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(Accredited by NAAC with Grade A+)

GU/Acad –PG/BoS - GU-ART /2025-26/574 Date: 26.11.2025

CIRCULAR

The syllabus for the Goa University–Admission Ranking Test (GU-ART) of **Master of Science in Zoology** and **B.Ed. in Zoology** Programmes, approved by the Academic Council in its meeting held on 7th November 2025 is attached.

The Dean/Vice-Dean (Academic) of the School of Biological Sciences and Biotechnology and the Principals of all the affiliated Colleges are requested to take note of the above and bring the contents of this Circular to the notice of all concerned, including students aspiring to pursue the Master's and B.Ed. Programmes.

ASHWIN VYAS LAWANDE
Digitally signed by ASHWIN VYAS LAWANDE
Date: 2025.11.26 12:23:25 +05'30'

(Ashwin V. Lawande)
Deputy Registrar – Academic

To,
1. The Dean, School of Biological Sciences and Biotechnology, Goa University.
2. The Vice-Dean (Academic), School of Biological Sciences and Biotechnology, Goa University.
3. Principals of all the affiliated Colleges.

Copy to:
1. Controller of Examinations, Goa University.
2. Assistant Registrar (Admissions), Goa University.
3. Assistant Registrar Examinations (UG/PG), Goa University.
4. Director, Directorate of Internal Quality Assurance, Goa University for uploading the Syllabus on the University website.

GOA UNIVERSITY

SYLLABUS FOR GOA UNIVERSITY-ADMISSIONS RANKING TEST (GU-ART) FOR MASTER'S & B.Ed. IN ZOOLOGY PROGRAMMES

Effective from AY: 2026-2027

Modules	Content
Module 1:	**Amazing World of Animals**
	Earth's evolution, animal origins, classification, habitats, roles in ecosystems and human life. Values & threats to animals, unique adaptations; habitat diversity, adaptive features, local fauna conservation.
Module 2	**Understanding Applications of Zoology**
	Scope and milestones of Zoology, role in public health, industry, and conservation. Disease-causing organisms & vectors, economically important species, GMOs, animal-inspired designs, & wildlife conservation strategies, conservation genetics.
Module 3:	**Biology of Non-Chordates and Chordates**
	Structural organization, symmetry, body plans, coelom types in non-chordates and chordates; invertebrate & vertebrate phyla (key features, classification, & evolutionary significance). Study of representative forms, larval types, organ systems, & adaptive traits across Protozoa to Mammalia.
Module 4:	**Cell Biology & Genetics**
	Structure & organization of prokaryotic & eukaryotic cells, organelles, membranes, chromosomes, cell division, & mutations. Inheritance patterns, sex determination, cytoplasmic inheritance, genetic disorders, Cell staining, karyotyping, chromosome study, Mendelian genetics.
Module 5:	**Vector-borne Diseases**
	Disease-transmitting vectors, types, transmission modes, control strategies. Insect vectors: mosquitoes, sandflies, houseflies, fleas, lice, bugs, arthropod & molluscan vectors (ticks & snails). Disease causative agents, life cycles, symptoms (malaria, dengue, leishmaniasis, plague, typhus, Chagas disease, schistosomiasis, Lyme disease). Identification, life cycles, vector morphology, epidemiological analysis, control programs for vector- & rodent-borne diseases.

Approved by: Academic Council on 7th November 2025

Module 6:	**Biochemistry** Carbohydrates, lipids, proteins and enzymes. Monosaccharides, disaccharides, polysaccharides; lipid types & membrane components; amino acid chemistry & protein organization; enzyme kinetics, specificity, inhibition. Qualitative & quantitative estimations of biomolecules, enzyme activity assays, biochemical analyses (glycogen, protein, fatty acid, cholesterol).
Module 7:	**Vertebrate Anatomy** Vertebrate organ systems, evolutionary adaptations. Structure & functions - integument & its derivatives, skeletal system, digestive systems of monogastric, avian, and ruminant vertebrates, circulatory systems (single and double circulation), respiratory organs (vertebrate), nervous systems & sense organs. Excretory and reproductive systems in anamniotes and amniotes.
Module 8:	**Basic Entomology** Definition, scope, importance of entomology; insect diversity & anatomy; classification (major orders); collection and preservation methods; insect behavior and adaptations in reference to pollination, metamorphosis, ecdysis, mimicry, aposematism, communication, migration, eusociality, parasitoidism, and silk production.
Module 9:	**Bioinstrumentation** Principles and applications of light, fluorescence, electron microscopy (TEM, SEM); flow cytometry, pH meter, sample preparation (cryofixation, staining, freeze methods), Centrifugation (types, rotors, applications); spectrophotometry (Beer-Lambert's law, UV-Vis instrumentation); chromatography (column, TLC, paper, affinity, ion exchange, gel filtration, HPLC); electrophoresis (PAGE, agarose); Micropipette, balance.
References/ Readings:	1. Brusca, R. C., & Brusca, G. J. (2003). *Invertebrates* (Vol. 347). Basingstoke. 2. Curtis, W. C., & Guthrie, M. J. (1927). *Textbook of General Zoology*. J. Wiley & Sons. 3. Enderle, J. D. (2006). *Bioinstrumentation*. Morgan & Claypool Publishers. 4. Harmening, D. (2007). *Laboratory management: principles and processes*. DH Book Publishing. 5. Hyman, L. H. (1943). *Comparative vertebrate anatomy*. University of Chicago Press. 6. Kardong, K. V. (2006). *Vertebrates: comparative anatomy, function, evolution* (pp. 365-383). New York: McGraw-Hill. 7. Klug, W. S., & Cummings, M. R. (2003). *Concepts of genetics* (No. Ed. 7, pp. xxviii+-693). 8. Linville, H. R., & Kelly, H. A. (1906). *A textbook in general zoology*. Ginn. 9. Ninfa, A. J., Ballou, D. P., & Benore, M. (2009). *Fundamental laboratory approaches for biochemistry and biotechnology*. John Wiley & Sons. 10. Rashmi, J. A. (2002). *A Textbook of Practical Biochemistry*. B. Jain

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