St. Xavier's College, Mapusa Goa

Established in 1963

Awarded "College with Potential for Excellence" by UGC (2004)

Re-accredited by NAAC with "A" grade, 4th Cycle (2019)

xavierscollege1963@gmail.com

https://xavierscollegegoa.ac.in/dbt-star-college-scheme

DBT STAR COLLEGE SCHEME

ANNUAL PROGRESS REPORT 2023 – 2024

Acting Principal: Ms. Ursula Barreto

Programme Coordinator: Dr. Trelita de Sousa

Department of Biotechnology

Proforma for submission of Annual Progress Report supported under Star College Scheme

1. Name of the College: **St. Xavier's College**

2. Name of Coordinator, Designation, Address, Phone nos.: **Dr. Trelita de Sousa, Assistant Professor, Department of Microbiology, St. Xavier's College, Mapusa, Goa, +91-9822315746**

3. Assessment duration: **01/04/2023 to 31/03/2024** Duration in years: **01 year**

4. Details of Departments Supported

S. No	Name of Department	Courses (B.Sc./M.Sc./PG Diploma,certificate etc.) offered	Regular Faculty members	
			Total = 58	
			With Ph.D. = 23	WithoutPh.D. = 35
1	Biotechnology	B.Sc.	Nil	Nil
	Microbiology	B.Sc.	04	07
2	Botany	B.Sc.	07	03
3	Chemistry	B.Sc., M.Sc.	06	10
4	Computer Science	B.Sc.	Nil	06
	Mathematics	B.Sc.	02	03
5	Electronics	B.Sc.	01	02
6	Physics	B.Sc.	03	04

5. Number & Date of Advisory committee meeting:

S. No.	Nature	Date	Participants
1	Internal Advisory Committee Meeting (contact mode)	7th July 2023	Local Advisory Committee members

6. Qualitative improvements due to DBT support. Please highlight 5 salient points (within 500 words).

(You may enumerate 5 minor projects where students were involved and their impact or similar activities andtheir outcome; this is for representative purpose and coordinator may include details as per his own choice; kindly refrain from providing philosophical data Avoid any introduction. All the justifications must be very crisp like any aspect non-existent pre-STAR Scheme and you achieved after the grant).

1. **New Hands-on Experiments**

   The procurement of multiple units of basic equipment and instrumentation has enabled introduction of new hands-on experiments thereby equipping students with skills that will help them understand better and find jobs faster.

2. **Mega Outreach Programme**

   All science departments worked together as a unit to bring their individual expertise towards the common goal of promoting science to school students across Goa.

3. **Keeping students updated with Current Research Findings**

   The Journal Club enabled the presentation of research papers and review articles published in reputed high-impact factor journals by our students before a panel comprising an expert from Goa University which helped raise the bar for scientific discussion.

4. **Strengthening of Industry-Academia links**

   Internships, workshops, field trips to prominent industries and institutes, panel discussions with successful alumni from the industry, and technical sessions by renowned industrialists have helped bridge the gap between academia and industry.

5. **Promotion of Green Practices**

   The implementation of effective laboratory waste management and activities promoting sustainable practices like composting and e-waste model-making have sensitized students towards the environment.

Some of the major student-centred activities undertaken under the DBT Star College Scheme include:

1. **Exhibition of Interdisciplinary Innovations**

   All the science departments of the college engaged students of FY, SY, and TY in conceptualizing and conducting interdisciplinary activities including scientific games, experiments, models, and exhibits for National Science Day 2024 including Fingerprint Analysis, Voice recognition and Visual guardian using ML, AI and NLP, and mathematics in magic tricks. Students had an opportunity to understand the principles and applications of laboratory techniques and instrumentation and explore laboratory facilities other than their field of study.

2. **Xavier's Open Lab Day**

A school outreach programme wherein High Schools across Goa were invited to the College campus to have first-hand information about our science laboratories, the types of equipment and instruments available, and the types of undergraduate courses available for higher studies in pure sciences.

3. **Certificate Course "Collection, Isolation, and Identification of Microfungi"**

The Department of Botany organised a 30-hour course for first-year students. The course was a mix of theory and practical sessions covering techniques for collection, isolation, and identification of coprophilous, saprophytic, and endophytic fungi and helped strengthen basics of microfungi.

