

Resolution No. AC/II(23-24).2.RUS2

S. P. Mandali's
Ramnarain Ruia Autonomous College
(Affiliated to University of Mumbai)



Syllabus for

Program: SYBSc

Program Code: RUSVSCBCHP

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

(Choice Based Credit System)

GRADUATE ATTRIBUTES

S.P. Mandali's Ramrain Ruia Autonomous College has adopted the Outcome Based Education model to make its science graduates globally competent and capable of advancing in their careers. The Bachelor's Program in Science also encourages students to reflect on the broader purpose of their education.

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 workplace 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 BIOCHEMISTRY will be able to:
PO 1	Achieve better understanding of the major thrust areas of the disciplines like Chemistry of Biomolecules & their metabolism, Cell biology (Basics, Membrane biochemistry, Cancer), Enzymology, Genetics, Plant Biochemistry, Pharmacology, Microbiology & Immunology.
PO 2	Gain acumen of the fundamental biochemical processes occurring at the molecular and gene level.
PO 3	Understand the role of Biochemistry in food and human nutrition
PO 4	Get insights into multiple important analytical tools for Biochemical testing and apply contextual knowledge and tools of biochemical research for problems solving.
PO 5	Acquire and empower technical knowledge by connecting disciplinary and interdisciplinary aspects of biochemistry.
PO 6	Compile and interpret Biological data using Biostatistics and Bioinformatics tools.
PO 7	Express ideas persuasively through scientific writing and oral presentation which will help in the development of the leadership qualities.
PO 8	Possess scientific temperament by research project-based learning.
PO 9	Procure hands-on real time experience in industries.
PO 10	Get exposure to the strong theoretical and practical understanding of various dimensions of Biochemistry and take up research-oriented courses in the fields of Biochemistry, Nutrition & Dietetics, Molecular Biology, etc.

CREDIT STRUCTURE BSc

Semester	Subject 1		Subject 2	GE/ OE course (Across disciplines)	Vocational and Skill Enhancement Course (VSC) & SEC	Ability Enhancement Course/ VEC/IKS	OJT/FP/CE PCC, RP	Total Credits
	DSC	DSE						
1	4		4	4 (2*2)	VSC-2 + SEC -2	AEC- 2 (CSK) + VEC- 2 (Env Sc.) + IKS-2		22
2	4		4	4 (2*2)	VSC-2 + SEC-2	AEC-2 (CSK)+ VEC-2 (Understanding India)	CC-2	22
Total	8		8	8	8	10	2	44
Exit option: award of UG certificate in Major with 44 credits and an additional 4 credit Core NSQF course/ Internship or Continue with Major and Minor								
3	Major 8		Minor 4	2	VSC-2	AEC-2 MIL	FP -2, CC-2	22
4	Major 8		Minor 4	2	SEC-2	AEC-2 MIL	CEP-2, CC-2	22
Total	16		8	4	4	4	8	44
Exit option: award of UG Diploma in Major with 88 credits and an additional 4 credit Core NSQF course/ Internship or Continue with Major and Minor								
5	DSC 12	DSE 4	Minor 2		VSC-2		CEP/FP-2	22
6	DSC 12	DSE 4	Minor 2				OJT-4	22
Total	24	8	4		2		6	44
Exit option: award of UG Degree in Major with 132 credits or Continue with Major for Honours/ Research								

SEMESTER III

Course Code: RUSVSCBCHPO201

Course Title: Isolation & Identification of Biomolecules and Enzyme Immobilization

Type of course: Vocational Skill Course (VSC)

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION A student completing this course will be able to:
CO 1	Demonstrate broad knowledge in basic analytical instrumentation with deep knowledge in its core concepts and its applications.
CO 2	Understand the principle, Instrumentation, working of different chromatographic techniques and their applications in various research fields
CO 3	Acquire cognitive, technical and creative skills which enables students to gain an established knowledge and practice concerning basic analytical instrumentation and measurement techniques
CO 4	Capable to choose and apply suitable analytical technique to identify different biomolecules
CO 5	Develop skill in carrying out research projects by employing the basic biochemical and molecular techniques.
CO 6	Demonstrate skill to explain about principle, Bioinstrumentation and applications of protein purification techniques and their applications in various research fields.
CO 7	Capable to choose and apply suitable analytical technique to identify different biomolecules

DETAILED SYLLABUS

Practical

Sr. No	Course code- RUSVSCBCHPO201 Practical Title- Isolation & Identification of Biomolecules and Enzyme Immobilization	2 Credit
1	Biochemical identification I- Carbohydrates	
2	Purity of starch by Willstatter method	
3	Separation of sugars using chromatography	
4	Separation of a mixture of Glucose and Starch by gel filtration Chromatography	
5	Biochemical identification II - proteins	
6	Ammonium sulphate fractionation of proteins	
7	Separation of amino acids using chromatography	
8	Extraction of β -Amylase, Urease & Invertase from suitable sources	
9	Determination of achromic point of alpha amylase	
10	Immobilization of Yeast and its use in determination of Invertase activity	
11	Immobilization of amylase using agar disc and its use in determination of activity	
12	Demonstration of separation of proteins using ion-exchange chromatography	
13	Separation of a mixture of lactose and casein by gel filtration Chromatography	
14	Extraction of lipid and it's TLC	
15	Estimation of cholesterol by zak and Zlatsky's method	

References:

1. Laboratory Manual in Biochemistry - J. Jayaraman - New Age International
2. An Introduction To Practical Biochemistry - Plummer David
3. Keith Wilson & John Walker, Practical Biochemistry, principle and technique, Cambridge University, 5th edition
4. Plummer, David T.; Introduction to practical biochemistry; Tata Mc. Graw and Hill publishers.
5. Principles & Techniques of Practical Biochemistry – Wilson, Walker- Cambridge Univ. Press.
6. Biophysical Chemistry, Principles & Techniques – Upadhyay, Upadhyay and Nath – Himalaya Publ. House.
7. Analytical Biochemistry - David Holme & Hazel Peck - Pearson Education Ltd, England
8. Principles of Instrumental Analysis - Douglas A. Skoog, F. James Holler, Stanley R. Crouch – Thomson Brooks/Cole

Modality of Assessment: Vocational Skill Course (VSC) Semester III

Semester End Practical Examination: Total 50 Marks

Practical Examination Pattern:

	Particulars	Marks
1	Laboratory work	40
2	Viva	05
3	Journal	05
	TOTAL	50