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ताळगांव पठार,
गोंय - ४०३ २०६
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(Accredited by NAAC with Grade A+)

GU/Acad –PG/BoS - GU-ART /2025-26/576 Date: 26.11.2025

CIRCULAR

The syllabus for the Goa University–Admission Ranking Test (GU-ART) of **Master of Science in Microbiology** and **B.Ed. in Microbiology** 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 12:55:56 +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 MICROBIOLOGY PROGRAMME

Effective from AY: 2026-27

Modules	Content
Module 1:	**Basics of Microbiology**
	Introduction & history of microbiology, Microbial Diversity & classification, Prokaryotic & Eukaryotic cell structure & function, Microbial cultivation, isolation, pure culture & preservation, Microbial growth control, Microbiology Good Laboratory Practices (GLP) and Biosafety, Preservation of cultures.
Module 2:	**Microbial Ecology and Environment**
	Ecology, Ecosystems, Biogeochemical aspects of microbial ecology, Microbes in their natural habitats, Ecological succession & role of microbes, Microbial biofilms, Microbial interactions, Environmental pollutants, biomagnification, eutrophication, Bioluminescence, Biocorrosion / Biodeterioration due to microorganisms.
Module 3:	**Microbial Biochemistry and Microbial Physiology**
	Carbohydrates, Lipids, Essential fatty acids, Saponification, Structural lipids, Phosphoglycerides, Proteins, Amino acids, Ninhydrin reaction, primary, secondary & quaternary structures, enzymes, coenzyme, Enzyme kinetic and inhibition, Multienzyme complex, qualitative and quantitative tests for biochemicals, Bioenergetics and Electron transport chain, Chemoheterotrophic Carbohydrate Anabolism & Catabolism, Chemoheterotrophic Lipid Metabolism, poly beta-hydroxybutyric acid, Chemoheterotrophic Protein Metabolism, Phototrophic Metabolism, mixed acid fermentation and butanediol fermentation
Module 4:	**Molecular Biology and Microbial Genetics**
	Nucleic acids, DNA, Plasmids, Eukaryotic DNA, Guanine quadruplex (G4) DNA, RNA, non-coding RNA, microRNA & Si RNA, Replication, Transcription, operon, Translation, electrophoresis, Gene expression and regulation, Gene transfer mechanisms, Transformation, Transduction, Conjugation, Chromosome mapping, Molecular Recombination, Mutations, Auxotrophs, Induced Mutations, Teratogenicity testing, Replica plate

Approved by: Academic Council on 7th November 2025

	technique, Gradient Plate Technique, UV Survival curve with effect of dark repair mechanism.
Module 5:	**Environmental Microbiology**
	Microbiology of Soil, Microbial succession, Biogeochemical cycles, Microbiology of Water, Normal & contaminant microflora, Water Potability, Water-borne pathogens, Purification of municipal water supplies, Sanitary analysis of water, Microbial contamination of air, Bioremediation and bioremediation, Xenobiotic, Oil spills.
Module 6:	**Cell Biology**
	Introduction to cell biology & Ultrastructure, cellular organelles, cellular junctions, Cell Signaling, Bacterial Chemotaxis, Quorum sensing, Cyclic GMP, MAP kinase pathway, CFTR, Calmodulin, Eukaryotic Cell Cycle, Protein Sorting and Transport, Cancer and abnormal cells, Stem cells, Mitosis and meiosis.
Module 7:	**Basic Biostatistics**
	Biological data & processing, Population & samples, parameter and statistics, frequency distribution, Graphical representation, Measures of central tendency, Measures of Dispersion, Measure of Asymmetry, Sampling Distributions, Normal distributions, source & classification of errors, testing of hypotheses, Large Sample & small sample Tests
Module 8:	**Instrumentation In Microbiology**
	Basic instruments in a microbiology laboratory, pH meter, buffers, Biosafety cabinet, Autoclave, Hot air oven, Incubator, Microscope, Micrometry, Spectroscopy of biomolecules, Chromatography, Electrophoresis, Centrifugation
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