4. **IOT-based Mini Projects**

The Department of Computer Science organised an exhibition of 22 IOT-based projects to enable students to develop critical thinking and hands-on experience with various technical aspects of internet of things and engineering problems for better engineering understanding and solutions.

5. **Lab to Field Study**

The Department of Microbiology trained final-year students to prepare compost and test their preparation on kitchen plants. The compost preparations were tested based on their filtration efficacy, wealth-to-waste incorporation, and overall appearance.

7. Any Novel aspect introduced or planning to introduce during the Scheme duration.

Novel aspects introduced

- **Xavier's Open Lab Day**

'Open Lab day' was organised on National Science Day for the very first time by the College, wherein all the science laboratories of the college were open to the public. Our College students also were free to visit any laboratory across disciplines to see the models on display and / or participate in the scientific games that were organised. 400+ school children from across the state of Goa visited the laboratories, participated in the scientific activities on display, and were introduced to opportunities available in Science.

- **Collaborative Initiatives with National Institutes for Skill Development**

  The Department of Microbiology collaborated with the Western Regional Instrumentation Centre (WRIC), Mumbai, and the Directorate of Higher Education, Goa to organize a 5-Day Interdisciplinary National-level Workshop on "Operation and Maintenance of Laboratory Equipment". A total of 40 teaching and non-teaching staff members from Goa and Hyderabad were trained in repairs, calibration, and maintenance of laboratory apparatus. Likewise, collaboration with the ICAR-CCARI, Old Goa, with the support of Our Advisory Committee External Expert, Dr. V. Arunachalam, enabled our students of TY Microbiology to have a first-hand study of the working of the PCR (polymerase chain reaction) machine.

- **Panel Discussion with Successful Alumni**

  "Micro-Conversations" was organized by the Department of Microbiology wherein well-placed alumni were invited to share success stories and their journey from St. Xavier's College to their current place of work. Academicians, research scientists, entrepreneurs, laboratory technicians were part of a panel discussion that enlightened the students about options in higher studies and job opportunities in the field of Science.

Novel aspects planning to introduce

- **Hands-on Training on Arduino programming and IoT to implement real-time applications**

  Through this activity, the students will be able to develop their programming skills, robotic implementation skills, and sensor technologies, and integrate these with IOT (Internet of Things) to implement and capture real-time data onto the cloud platform and remotely analyze data in real-time.

- **Workshop on Algae and Fungi**

  Renowned scientists and academicians will be invited as resource persons. Students will learn to collect, preserve, and identify various indigenous algae and fungi and study bioproducts of medicinal and biotechnological value.

- **Bridge Courses and MOOC Programmes**

  With the aim of providing Microbiology courses for students under the broad discipline of Natural Sciences, online courses in Applied Microbiology will be conducted.

8. Lessons learnt / difficulties faced/suggestions if any, in implementation of the programme and utilization of DBT grant. (Max 3 points within 300 words).

- Presenting our progress at the 3rd Review meeting of the Task Force at Rathnavel Subramaniam College of Arts and Science, Coimbatore (7th to 9th February, 2024) was a very insightful and enriching experience and has provided valuable information that will enable us to grow better as an Institute
- The delay in releasing the next installment has been a major setback for us. Although we have continued to conduct activities aligned with the objectives chalked out under the DBT Star College Scheme, it has discouraged the planning and conduct of activities a great deal. Furthermore, a major chunk of our payments is still pending which has never happened before.

