

# Revised Syllabus

## DEPARTMENT OF ZOOLOGY COURSE CURRICULUM & MARKING SCHEME

### B.Sc. I & II Semester ZOOLOGY

(Based on Choice Based Credit System)

SESSION : 2022-23



ESTD : 1958

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

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

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

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## **B. Sc. WITH ZOOLOGY**

[B.Sc (CBZ), B.SC (CZBc), B.Sc (CZBt), B.Sc (CZAn)  
B.Sc(CZGl), B.Sc(CZlc)]

**Appendix-II**

**Table: A Sample UGCF 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)		Choose one from a pool of courses GE-1 (4)	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)		Choose one from a pool of courses (2)	22 Credits
	DSC B 1-(4)							
	DSC C 1-(4)							
II	DSC A 2-(4)		Choose one from a pool of courses GE-2 (4)	Choose one from a pool of AEC courses (2)	Choose one from a pool of courses (2)		Choose one from a pool of courses (2)	22 Credits
	DSC B 2-(4)							
	DSC C 2-(4)							
<i>Students on each 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 3-(4)	Choose one from a pool of courses DSE A,B,C (4) Or Choose one from a pool of courses GE-3(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 (2)	22 Credits
	DSC B 3-(4)							
	DSC C 3-(4)							
IV	DSC A 4-(4)	Choose one from a pool of courses DSE A,B,C (4) Or Choose one from a pool of courses GE-4(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 (2)	22 Credits
	DSC B 4-(4)							
	DSC C 4-(4)							
<i>Students on each 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 5-(4)	Choose one from a pool of courses DSE A/B/C (4)	Choose one from a pool of courses GE-5 (4)	Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)				22 Credits
	DSC B 5-(4)							
	DSC C 5-(4)							
VI	DSC A 6-(4)	Choose one from a pool of courses DSE A/B/C (4)	Choose one from a pool of courses GE-6 (4)	Choose one SEC (2) OR Internship/Apprenticeship/Project/community outreach (2)				22 Credits
	DSC B 6-(4)							
	DSC C 6-(4)							
<i>Students on each 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(3x4) courses OR Choose two DSE-(2x4) and one GE(4) course OR Choose one DSE and two GE(4) courses OR All three GE 7, 8 & 9(total=12)					Dissertation (6)	22 credits
VIII	DSC A/B/C(4)	Choose three DSE(3x4) courses OR Choose two DSE-(2x4) and one GE(4) course OR Choose one DSE and two GE(4) courses OR All three GE 10, 11 & 12(total=12)					Dissertation (6)	22 credits
<i>Students on each 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>								
								<b>Total = 176 Credits</b>

**Note:**

1. In 1<sup>st</sup> semester Hindi Language, 2<sup>nd</sup> semester English Language and Environmental studies in 3<sup>rd</sup> and 4<sup>th</sup> 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**

**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**

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

The syllabus with the paper combinations is as under:

**B.Sc. Semester - I**

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

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

<b>GEC Pool – (Choose any one)</b> <b>01 – Developmental and Reproductive Biology</b>	3	Demonstration in each GEC course	1
<b>SEC Pool – (Choose any one)</b> <b>01 – Good laboratory Practices in Zoology</b>	1	Demonstration in each SEC course	1

<b>B.Sc. Semester - VII</b>			
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<b>DSC Pool – (Choose any one from pool of A/B/C) - BZO701</b> Ecology and wildlife conservation	3	<b>Lab Course V: Lab Course BZOL701</b>	1
<b>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)</b> <b>DSE – BZO702</b> Aquatic Zoology	3	<b>Lab Course V: Lab Course BZOL702</b>	1
<b>DSE – BZO703</b> Endocrinology, behaviour and Evolution	3	<b>Lab Course V: Lab Course BZOL703</b>	1
<b>GEC Pool – (Choose any one)</b> <b>01 – Ecology and wildlife conservation</b>	3	Demonstration in each GEC course	1
<b>Dissertation</b>	6		

