



SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)

SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)
MASTER OF SCIENCE IN ZOOLOGY



National Education policy-2020
(Effective from session 2024-25)



SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)

Programme Outcomes

On completion of programme students will be able to

- To give comprehensive understanding about the principles of taxonomy, cellular and molecular biology, genetics, ecology and evolution
- To acquire knowledge on the various aspects of zoological sciences, cell biology, genetics, taxonomy, physiology, applied zoology, general embryology and public health
- To recognize the scientific facts behind natural phenomena
- To develop insight and improve their analytical communication and professional skills
- To understand the applications of zoological sciences in Biotechnology, Apiculture, Poultry, Fisheries, Aquaculture, Agriculture and vermiculture
- To gained the knowledge to use modern sophisticated equipment's and tools



SHRI DAVARA UNIVERSITY NAYA RAIPUR (C.G.)

Faculty of Science

Two Years M. Sc.

Programme Scheme of Teaching and Examination

M. Sc. III Semester Zoology

(Effective from the Academic Year 2024-2025)

SN	Course Code	Course Title	Hours/Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs.)
			L	T	P		Continuous Evaluation	Sem. End Exam	Total	
1.	DUZOC301	Paper I: COMPARATIVE ANATOMY OF VERTEBRATES	4	1	-	5	30	70	100	3
2.	DUZOC302	Paper II: BIOSTATISTICS.	4	1	-	5	30	70	100	3
3.	DUZOC303	Paper III: POPULATION ECOLOGY	4	1	-	5	30	70	100	3
4.	DUZOC304	Paper IV: ECONOMY ZOOLOGY	4	1	-	5	30	70	100	3
5.	DUZOP305	Lab course: I (Combining Paper I and II)	-	-	4	2	30	70	100	5
6.	DUZOP306	Lab Course: II (Combining Paper III and IV)	-	-	4	2	30	70	100	5
TOTAL						24			600	



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Course Title	Paper I: COMPARATIVE ANATOMY OF VERTEBRATES				
Course Code	DUZOC301				
Course Credits	L	T	P	Details	
	4	1		5	
Prerequisites	Nil				
Course objectives	To understand the evolution of Vertebrates.				
Course Contents	UNIT –I ☐ Origin of Chordates. ☐ Diversity and Evolution of Vertebrates. ☐ Classification of Amphibia, Reptilia, Aves and Mammals (up to orders). UNIT –II ☐ Hard and Soft derivatives of skin. ☐ Comparative account on skin structure in vertebrates. ☐ Comparative account of Skeletal System of Vertebrates. UNIT –III ☐ Evolution of heart in vertebrates. ☐ Evolution of Aortic Arches and Portal System. ☐ Comparative account on circulatory systems. ☐ Comparative account of respiratory organs in vertebrates. UNIT –IV ☐ Comparative account of brain of vertebrates. ☐ Comparative account of Sense organs of Vertebrates. ☐ Comparative account of urino-genital system of vertebrates.				



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Course outcomes	<i>After successful completion of these courses the student would be able:</i> • to conceptualize the origin, diversity and evolution of vertebrates. • to understand the comparative account of skin derivatives and skeletal system of vertebrates. • to explain the evolution of heart and make comparison of circulatory and respiratory organs of vertebrates • to understand the comparative account of sense organs and urino-genital systems of vertebrates.
Text and References	1. Vertebrate life: William N. Ferland, F. Harvey Pough, Tom J Gode, John B. Heiser, Collier Mac Nillan International edition. 2. Chordate morphology: Malcom Jollie, Reinhold Publishing Corporation National York. 3. Chordate –Structure & Function: Arnold G. Khage, B.E. Fry Johanson, Mc Millan Publishing Co. INC. National York. 4. Comparative Animal Physiology: Orosser, Satish Book Enterprises, Agra. 5. The Vertebrate Body: - Alfred Sherwood Romer Vakils, Feffer & Simons Publications Ltd.



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Course Title	Paper II: BIOSTATISTICS.				
Course Code	DUZOC 302				
Course Credits	L	T	P	Details	
	4	1		5	
Prerequisites	NIL				
Course objectives	To understand the Invertebrates Evolution.				
Course Contents	UNIT –I <i>MANAGEMENT OF DATA</i> Classification of data ☐ Objectives of classification. ☐ Rules for classification. ☐ Methods of classification. <i>Tabulation of data</i> ☐ Distinction between classification & tabulation. ☐ Rules & parts of table. ☐ Types of table. <i>Diagrammatic presentation of data</i> ☐ General rules for constructing diagram. ☐ Kinds of diagrams. <i>Graphical presentation of data</i> ☐ Technique for construction of graph, rules for construction of graph. ☐ Histogram. ☐ False base line, Gantt chart, Silhouette graph, zone graph. ☐ Zee chart – histogram of two different scales. ☐ Graph of frequency distribution. UNIT –II <i>CENTRAL TENDENCY, DISPERSION & SKEWNESS</i> Mean ☐ Arithmetic mean – individual series, discrete series, continuous series ☐ Geometric mean ☐ Harmonic mean <i>Median</i> ☐ Individual series, discrete series, continuous series <i>Mode</i> ☐ Individual series, discrete series, continuous series ☐ Standard deviation & standard error. UNIT –III <i>TEST OF SIGNIFICANCE</i> Test of significance based on t-distribution ☐ Test of significance of sample mean – t-test				