9. **Key performance indicators**

S. No	Indicator	Pre-support (2020-2021)								During /After Support (2023-2024)								Remarks
1	No. of students admitted	Total = 224								Total = 193								
		M= 70				F= 154				M= 74				F= 119				
		SC 0	ST 0	OBC 15	G 55	SC 5	ST 1	OBC 47	G 101	SC -	ST 1	OBC 15	G 58	SC 4	ST 2	OBC 37	G 76	
2	No. of students passing out (%) Students Admitted/passing out (pass %)	Biotechnology: 16 (100%)								17 (89.5%) [17 passed, 2 RA*]								
		Microbiology: 75 (100%)								56 (84.84%) [56 passed, 10 RA*]								
		Botany: 20 (100%)								03 (100%)								
		Chemistry: 80 (100%)								57 (81.4%) [57 passed, 13 RA*]								
		Computer Science 26 (100%)								16 (80%) [16 passed, 4 RA*]								
		Mathematics: 27 (100%)								7 (58.33)% [7 passed, 5 RA*]								
		Electronics: 11 (100%)								04 (100%)								
		Physics: 40 (100%)								15 (93.75%) [15 passed, 1 RA*]								
3	Drop-out rates	Biotechnology: 0								0								
		Microbiology: 0								0								
		Botany: 0								0								
		Chemistry: 0								0								
		Computer Science 0								0								
		Mathematics: 0								0								
		Electronics: 0								0								
		Physics: 0								0								
4	No. of students opting for MSc	Biotechnology: 14								16								
		Microbiology: 39								25								
		Botany: 8								3								
		Chemistry: 32								39								
		Computer Science 7								8								
		Mathematics: 20								6								
		Electronics: 3								4								
		Physics: 20								6								
5	Average marks	Biotechnology: 75%								75%								
		Microbiology: 75%								71.25%								
		Botany: 74.03%								80.69%								
		Chemistry: 89.16%								62.19%								

		Computer Science	75.3%	75.02%	
		Mathematics:	60%	60%	
		Electronics:	60%	80.81%	
		Physics:	65%	63.77%	
6	No. of hands-on experiments being conducted	Biotechnology:	90	96	
		Microbiology:	103	113	
		Botany:	176	178	
		Chemistry:	24	43	
		Computer Science	200	215	
		Mathematics:	57	82	
		Electronics:	190	219	
		Physics:	92	96	
7	No. of new experiments introduced	Biotechnology:	0	2	
		Microbiology:	0	1	
		Botany:	0	14	
		Chemistry:	0	16	
		Computer Science	0	14	
		Mathematics:	0	15	
		Electronics:	3	16	
		Physics:	0	4	
8	Publications (scopus indexed) /patents, ifany.	Biotechnology:	0	0	
		Microbiology:	1	0	
		Botany:	1	0	
		Chemistry:	0	0	
		Computer Science	0	0	
		Mathematics:	3	1	
		Electronics:	2	0	
		Physics:	0	0	
9	Training received by faculty	Biotechnology:	0	1	
		Microbiology:	0	6	
		Botany:	0	11	
		Chemistry:	0	7	
		Computer Science	2	3	
		Mathematics:	0	15	
		Electronics:	0	1	
		Physics:	0	11	
10	Exhibitions/seminars /training courses conducted	All Departments	0	1	
		Biotechnology:	2	5	
		Microbiology:	1	20	
		Botany:	0	9	
		Chemistry:	0	3	
		Computer Science	0	3	
		Mathematics:	0	1	
		Electronics:	1	1	
		Physics:	0	0	
11	Books/journals subscribed from grants	Biotechnology:	0	0	
		Microbiology:	3	0	
		Botany:	2	0	
		Chemistry:	0	0	
		Computer Science	0	0	
		Mathematics:	0	0	
		Electronics:	0	0	
		Physics:	0	0	
12	Outreach activities (Popular lectures)	All Departments	0	1	
		Biotechnology:	0	1	
		Microbiology:	0	4	
		Botany:	0	0	
		Chemistry:	0	0	
		Computer Science	0	0	
		Mathematics:	0	0	

		Electronics:	1	0	
		Physics:	1	1	
13	Colleges mentored toapply for DBT Star College grants				
14	Invited lectures	Biotechnology:	1	3	
		Microbiology:	2	4	
		Botany:	0	1	
		Chemistry:	1	5	
		Computer Science	0	3	
		Mathematics:	0	1	
		Electronics:	1	0	
		Physics:	1	1	

*RA: Results Awaited

- Proofs (S.No. 6-14 not more than 5 pages, 1.5 line spacing 11 times roman font size) to be provided duly attested by Principal and Coordinator. **(Attached as Annexure)**