<b>B.Sc. Semester - VIII</b>			
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<b>DSC – BZO801</b> Ichthyology	3	<b>Lab Course VIII: Lab Course BZOL801</b>	1
<b>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)</b>	3	<b>Lab Course VIII: Lab Course BZOL802</b>	1

<b>DSE – BZO802</b> Applied Zoolgy			
<b>DSE – BZO 803</b> Ecology and wildlife conservation	3	<b>Lab Course VIII: Lab Course</b> BZOL804	1
<b>GEC Pool – (Choose any one)</b> GEC – BZO801 Ichthyology	3	<b>Lab Course VIII: Lab Course</b> BZOL801	1
<b>Dissertation</b>	6		



**Marking Scheme**  
**4Yr UG Program**  
**B.Sc.(Multidisciplinary) with Zoology**  
**CBCS Pattern**  
**Session - 2022-23**  
**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	BZOSC01	75	30
SEC	BZOSLC01	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 1 (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	
SEC1	2	50	40	10	84%	9	18	
<b>Total</b>	<b>22</b>	<b>450</b>	<b>280</b>		<b>560</b>	<b>62</b>	<b>178</b>	

CGPA of an Academic Yr =  $\frac{SGPA1 + AGPA2}{2}$  or  $\frac{(SGPA1 + SGPA2 + \dots + SGPA_n)}{n}$ ,  
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

Name and Signatures

Chairperson /H.O.D <i>Dr. A. Hundait</i>	<b>Departmental members</b> 1. <i>Dang</i> 2. 3. 4. <i>Sinha</i> 5. <i>My</i> 6. <i>Jyoti</i> 7. 8. 
University Nominee <i>Tamboli</i>	
Subject Expert <i>Dr. R.K. Tamboli</i>	
Subject Expert <i>P. S. V.</i>	
Representative from Industry/entrepreneur <i>entrepreneur</i>	
Student representative <i>Dalysahy</i>	
Other Prof. from Science faculty <i>Das</i>	

**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**

Semester	Course code/Title of the Paper	Marks Allotted in Theory		
		Max	Min	
I	<b>Core Course</b> BZO101/Animal Diversity - I	75	30	
	BZOL101: Lab. Course - I	25	10	
	<b>SEC Pool – (Choo POOL - Choose any one)</b> 01 – Good Laboratory Practices	25	10	
	Lab. Demonstration	25	10	
	<b>Generic Elective</b> BZO101/Animal Diversity – I	75	30	
	BZOL101: Lab. Course – I	25	10	
	<b>Value Added – (Choose any one)</b> 01 - Sports	25	10	
	Demonstration	25	10	
	II	BZO201/ Animal Diversity - II	75	30
		BZOL201: Lab. Course - II	25	10
<b>GEC Pool – (Choose any one)</b> 01 - Animal Diversity - II		75	30	
Lab. Demonstration		25	10	
<b>SEC Pool – (Choose any one)</b> 01 – Vermicomposting		25	10	
Lab. Demonstration		25	10	
<b>Value Added – (Choose any one)</b> 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
<b>Total Marks</b>	-	<b>300</b>

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

#### Name and Signatures

Chairperson /H.O.D ..... University Nominee Dr. A. Hundait Subject Expert Dr. R.K. Tamboli Subject Expert Dr. R.P. Dixit Representative from Industry/entrepreneur Dr. Belchandani Student representative Dolly Sahu Other Prof. from Science faculty .....	Departmental members 1. .... 2. .... 3. .... 4. .... 5. .... 6. .... 7. .... 8. ....
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**GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)  
SESSION 2022-26**

**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  
Mollusca- 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.

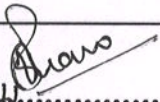

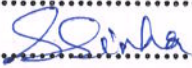




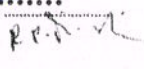

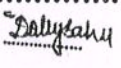
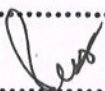
### Course Outcomes:

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 phylums.

