four year UG (B.Sc.) Programme with Zoology and semester – IV is hereby approved for the session 2023-24

Name and Signatures

Chairperson /H.O.D	Departmental members
	1.
University Nominee	2. 
Subject Expert	3. 
Subject Expert	4. 
Representative from Industry/entrepreneur	5. 
Student representative	6. 
Other Prof. from Science faculty	7. 
	8. 

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2023-24
4YR UG (B.SC) PROGRAM WITH ZOOLOGY
SEMESTER - IV
Lab. Course - IV, Course Code – BZOL401

The practical work in general shall be based on the syllabus prescribed. The students will be required to show the knowledge of the following:

1. Study of morphology and sexual dimorphism in *Drosophila*
2. Staining of Mitochondria and Barr Body
3. Study of Mitosis cell division in onion root tip and Meiosis cell division in grasshopper testes.
4. Study of permanent slides of cell division

Scheme of Practical Exam

Time- 3.30 Hrs.

Max. M - 25

Min. M. – 10

SN	Practical	Marks
1.	Identification of mutants in <i>drosophila</i> /Squash preparation	05
2.	Staining of Barr body/Mitochondria	05
3.	Spotting -04 (Identification of mitosis and meiosis stages)	08
4.	Viva-voce	02
5.	Sessional	05

List of Experiments

2. Culturing and Handling of *Drosophila*:
3. Morphology and Sexual dimorphism of *Drosophila*
4. Study of at least five types of *Drosophila*: a) Body color mutant- Ebony body and Yellow body. b) Wing mutant- Curly wing and vestigial wing. c) Eye colour mutant- Bar eye, White eye, Sepia eye.

5. Dissection of Salivary glands and Preparation of Polytene chromosome (comment on diagram)
6. Vital staining of mitochondria (Genus green B staining)
7. Staining of Barr body
8. Squash preparation of onion root tip for study of mitosis.
9. Study of meiosis in grasshopper testes.
10. Study of permanent slides of mitosis and meiosis

Course Outcomes

After successful completion of these courses the student would be able to:

CO1: To learn the importance of cell as a structural and functional unit of life

CO2: To understand the difference between prokaryotic and eukaryotic system

CO3: To comprehend the structure and function of different cell organelles with cell division

CO4: To understand the general idea about cellular immunity and cell transformation

The syllabus and marking scheme for Four year UG (B.Sc.) Programme with Zoology semester – IV practical is hereby approved for the session 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2.
Subject Expert		3.
Representative from Industry/entrepreneur		4.
Student representative		5.
Other Prof. from Science faculty		6.
		7.
		8.

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
SESSION 2022-23 & 2023-24
FOR 4YR UG (B.SC) PROGRAM WITH ZOOLOGY
SKILL ENHANCEMENT COURSE
SEMESTER-I, Course Code – SEC02,
VERMICOMPOSTING

Max. Marks:25

Min. marks: 10

- Introduction to vermicomposting
- Identification of earthworm
- Bed/pit preparation,
- Inoculation of earthworm
- Maintenance of Bed
- Vermiwash collection and its use
- Vermicompost collection, packaging, storage and marketing
- Separation of earthworms
- Nutritional value of Vermicompost and vermiwash
- Importance of Vermicompost

Course Outcomes

After successful completion of these courses the student would be able to:

CO1: Cultivate skills to understand vermiculture

CO2: Learn the techniques of composting in a limited space

CO3: Develop technical skills on harvesting and management of vermicopost

CO4: Understand the scope of vermicomposting as entrepreneurship

The syllabus for skill enhancement course on vermicomposting is hereby approved for the Session 2022-23 & 2023-24

Name and Signatures

<p>Chairperson /H.O.D <i>[Signature]</i></p> <p>.....</p> <p>University Nominee <i>[Signature]</i></p> <p>.....</p> <p>Subject Expert <i>[Signature]</i></p> <p>.....</p> <p>Subject Expert <i>[Signature]</i></p> <p>.....</p> <p>Representative from Industry/entrepreneur <i>[Signature]</i></p> <p>.....</p> <p>Student representative <i>[Signature]</i></p> <p>.....</p> <p>Other Prof. from Science faculty <i>[Signature]</i></p> <p>.....</p>	<p style="text-align: center;">Departmental members</p> <p>1.</p> <p>2. <i>[Signature]</i></p> <p>3. <i>[Signature]</i></p> <p>4. <i>[Signature]</i></p> <p>5. <i>[Signature]</i></p> <p>6. <i>[Signature]</i></p> <p>7. <i>[Signature]</i></p> <p>8. <i>[Signature]</i></p>
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GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)