10. Self-evaluation

Department	*Objective (as stated in proposal)	%achieved	Reasons for underachievement/If achieved, state in Quantitative metrics
Biotechnology	1. To provide students with basic understanding and hands-on training on the basic SOPs to handle, calibrate and maintain various equipment and instruments.	100%	2
	2. To highlight the impact of the field of biotechnology through various invited lectures and field trips	100%	2
	3. To upgrade faculty skills in maintenance of laboratory equipment through training workshops	100%	2
Microbiology	1. To inculcate green habits amongst the students through increased hands-on composting projects	100%	2
	2. To strengthen industry-academia links through specialized workshops and internship programmes and guide student career trajectories through job sessions, alumni panel discussions, and competitive exam preparatory sessions	100%	2
	3. To initiate collaborations with national institutes for skill development of faculty members, non-teaching staff, and research scholars	100%	2
	4. To promote scientific temperament, critical thinking, and rational discussion through the journal club	100%	2
	5. To generate awareness and scientific interest in Microbiology in schools through state-level events, workshops, and sessions for school students	100%	2

Botany	1. To provide training to students in estimation of AM fungi in root colonization	100%	2
	2. To create awareness about application of plants through technology transfer	100%	2
	3. To sensitize the students on the environment around us and the use of plants, plant products and nursery and gardening	100%	2
Chemistry	1. To upgrade faculty skills in advanced technology and instrumentation	100%	2
	2. To make students ready for employment in industry through increased hands-on experimentation	100%	2
Computer Science	1. To bridge the gap between academia and industry through increased hands-on experimentation and workshops	100%	2
	2. To promote green technology through the development of e-waste working models	100%	2
	3. To strengthen advanced computational skills through the creation of IOT-based working models and apps	100%	2
Mathematics	1. To upgrade faculty mathematical skills through increased training workshops	100%	2
	2. To sharpen mathematical skills in students through increased hands-on mathematical experimentation	100%	2
Electronics	1. To increase hands-on training of students for ready employment in industry	100%	2
	2. To develop students' skill and expand their knowledge by conducting workshops in the latest technologies.	100%	2
Physics	1. To exposure students to new discoveries and smart technology through advanced teaching	100%	2
	2. To upgrade faculty skills in material science and technology through training workshops	100%	2

* For quantitative analysis you may fix five objective (max) each having 2 marks and accordingly cancalculate the matrix.

Course Coordinator
(With Seal)

PROGRAMME COORDINATOR
DBT STAR COLLEGE SCHEME
ST. XAVIER'S COLLEGE
MAPUSA, GOA.

ST. XAVIER'S COLLEGE GRADE "A" MAPUSA - GOA

Head of the Institution
(With Seal)

ACTING PRINCIPAL
ST. XAVIER'S COLLEGE
MAPUSA - GOA.

Annexure: Key Performance Indicators (2023-2024)