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

### Name and Signatures

Chairperson /H.O.D ..... Dr. USHA SAHAI 	Departmental members 1. ....  2. .... 3. .... 4. ....  5. ....  6. .... 7. .... 8. .... 
University Nominee ..... Dr. A. Haudait 	
Subject Expert ..... Dr. R. K. Tamboli 	
Subject Expert ..... Dr. R. P. Dixit 	
Representative from Industry/entrepreneur ..... Dr. Belchandan 	
Student representative ..... Dolly sahu 	
Other Prof. from Science faculty ..... 	
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**GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)**  
**SESSION 2022-23**  
**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 arial, aquatic and terrestrial adaptation.

**Scheme of Practical Exam**

**Time- 3.30 Hrs.**

**Max. M - 25**

**Min. M. - 10**

<b>SN</b>	<b>Practical</b>	<b>Marks</b>
1.	Major Dissection	05
2.	Minor Dissection	03
3.	Adaptation	02
4.	Spotting	08
5.	Viva-voce	02
6.	Sessional	05

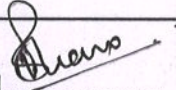

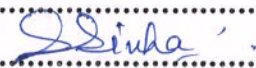




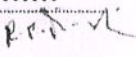

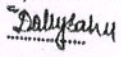
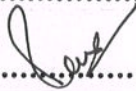
## Course Outcomes

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.

Name and Signatures

Chairperson /H.O.D Dr. USHASAHU 	Departmental members 1.  2. .... 3. .... 4.  5.  6. .... 7. .... 8. 
University Nominee Dr. A. Hundait 	
Subject Expert Dr. R. K. Tambali 	
Subject Expert Dr. R. P. Dixit 	
Representative from Industry/entrepreneur Mr. Belchandan 	
Student representative Dolly Salun 	
Other Prof. from Science faculty 	
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**GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)**  
**SESSION 2022-26**  
**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 arial 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.

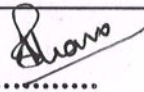
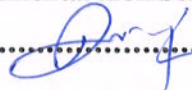
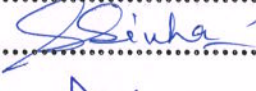



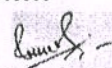
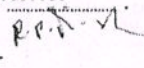


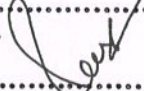
### Course Outcomes

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

### Name and Signatures

Chairperson /H.O.D Dr. USHA SAHU 	Departmental members 1.  2. 3. 4.  5.  6. 7. 8. 
University Nominee Dr. A. Hundait 	
Subject Expert Dr. R. K. Tamboli 	
Subject Expert Dr. R. P. Dixit 	
Representative from Industry/entrepreneur Mr. Belchandan 	
Student representative Dolly Sahu 	
Other Prof. from Science faculty 	
.....	
.....	

**GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)**  
**SESSION 2022-23**  
**4YR UG (B.SC) PROGRAM WITH ZOOLOGY**  
**SEMESTER-I,**  
**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. Dissection of Scoliodon by alternative method.
4. Preparation of Permanent mounts.

**Scheme of Practical Exam**

**Time- 3.30 Hrs.**

**Max. M - 25**

**Min. M. - 10**

<b>SN</b>	<b>Practical</b>	<b>Marks</b>
1.	Major Dissection	05
2.	Minor Dissection	03
3.	Preparation of permanent slide	02
4.	Spotting	08
5.	Viva-voce	02
6.	Sessional	05

## 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.

### Name and Signatures

Chairperson /H.O.D Dr. USHA SAHU	Departmental members 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____
University Nominee Dr. A. Hundarik	
Subject Expert Dr. R. K. Tamboli	
Subject Expert Dr. R. P. Dixit	
Representative from Industry/entrepreneur Mr. Belchandran	
Student representative Dallysahu	
Other Prof. from Science faculty Jay	

**GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)**  
**SESSION 2022-26**  
**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

