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. (VSC)

Program Code: (RUSPHY)

2024-25

(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.

Graduate Attributes	Graduate Attributes Description A student completing Bachelor's Degree in Science program will be able to:
Graduate Attributes 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.
Graduate Attributes 2	Evaluate scientific ideas critically, analyse problems, explore options for practical demonstrations, illustrate work plans and execute them, organise data and draw inferences
Graduate Attributes 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.
Graduate Attributes 4	Ask relevant questions, understand scientific relevance, hypothesize a scientific problem, construct and execute a project plan and analyse results.
Graduate Attributes 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.
Graduate Attributes 6	Apply scientific information with sensitivity to values of different cultural groups. Disseminate scientific knowledge effectively for upliftment of the society.
Graduate Attributes 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.
Graduate Attributes-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 Statistics will be able to:
PO 1	To demonstrate fundamental and procedural knowledge related to different areas of study in Physics including mechanics, optics, modern physics, thermodynamics, electronics, electrodynamics at a level attuned with graduate programs in physics at peer institutions
PO 2	To demonstrate comprehensive, quantitative and conceptual understanding of the core areas of physics.
PO 3	To apply the principles and acquired skill-set related to physics, to handle innovative and unfamiliar problems, so that effective solution or strategy to deal with, could be developed.
PO 4	To explore and deduce quantitative results in the extents of physics.
PO 5	To use contemporary experimental apparatus and analysis tools to acquire, analyse and interpret scientific data in the extents of physics.
PO 6	To communicate scientific results effectively in presentations or posters in the extents of physics to both the scientists and public at large.
PO 7	Utilize acquired ICT skills, physics practical skills, mathematical skills to prepare for employment, for advancement of a career path and also for lifelong learning in Physics.

CREDIT STRUCTURE B.Sc.

Semester	Subject 1		Subject 2	GE/ OE course (Across disciplines)	Vocational and Skill Enhancement Course (VSC) & SEC	Ability Enhancement Course/ VEC/IKS	OJT/FP/CEP CC, 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 Honors/ Research							

Course Code- Vocational Skill Course: RUSVSCPHYPO201

Course Title: Study of Electronic circuits and Magnetism

Academic year 2024-25

COURSE OUTCOMES:

COURSE OUTCOME	DESCRIPTION A student completing this course will be able to:
CO 1	Demonstrate a comprehensive understanding of Op-Amp and its characteristics Gain proficiency in designing and analysing operational amplifier (Op-Amp) circuits, specifically as an Non-INV/INV amplifier. Understand the principles of negative feedback, input impedance, and gain calculations in the configuration.
CO 2	Master the operation and characteristics of band pass filter, including their role in communication equipment design. Develop the ability to frequency-gain plots. Understand the relationship between filter parameters such as cutoff frequency, gain, and input impedance.
CO 3	Demonstrate proficiency in understanding the working principles of Colpitts's oscillator and analyse its frequency stability, amplitude, and harmonic content.
CO 4	Develop a deep understanding of the characteristics and operation of multivibrators which are important for digital electronics. Constructing from transistors and 555 timer IC. Gain proficiency in analysing key parameters such as clock time period, rise time, transistor switching
CO 5	Apply experimental technique related to mirror galvanometer for the measurement of capacitance and mutual inductance.
CO 6	Determine fundamental constants as ratio e/m (specific charge) form study of beam of electron.
CO 7	Understand how Hysteresis characteristic get demonstrated in the case of magnetic materials by B-H curve plot .

Practical

No.	Study of Digital and Analog Circuits (VSC) Experiments (RUSVSCPHYPO201)	2 Credit
	Group A (Electronics)	**1 credit**
1.	Op-Amp as an Integrator / Differentiator.	
2.	OP-AMP As a Non-inverting Amplifier	
3.	Passive band pass filter.	
4.	Colpitts's Oscillator	
5.	555 timer as Astable Multivibrator	
6.	Transistorized Astable multivibrator	
	Group B (Magnetism)	**1 credit**
1.	Figure of merit of a mirror galvanometer.	
2.	Determination of absolute capacitance using BG	
3.	Determination of the specific charge of the electron (e/m) from the path of an electron beam by Thomson Method.	
4.	B-H Curve	
5.	Mutual Inductance by BG	
6.	Maxwell's Bridge.	

Modality of Assessment: Vocational Skill Course (2 Credit Practical course)

➢ 1. Student doing **mini-project** up to the satisfaction of the Professor or In-Charge of the Practical.
   2. Study Tour: Students participated in study tour must submit a study tour report will be exempted for one practical.

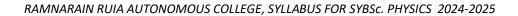**Students must complete Minimum 5 experiments out of 6 from each group.**

➢ **Experiments *Group A and Group B.*** from the list should be reported in the Journal.
➢ **Certified Journal is a MUST** for a candidate to be eligible in the **end semester practical examination**.

External Examination (Semester End) - 25 Marks per group. Total 50 marks.

➢ **Practical exam would be conducted for two groups: Group A and Group B. The assessment for the same is as follows:**

➢ **Semester End Practical Examination:**
   Duration – The duration for these examinations shall be of **90 minutes for each group.** Practical question paper mark distribution.:

Question	Options	Marks
Group A		

1	Laboratory work	**20**
2	Viva	**5**
Total **(= 1 + 2)**		**25**
Group B		
1	Laboratory work	**20**
2	Viva	**5**
Total **(= 1 + 2)**		**25**