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

S. P. Mandali's

Ramnarain Ruia Autonomous College

(Affiliated to University of Mumbai)

RUIA COLLEGE
Explore • Experience • Excel

Syllabus for

Program: F.Y.B.Sc.

Program Code: RUSBCH

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

(Choice Based Credit System)

GRADUATE ATTRIBUTES

S.P. Mandali's Ramnrain 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/CEPCC, 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 I

Course Code: RUSVSCBCH.O101

Course Title: Tools of Biochemistry

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	Define basic analytical instrumentation with deep knowledge in its core concepts and its applications.
CO 2	Illustrate the principle, Instrumentation, working of spectroscopic techniques (Flame photometry) and its applications in various research fields
CO 3	Enlist the cognitive, technical and creative skills which enables students to gain an established knowledge and practice concerning basic analytical instrumentation and measurement techniques
CO 4	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	Identify and describe the parts of microscope. To study the distinguishing features, principle components and applications of various types of light and electron microscope.
CO 7	Develop an analytical insight to understand the principle and methodology of centrifugation, different types & application of centrifuge and rotors.
CO 8	Make use of theoretical concepts of Spectroscopy, Microscopy & Centrifugation and develop experimental acumen.

Practical

Sr. No	Course code- RUSVSCBCH.O101	1 Credit
1	Safety laboratory measures	
2	Study of the parts of a compound microscope	
3	Study of different types of Light microscope- Bright Field, Dark field, Phase contrast, Fluorescence microscopy	
4	Cell count using microscope	
5	Study of different types of centrifuges- Preparative & Analytical centrifuges	
6	Separation of milk proteins by bench top centrifuge	
7	Study of Colorimeter	
8	Study of Spectrophotometer	
9	Estimation of absorbance maxima & molar extinction coefficient	
10	Colorimetric estimation of pigment / dye	
11	Cell count using optical density	
12	Study of different types of chromatograhy	
13	Separation of plant pigments by paper chromatography	
14	Separation of lipids by thin layer chromatography	
15	Demonstration of Flame photometer	

References:

1. Principles & Techniques of Practical Biochemistry – Wilson, Walker- Cambridge Univ. Press.
2. Biophysical Chemistry, Principles & Techniques – Upadhyay, Upadhyay and Nath – Himalaya Publ. House.
3. Analytical Biochemistry - David Holme & Hazel Peck - Pearson Education Ltd, England
4. Principles of Instrumental Analysis - Douglas A. Skoog, F. James Holler, Stanley R. Crouch – Thomson Brooks/Cole
5. A.L., Lehninger, Principles of Biochemistry (1982), Worth Publishers, Inc. New York.
6. Laboratory Manual in Biochemistry - J. Jayaraman - New Age International
7. An Introduction To Practical Biochemistry - Plummer David
8. Keith Wilson & John Walker, Practical Biochemistry, principle and technique, Cambridge University, 5th edition
9. Plummer, David T.; Introduction to practical biochemistry; Tata Mc. Graw and Hill publishers.

Modality of Assessment: Vocational Skill Course (VSC)
(2 Credit Theory Course for BSc)

Semester End Practical Examination: Total 50 Marks

Practical Examination Pattern:

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