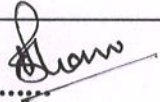


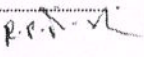

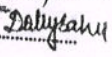






**Course Outcomes**

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

**Name and Signatures**

<p><b>Chairperson /H.O.D</b>            Dr. USHA SAHU </p> <p><b>University Nominee</b>            Dr. A. Hundait </p> <p><b>Subject Expert</b>            Dr. R. K. Tamboli </p> <p><b>Subject Expert</b>            Dr. R. P. Dixit </p> <p><b>Representative from Industry/entrepreneur</b>            Mr. Belchandan </p> <p><b>Student representative</b>            Dolly Sahu </p> <p><b>Other Prof. from Science faculty</b>  </p>	<p style="text-align: center;"><b>Departmental members</b></p> <p>1. </p> <p>2. ....</p> <p>3. ....</p> <p>4. </p> <p>5. </p> <p>6. ....</p> <p>7. </p> <p>8. </p>
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**SESSION 2022-26**  
**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

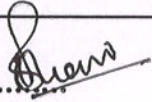
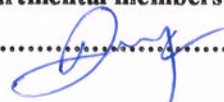

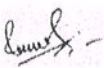
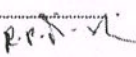

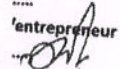





CO2: learn the techniques of composting in a limited space

CO3: develop technical skills on harvesting and management of vermicopost

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

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

**Name and Signatures**

Name and Signatures	Departmental members
Chairperson /H.O.D Dr. USHA SAHU 	1. 
University Nominee Dr. A. Hundair 	2. ....
Subject Expert Dr. R. K. Tamboli 	3. ....
Subject Expert Dr. R. P. Dixit 	4. 
Representative from Industry/entrepreneur Mr. Belchandan 	5. 
Student representative Dolly Sahu 	6. ....
Other Prof. from Science faculty 	7. 
.....	8. 

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**SESSION 2022-26**  
**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)

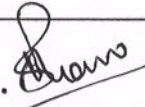


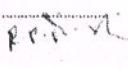
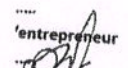
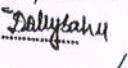

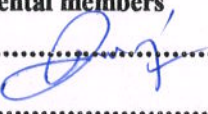




**Course Outcome:**

**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

Name and Signatures

<p><b>Chairperson /H.O.D</b>                  ..... Dr. USHASAHI </p> <p><b>University Nominee</b>                  ..... Dr. A. Hundair </p> <p><b>Subject Expert</b>                  ..... Dr. R. K. Tamboli </p> <p><b>Subject Expert</b>                  ..... Mr. R. P. Dixit </p> <p><b>Representative from Industry/entrepreneur</b>                  ..... Mr. Belchandan </p> <p><b>Student representative</b>                  ..... Dolly Sahu </p> <p><b>Other Prof. from Science faculty</b>                  ..... </p>	<p><b>Departmental members</b></p> <p>1. .... </p> <p>2. ....</p> <p>3. ....</p> <p>4. .... </p> <p>5. .... </p> <p>6. ....</p> <p>7. .... </p> <p>8. .... </p>
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**GOVT.V.Y.T. PG AUTONOMOUS COLLEGE, DURG (CG)**  
**FOR 4YR UG (B.SC) PROGRAM WITH ZOOLOGY**  
**SKILL ENHANCEMENT COURSE**  
**SEMESTER-I, SESSION 2022-26**  
**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 acquaintant 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

**Name and Signatures**

<p><b>Chairperson /H.O.D</b>                  ..... <i>Dr. Usha Sahy</i> .....</p> <p><b>University Nominee</b>                  ..... <i>Dr. A. Hundair</i> .....</p> <p><b>Subject Expert</b>                  ..... <i>Dr. R. K. Tambali</i> .....</p> <p><b>Subject Expert</b>                  ..... <i>Dr. R. P. Dixit</i> .....</p> <p><b>Representative from</b>  <b>Industry/entrepreneur</b>                  ..... <i>Dr. Belchandan</i> .....</p> <p><b>Student representative</b>                  ..... <i>Dolly Sahy</i> .....</p> <p><b>Other Prof. from Science faculty</b>                  .....</p>	<p style="text-align: center;"><b>Departmental members</b></p> <p>1. .... <i>[Signature]</i> .....</p> <p>2. .... .....</p> <p>3. .... .....</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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