Resolution Number: AC/II(23-24).2.RUS1

S. P. Mandali's

Ramnarain Ruia Autonomous College

(Affiliated to University of Mumbai)

Syllabus For:

Program: Integrated M.Sc. in Bioanalytical Sciences

(S.Y. B.Sc. Syllabus)

Program Code: RUSBAS

(As per the guidelines of National Education Policy 2020-Academic year 2024-25)

(Choice based Credit System)

GRADUATE ATTRIBUTES

GA	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)

PO	Description A student completing Bachelor's Degree in Science program in the subject of Bioanalytical Sciences will be able to:
PO 1	Gain high quality science education in a vibrant academic ambience with the faculty of distinguished teachers and scientists.
PO 2	Take up the challenge of doing quality research and teaching and also contribute to industrial production and R & D in the fields of Bioanalysis, Bioinformatics and Nutraceutical Sciences.
PO 3	Amalgamate classical analytical chemical techniques with modern genomic and proteomic technologies of manufacturing and analysis to better characterize the products useful as medicines as well as nutraceuticals.

Semester III

Course Code: RUSVSCBASPO201

Subject V

Course Title: Tools and Techniques in Biology I

Type Course: Vocational Skills Course

Academic Year 2024-25

S. Y. B.Sc.

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION
CO 1	Recollect the functioning of analytical instruments.
CO2	Apply the instrumentation skills in analysis of given samples

DETAILED SYLLABUS

Paper Code	Semester III	Credits/ Hours
RUSVSCBASPO201	**Tools and Techniques in Biology I**	**2/60**
Practicals		
1. To determine the molecular weight of the given polymer using viscometer. 2. To determine refractive index of the given sample using Refractometer 3. To determine the Total Dissolved Solids (TDS) in a sample using TDS analyzer. 4. To design and execute experiments on colorimeter/Spectrophotometer 5. Verification of Beer-Lambert's law 6. To determine: i) λmax ii) Molar absorptivity constant 7. To determine turbidity of the given sample using Turbidimeter/Nephelometer.		

Reference Books:

Tools and Techniques in Biology I	Handbook of Analytical Instruments (R.S. Khandpur)

Semester IV

Course Code: RUSVSCBASE211

Subject V

Course Title: Tools and Technique in Biology II

Type of Course: Vocational Skills Course (VSC)

Academic Year 2024-25

S. Y. B.Sc.

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION
CO 1	Evaluate the importance of biomolecule extraction in bioanalysis.
CO2	Apply the correct immunology-based technique for qualitative and quantitative estimation of the given sample.

DETAILED SYLLABUS

Paper Code	Semester IV	Credits/Hours
RUSVSCBASE211	**Tools and Techniques in Biology II**	**2/60**
PRACTICALS		
1. Isoagglutinin titer- Widal, VDRL tests, 2. Use of diagnostic tests- ELISA- Qualitative and Quantitative 3. Flow Cytometry- Demo 4. Immunohistochemistry 5. Case Study-Autoimmune disorder 6. To study the bactericidal effect of serum 7. Extraction and estimation of biomolecules from the given samples: a) Proteins b) Carbohydrates c) Lipids d) Nucleic Acids		

References:

Tools and Techniques in Biology II	● Molecular Cell Biology: Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger ● Biochemical Methods of Analysis: Saroj Dua