AC/II(23-24).2.RUS3

S. P. Mandali's

Ramnarain Ruia Autonomous College

(Affiliated to University of Mumbai)

RUIA COLLEGE
Explore • Experience • Excel

Syllabus for

Program: UG Biotechnology

Program Code: RUSBTK

(Credit Based Semester and Grading System for Academic Year 2024–2025)

GRADUATE ATTRIBUTES

GA	Description **A student completing Bachelor's Degree in Science program will be able to:**
GA 1	Recall and explain acquired scientific knowledge in a comprehensive manner and apply the skills acquired in their chosen discipline. Interpret scientific ideas and relate its interconnectedness to various fields in science.
GA 2	Evaluate scientific ideas critically, analyse problems, explore options for practical demonstrations, illustrate work plans and execute them, organise data and draw inferences.
GA 3	Explore and evaluate digital information and use it for knowledge upgradation. Apply relevant information so gathered for analysis and communication using appropriate digital tools.
GA 4	Ask relevant questions, understand scientific relevance, hypothesize a scientific problem, construct and execute a project plan and analyse results.
GA 5	Take complex challenges, work responsibly and independently, as well as in cohesion with a team for completion of a task. Communicate effectively, convincingly and in an articulate manner.
GA 6	Apply scientific information with sensitivity to values of different cultural groups. Disseminate scientific knowledge effectively for upliftment of the society.
GA 7	Follow ethical practices at work place and be unbiased and critical in interpretation of scientific data. Understand the environmental issues and explore sustainable solutions for it.
GA 8	Keep abreast with current scientific developments in the specific discipline and adapt to technological advancements for better application of scientific knowledge as a lifelong learner

PROGRAM OUTCOMES

PO	Description **A student completing Bachelor's Degree in Science program in the subject of Biotechnology will be able to:**
PO 1	Adept in basic sciences along with a thorough understanding of biotechnology principles and chemical sciences to create a foundation for higher education with the insights into interdisciplinary approach.
PO 2	Demonstrate the applications of fundamental biological processes from the molecular, cellular, industrial and environmental perspective.
PO 3	Develop effective communication skills with improved individual and team work abilities in the domain of scientific research writing. Showcase their innovative ideas and research work efficiently.
PO 4	Reflect, analyse and interpret information or data for investigating the problem in fields of biotechnology. Acquire scientific and entrepreneur skills to furnish sustainable solutions to coeval problems
PO 5	Illustrate the relevance of ethical implications and standard laboratory practices in tissue culture techniques, forensic biology, developmental biology and other fields of biotechnology.
PO 6	Apply the conceptual knowledge to develop coherent, efficacious and proficient practical, technical and analytical skills.

PROGRAMME OUTLINE

YEAR	SEMESTER	PAPER	COURSE CODE	COURSE TITLE	CREDITS
FYBSc **I**	**I**	DSC	RUSBTK.O101	Biotechnology I- Fundamentals of biotechnology	3
		DSC	RUSBTKP.O101	Practicals based on Biotechnology I- (Fundamentals of biotechnology)	1
		DSC	RUSBTK.O102	Fundamentals of chemistry for biotechnology	3
		DSC	RUSBTKP.O101	Practicals based on Fundamentals of chemistry for biotechnology	1
		OE	RUSOEBTK.O101	Fitness - I	3
		OE	RUSOEBTKP.O101	Practicals based on Fitness - I	1
		VSC	RUSVSCBTKP.O101	Marine Biotechnology	2
		SEC	RUSSECBTKP.O101	Microscopy and microbial techniques	2
FYBSc **I**	II	DSC	RUSBTK.E111	Biotechnology II- Fundamentals of genetics	3
		DSC	RUSBTKP.E111	Practical of Biotechnology-II	1
		DSC	RUSBTK.E112	Bioorganic chemistry	3
		DSC	RUSBTKP.E112	Practical of subject 2	1
		OE	RUSOEBTK.E111	Fitness - II	3
		OE	RUSOEBTKP.E111	Practicals based on Fitness - II	1
		VSC	RUSVSCBTKP.E111	Techniques in forensic science	2

