Resolution No. AC/II(23-24).2.RUS12

S. P. Mandali's

Ramnarain Ruia Autonomous College

(Affiliated to University of Mumbai)

RUIA COLLEGE
Explore • Experience • Excel

Syllabus for

Program: S.Y.B.Sc.

Program Code

RUSVSCZOOP and RUSSECZOOP

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

(Choice based Credit System)

GRADUATE ATTRIBUTES

S. P. Mandali's Ramnarain 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 Bachelors 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 the values of different cultural groups. Disseminate scientific knowledge effectively for upliftment of the society.
GA 7	Follow ethical practices at the workplace and be unbiased and critical in the 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 ZOOLOGY will be able to:**
PO 1	Identify the major groups of organisms, discuss the basis of their biodiversity, and draw parallels with their phylogenetic relationship, using well-thought cardinal features of classification on the basis of morphology and molecular information.
PO 2	Understand and analyse the evolutionary link amongst the animals and also understand the basic classification patterns of invertebrates and vertebrates. They will be able to compare and contrast the anatomy and physiology of different invertebrates and vertebrate phylum.
PO 3	Analyse the genes, genomes, cells, cell organelles, tissues and histological studies, understand the linkage of genes, mechanisms of sex determination, various structures of DNA and apply the knowledge of genetics to the process of evolution.
PO 4	Analyse and understand the broad concepts of ecology, food webs, food chains and the interconnectedness of biotic and abiotic factors. Comprehend the concepts of Population dynamics, communities and its dependence on the ecosystems.
PO 5	Objectively understand and evaluate information about animal behaviour and ecology encountered in our daily lives.
PO 6	Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within Zoology.
PO 7	Get a flavor of research by working on project besides improving their writing skills. It will further enable the students to think and interpret individually.

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**	**DS E 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							

Course Code: RUSSECZOOPE211

Course Title: Apiculture

Type of Course: Skill Enhancement Courses (SEC)

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION A student completing this course will be able to:
CO 1	Explain the concepts of handling, managing the apiculture farm
CO 2	Distinguish between different types and caste of Honeybee
CO 3	Explain the modern trends of Apiculture and equipment used.
CO 4	Identify and describe different types and species of honeybees.
CO 5	Describe the various diseases of honeybees and their control measures.

DETAILED SYLLABUS

Practicals

Course Code: RUSSECZOOPE211		
Sr. No.	**Practical Title- APICULTURE**	**Credits: 2**
1.	Morphological differences between species of Honeybee- *Apis dorsata, Apis indica, Apis florae, Apis mellifera*.	
2.	Study of the life cycle of Honeybee.	
3.	Bee colony and beehive.	
4	Study and identification of Caste in Honeybee.	
5.	Beekeeping types of equipment.	
6.	First aid after bee sting.	
7.	Mounting- mouth parts, appendages, pollen basket and sting apparatus of workers bees.	
8.	Bee disease and control (one disease for each)- Protozoan, Bacterial, viral, Fungal	
9.	Microscopic examination of the honey samples for the presence of pollen grains.	
10.	Detection of Honey adulterants: Sugar solution and Invert sugar/jaggery, Impurities.	
11.	Visit to Central Bee Research Institute	
12.	Apiary-Visit and hands-on training	

REFERENCES

- Bee and Bee Keeping, 1978, Roger A. Morse, Conell University Press, London.
- The Behaviour and social Life of Honeybees, C. R. Ribbandas. Dover Publication inc. New York V. K. Sharma. Microscopy and Cell Biology, Tata McGraw Hill Publishing Co. Ltd.

Skill Enhancement Course (SEC)

Modality of Assessment

Practical Examination Pattern: Total Marks 50

Duration: The duration of the practical will be of 3 hours

Semester End Practical Examination:

Particulars	Practical
Major Experiment and/or Minor Experiment, Identification, and *Viva voce*	30
Journal	05
Lab participation	05
Lab work / Field report / presentation	10
Total	**50**

PRACTICAL BOOK/JOURNAL

The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.
In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from Head/ Co-ordinator / In charge of the department; failing which the student will not be allowed to appear for the practical examination.

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