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	☐ Test of significance of difference between two sample means. The difference test paired sample. <i>Fisher Z-test</i> ☐ Test of significance between the observed & calculated values of – r Variance-ratio test – f-test <i>Chi-square (X^2) test</i> ☐ Test of goodness of fit ☐ Characteristic of chi-square (X^2) test ☐ Special properties of chi-square (X^2) test UNIT –IV ADVANCE METHODS FOR VALIDATION OF DATA Analysis of Variance (ANOVA) ☐ One way analysis of variance. ☐ Two way analysis of variance. ☐ Neuro variate statistics <i>Probability –</i> ☐ Sampling distribution. ☐ Calculation of probability. ☐ Events. ☐ Addition theorem. ☐ Multiplication theorem. ☐ Parametric and non parametric statistics..
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Course outcomes	<i>After successful completion of these courses the student would be able:</i> • To explain the concept of adaptation and acclimatization. • To understand adaptive radiation in different aspects of terrain. • To explain the role of hormones during stress and homeostasis. • To understand the role of body size of organisms and effect of yoga and meditation on humanphysiology
Text and References	1. ANIMAL PHYSIOLOGY, MECHANISM AND ADAPTATION: Eckert, R., W.H. Freeman andCo. 2. BIOCHEMICAL ADAPTATION: Hochachka, P.W, and Somero S.N, Princeton, National Jersey. 3. ANIMAL PHYSIOLOGY, ADAPTATION AND ENVIRONMENT: Hochachka, P.W. andSomero S.N, Princeton, National Jersey Schiemidt Nielsen, Cambridge. 4. GENERAL & COMPARATIVE ANIMAL PHYSIOLOGY: Hoar W.S. Princeton Hall ofIndia. 5. ENVIRONMENTAL PHYSIOLOGY: Willmer, P.G. Stone & Johansan I, Blackwell



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	ScienceOxford.
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Course Title	Paper III: POPULATION ECOLOGY				
Course Code	DUZOC303				
Course	L	T	P	Details	
Credits	4	1		5	
Prerequisites	NIL				
Course objectives	The students will understand the population concepts, population dynamics, interactions, ecological theories, data analysis and modeling.				
Course Contents	UNIT-1 <i>Demography</i> - Life tables – definition, construction & uses. - Survivorship curves – Types & uses. <i>Population density –</i> - Definition & different methods for determining population density. <i>Fecundity</i>. Natality (Birth rate). Mortality (Death rate). <i>Population Growth</i> - Growth forms of population (exponential growth), - Growth rate of population UNIT-II <i>Population dispersal - Migration</i> - Emigration. - Immigration. <i>Regulation of population size</i> - Extrinsic & Intrinsic mechanism. - Population cycle. <i>Age distribution of population</i> - Age pyramids – different types & uses. - Age ratio. - Biotic potential and environmental resistance. - Methods of measuring the age of population. UNIT -III <i>Reproductive strategies</i> - R & K selection. - Breeding age and Sex ratio. <i>Concept of Niche</i> - Habitat & niche. - Niche segregation. Competition - Intra specific & inter specific competition <i>Concept of Limiting Factors</i> - Liebig's law of minimum. - Shelford's law of tolerance.				



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	- Limiting factors & population control. UNIT –IV <i>Positive Interaction</i> Neutralism – definition & different examples Commensalisms - definition & different examples Proto Co-operation - definition & different examples Mutualism - definition & different examples <i>Negative Interaction</i> - Predation – Definition & different examples. - Role of Predations in nature. - Components of Predation. <i>Parasitism</i> - Host parasite relationship - Parasitic adaptations. - Antibiosis
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Course outcomes	<i>After successful completion of these courses the student would be able:</i> - To understand the characteristics of population and population dynamics. - To explain the concept of illustration, coexistence and interactions among different species - To make aware and responsible for surrounding nature.
Text and References	ECOLOGY with special reference to animal & man: S. Charles, Kendeigh, Prentice hall of India Pvt. Ltd. National Delhi. ELEMENTS OF TROPICAL ECOLOGY: Yanney Ewusie, English language Book Society, Heine mann Educational book publication. FUNDAMENTALS OF ECOLOGY: Odum P.