SESSION 2022-23 & 2023-24

FOR 4YR UG (B.SC) PROGRAM WITH ZOOLOGY

SKILL ENHANCEMENT COURSE

SEMESTER-I

Field Demonstration, Course Code – SECL02

VERMICOMPOSTING

Max. Marks:25

Min. marks: 10

- | | | |
|--|----|--|
| • Earthworm Identification | 05 | |
| • Bed/pit preparation, Inoculation of earthworm and Maintenance of Bed | 10 | |
| • Vermiwash collection and its use | 05 | |
| • Vermicompost collection, packaging and storage | 05 | |

Course Outcomes

After successful completion of these courses the student would be able to:

CO1: cultivate skills to understand vermiculture

CO2: learn the techniques of composting in a limited space

CO3: develop technical skills on harvesting and management of vermicopost

CO4: understand the scope of vermicomposting as entrepreneurship Separation of earthworms

The syllabus for skill enhancement field demonstration course on vermicomposting is hereby approved for the Session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D		Departmental members
University Nominee		1.
Subject Expert		2.
Subject Expert		3.
Representative from Industry/entrepreneur		4.
Student representative		5.
Other Prof. from Science faculty		6.
		7.
		8.

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
 SESSION 2022-23 & 2023-24
 FOR 4YR UG (B.SC) PROGRAM WITH ZOOLOGY
 SKILL ENHANCEMENT COURSE
 SEMESTER-I, Course Code – SEC01
 GOOD LABORATORY PRACTICES IN ZOOLOGY

Max. Marks:25

Min. marks: 10

- General Safety Guidelines
- Laboratory outfit
- Handling of hazardous chemicals
- Safe usages of equipments
- Cleaning and drying of glassware
- Cleaning and drying of plasticware
- Sterilization of lab wares
- Preparation of solutions: Molar, Molal and Normal solution
- Preparation of stock solution and dilution series.
- Maintenance and calibration of Instruments (pH meter, Centrifuge and Spectrophotometer)







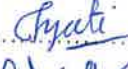


Course Outcome:

After successful completion of the course, students are expected to be able to:

- CO1: understand about the laboratory safety rules
- CO2: get the knowledge about laboratory ethics
- CO3: develop skill of maintaining a safe laboratory
- CO4: Explain the basic principles of laboratory instruments.

The syllabus for skill enhancement course on Good Laboratory Practices in Zoology is hereby approved for the Session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D	Departmental members
..... 	1.
University Nominee	2. 
.....	3. 
Subject Expert	4. 
.....	5. 
Subject Expert	6. 
.....	7. 
Representative from Industry/entrepreneur	8. 
.....	
Student representative	
.....	
Other Prof. from Science faculty	
..... 	

GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)
 FOR 4YR UG (B.SC) PROGRAM WITH ZOOLOGY
 SKILL ENHANCEMENT COURSE
 SEMESTER-I, SESSION 2022-23 & 2023-24
 Lab. Demonstration, Course Code – SECL01
 GOOD LABORATORY PRACTICES IN ZOOLOGY

Max. Marks:25

Min. marks: 10

- | | | |
|--|----|----|
| • Cleaning and drying of glassware | 05 | |
| • Cleaning and drying of plasticware | | 05 |
| • Sterilization of lab wares | 05 | |
| • Preparation of solutions: Molar, Molal and Normal solution | | 05 |
| • Preparation of dilution series | | 05 |

Course Outcome:

After successful completion of the course, students are expected to be able to:

CO1: Get acquainted with knowledge about laboratory safety rules.

CO2: Understand the protocols of laboratory ethics

CO3: Develop skill to operate and maintain the sophisticated instruments.

CO4: Explain the basic principles and applications of the lab. Equipment.

The syllabus for skill enhancement Lab. course on Good Laboratory Practices in Zoology is hereby approved for the Session 2022-23 & 2023-24

Name and Signatures

Chairperson /H.O.D	Departmental members
..... University Nominee	1.....
..... Subject Expert	2.....
..... Subject Expert	3.....
..... Representative from	4.....
Industry/entrepreneur	5.....
.....	6.....
Student representative	7.....
.....	8.....
Other Prof. from Science faculty	