		SEC	RUSSECBTKP.E111	Techniques in tissue culture	2

SEMESTER I

Course Code: RUSVSCBTKP.O101

Course Title: MARINE BIOTECHNOLOGY

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	CO DESCRIPTION
CO 1	Isolate different types of organisms from marine sources.
CO 2	Using various qualitative and quantitative parameters, Estimate the quality of fish.
CO 3	Extract and study various metabolites from marine organisms.
CO 4	Design extraction method for genetic material from fish.

DETAILED SYLLABUS

Course Code	Course/ Unit Title	Credits
RUSVSCBTKP.O101	1. Isolation of marine bacteria 2. Isolation of marine fungi 3. Isolation of microalgae. 4. Isolation of macroalgae. 5. Isolation of bioluminescent organism from fish 6. Length -Weight relationship of fish 7. Estimation of moisture content from fish tissue 8. Identification of commercially Important Fin Fishes, Shell Fishes, Molluscs, Lobsters and Seaweed. 9. Physical, Biochemical and Microbiological Methods to Examine Freshness of Fish. 10. Extraction and Estimation of Protein in Fish. 11. Extraction and Estimation of Lipid, Carbohydrate and Salt Content in Fish. 12. Extraction and Estimation of Salt Content in Fish. 13. Extraction and estimation of Collagen. 14. Extraction of alkaloids from marine organisms and their separation by Paper chromatography 15. Estimation of carotenoids from marine organisms and their separation by paper chromatography 16. Extraction of DNA from fish fin. 17. Extraction of Shark liver oil. 18. Detection of heavy metals from fish / fish parts 19. Introduction to aquaponics and aquaponics setup	**2**

SEMESTER II

Course Code: RUSVSCBTKP.E111

Course Title: Techniques in forensic science

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	CO DESCRIPTION
CO 1	Comprehend the importance of collection, preservation identification of samples/ evidence.
CO 2	Devise experiments to analyse different types of evidence
CO 3	Interpret the collected evidence and reconstruct the most probable scenarios associated with the crime to solve the case.
CO 4	Using suitable methods, analyse traces of poison on crime scene and evidences.

DETAILED SYLLABUS

Course code	Title	Credits
RUSVSCBT KP.E111	1. Collection and Packaging of forensic evidences from site 2. To take plain and rolled fingerprints and identify fingerprint patterns. 3. To perform ridge counting and ridge tracing, Lifting and preservation of fingerprint 4. Fingerprint analysis – powder analysis, ninhydrin spray test, Iodine development, silver nitrate 5. Collection and Examination of Lip prints and Ear prints 6. Microscopic examination of hair of different animals such as Dogs, Cats, Cow, Horse, Goats, humans etc. 7. Determination of secretor / non-secretor antigen from blood/ saliva. 8. Amylase in saliva (animal and human sources) 9. Luminol/ Phenolphthalein/ precipitin test for blood 10. Extraction, isolation and detection of DNA from blood/saliva 11. Acid phosphatase for semen and Barberio test of semen 12. Chromatographic analysis of analgesics/ semen 13. Chromatographic analysis of ink and dyes 14. Cement analysis by volumetric and gravimetric method 15. Detection of Blood Alcohol Content. 16. Blood spatter analysis 17. Analysis and preservation of bite marks and Determination of Age, sex, occupation/habits by dental evidence 18. Test for arsenic 19. Tests for cyanide 20. Tests for drugs	**1**

MODALITY OF ASSESMENT

VSC

Practical Examination Pattern:

(Semester end practical examination): 50 Marks

PARTICULARS	MARKS
Lab work	40
Journal	5
Viva	5
TOTAL	**50**