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Course Title	Paper IV: ECONOMY ZOOLOGY				
Course Code	DUZOC 304				
Course Credits	L	T	P	Details	
	4	1		5	
Prerequisites	NIL				
Course objectives	To understand economical importance of animals and their role in human livelihood				
Course Contents	UNIT-1 Vermiculture Introduction to Vermiculture. Types of earth worm, Biology of Eisenia fetid. Rearing of earthworms, Equipment's, devices used in vermiculture, Vermicompost Technology – Methods and products, Vermi wash Collection, Composition & use. UNIT II Apiculture Morphology and Biology of honey bees – Honey bee species – social behavior of honey bees – Bee keeping and ancillary industries – Nationalton's Bee hive Extraction of honey – Medicinal value of honey – bee products – Importance of bee colonies in crop pollination. UNIT III Prawn culture Prawn fishery – Types of prawn fishery – Culture of fresh water prawn – Culture of marine prawn – Preparation of farm. Preservation and processing of prawn. Export of prawn. UNIT IV Fish culture Fish culture – Aim of fish culture – Breeding Pond – Fish Seed – Hatching pond. Transport of fish fry to rearing ponds. Harvesting – Preservation of fish – Composite fish forming. By- products of fishing industry. Poultry Management Breeds of fowl, Housing and Equipment, Deep litter System, Laying cages, Methods of brooding and Rearing, Debeaking. Management of growers, Layers, Broilers – Feed formulations for chicks, Growers and Broilers. Diseases of fowl. Nutritive value of egg and meat. Incubation and hatching of eggs.				



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Course outcomes	<i>After successful completion of these courses the student would be able:</i> • To cultivate skills to understand vermiculture • To learn the techniques of apiculture • To study the technique of prawn culture • To develop technical skills on culture, rearing, harvesting and marketing management • To gain knowledge about poultry management
Text and References	• Vasantha raj David, B. and Kumaraswami T., 1998. Elements of Economic Entomology Pop.Book Depot. Chennai. • Bhatnagar, R.K. and Palpa, R.K. 1996 Vermiculture and Vermicomposting, KalyaniPublishers, National Delhi. • Arul K. Sharma, A Hand book of Organic farming, Agro, Bio. Jothpur, India. • Shukla, G.S. and Xupadhyay G.S. Economic Zoology, Rastogi Publications, Meerut. • Arumugam, N. 2008. Aquaculture, Saras Publication Nagarkoli, Tamilnadu. • Shanmugam, K. 1992. Fishery Biology and Aquaculture LEO Pathipagam, Chennai.



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Course Title	Lab course: I (Combining Paper I and II)				
Course Code	DUZOP301				
Course Credits	L	T	P	Details	
			4	2	
Prerequisites	NIL				
Course objectives	To understand the practical approach Biostatics & Chordates.				
Course Contents	1. STUDY OF MUSEUM SPECIMEN OF CHORDATES. 2. STUDY OF HISTOLOGICAL SLIDES OF CHORDATES. 3. STUDY OF OSTEOLOGY OF CHORDATES. 4. PREPERATION OF PERMANENT SLIDES. 5. EXERCISE BASED ON BIOSTATISTICS. (MEAN, MODE, MEDIAN, FREQUENCY, DENSITY, CO-RELATION ETC.).				

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Course Title	Lab Course: II (Combining Paper III and IV)				
Course Code	DUZOP302				
Course Credits	L	T	P	Details	
			4	2	
Prerequisites	NIL				
Course objectives	To understand the practical approach of basics of Population Ecology & Economy Zoology.				
Course Contents	1. STUDY OF POPULATION DENSITY USING QUADRAT METHOD 2. DETERMINATION OF POPULATION GROWTH RATE IN LABORATORY CULTURE 3. IDENTIFICATION AND STUDY OF ECONOMICALLY IMPORTANT INSECTS 4. STUDY OF POPULATION DISPERSION PATTERNS 5. ECONOMIC IMPORTANCE OF AQUATIC ORGANISMS 6. CONSTRUCTION OF LIFE TABLES FOR A HYPOTHETICAL ANIMAL POPULATION 7. ROLE OF EARTHWORMS IN SOIL FERTILITY (VERMICOMPOSTING)				



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Faculty of Science

Two Years M. Sc.

Programme Scheme of Teaching and Examination

M. Sc. IV Semester Zoology

(Effective from the Academic Year 2024-2025)

SN	Course Code	Course Title	Hours/Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs.)
			L	T	P		Continuous Evaluation	Sem. End Exam	Total	
1	DUZOD401	Dissertation	-	-	36	18	135	315	450	-
2	DUZOV401	Seminar and Viva Voce	-	-	8	4	35	70	100	-
3	DUZOR401	Research paper/Seminar, PPT, Poster/Workshop	-	-	4	2	15	35	50	-
TOTAL						24			600	



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Course outcomes	<i>After successful completion of these courses the student would be able:</i> • Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society • Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions • Engage in systematic discovery and critical review of appropriate and relevant information sources • Appropriately apply qualitative and/or quantitative evaluation processes to original data • Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources • Communicate research concepts and contexts clearly and effectively both in writing and orally
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