Department	List of Hands-on experiments being conducted	
Biotechnology	1. Preparation and running of agarose gel. 2. Preparation and running of SDS-PAGE gel.	
Microbiology	1. Study of effect of antibiotics on bacterial replication 2. Evaluation of antibiotic action on bacterial transcription by paper disk assay 3. Assay by disk method to determine the effect of antibiotics on bacterial translation 4. Separation of mixture of sugars/amino acids by thin layer chromatography	
Botany	Estimation of AM fungi in root colonization	
Chemistry	1. pH of soil sample 2. Bulk density of soil sample 3. Moisture content of soil sample 4. Conductivity of soil sample 5. Organic content in soil sample 6. pH and conductivity of a water sample 7. Dissolved oxygen in a given water sample 8. Magnesium content	9. Total hardness in the water sample 10. Acidity of a water sample 11. Alkalinity in a given water sample 12. Dissolved CO_2 13. Total solids in water 14. Extraction of essential oils as perfumery and identification of the active compounds 15. Study of the variation of viscosity of an aqueous solution with concentration of solute 16. Calibration of Burette and Pipettes
Computer Science	1. 3-D Printing 2. FIGMA 3. Firebase 4. GitHub 5. Jupyter 6. Water Level Indicator 7. Flappy Bird Game	8. Self-Balancing Robot using Arduino 9. Line Guided Autonomous Vehicle 10.Object Detection Radar 11.Help Indicator with Sound Sensor 12.Fire Alarm System 13.Pandas, Matplotlib, Plotply Express 14.Laser Light Security System using Arduino
Mathematics	1. Finding roots of equations using Bisection method. 2. Finding roots of equations using Regula – Falsi method. 3. Finding roots of equations using Secant method. 4. Finding roots of equations using Newton – Raphson method and Finding qth roots and reciprocals of equations using Newton – Raphson method. 5. Finding roots of polynomials using Bairstow's method. 6. Interpolating data using Newton – Gregory's Forward Difference Interpolation Formula. 7. Interpolating data using Newton – Gregory's Backward Difference Interpolation Formula. 8. Interpolating data using Central Difference Interpolation Formula. 9. Interpolating data using Newton's Divided Difference Interpolation Formula. 10.Interpolating data using Lagrange Interpolation Formula. 11.Computing the first and second order numerical derivative. 12.Calculating the numerical integral using Trapezoidal rule. 13.Calculating the numerical integral using Simpson's 1/3rd and 3/8th rule. Pedagogy 14.Fitting a straight line to a given data. 15.Fitting quadratic and exponential curves to a given data 16.Importing data from CSV or Excel file. Data entry in R/SPSS/PSPP. 17.Finding measures of central tendency, namely, mean, median and mode. 18.Finding measures of dispersion (range, quartile deviation, mean, standard deviation)	

	19.Graphical representations and their interpretations. 20.Analyzing correlation and regression. 21.Testing of hypothesis (single mean, difference of means) by independent & paired t-tests 22.Testing of hypothesis for more than two means using ANOVA. 23.Testing of hypothesis regarding independence of attributes using Chi square test 24.Testing hypothesis using Kruskal Wallis test. 25.Working with questionnaires for understanding the collected data and their analysis.	
Electronics	1. Simple touch sensor using transistor 2. Intruder Alarm 3. Water tank level 4. LED chaser circuit 5. Light intensity measurement using LDR 6. LED flip flop 7. Smoke detector 8. Rain detector	9. Regulator circuit using 7805 10. Adder circuit using opamp IC 741 11. Bridge Rectifier 12. LED flasher using IC 555 13. Water controller circuit 14. Touch plate switch using transistor BC547 15. Fire alarm detector 16. Displaying decimal number on 7- segment display using BCD to 7- segment decoder IC
Physics	1. Table Lamp making 2. Remote control electrical	3. Construction of electrical switch board 4. Staircase wiring Experiment

Department	List of New experiments introduced	
Biotechnology	1. Basic SOPs for handling, calibration and maintenance of equipment and instruments such as micropipettes, weighing balance, autoclave, centrifuge etc. 2. Graphical data representation and analysis using Microsoft Excel.	
Microbiology	Experimental Extraction and Isolation of DNA from strawberry	
Botany	1. Demonstration of tropic responses in plants 2. Preparation of plant-based holi colours 3. Making of handmade paper 4. Preparation of coir stick/coir basket 5. Preparation of a garden in window boxes, troughs and trays 6. Preparation of a terrarium 7. Preparation of any one type of pickle	8. Preparation of fruit juice and squash. 9. Preparation of tomato puree and tomato ketchup. 10.Preparation of jam and marmalade from suitable fruits. 11.Preparation of tutti fruity from raw papaya. 12.Preparation of raisins. 13.Preparation of vinegar from toddy and assessment of pH 14.Preparation of amla and ginger candy.
Chemistry	As listed above under hands-on experiments	
Computer Sci.	As listed above under hands-on experiments	
Mathematics	1. Identifying, using quantifiers, Negating, Compound, Conjunction, disjunction of statements 2. Different forms of implications (converse, negating, and 30 Contrapositive) 3. Different types of proofs in mathematics. 4. Operations on sets like union, intersection, set difference, and complementation 5. Identifying one – one and onto functions – I. 6. Identifying one – one and onto functions – II. 7. Finding "natural" bijections between given sets, finding inverse of a bijective function. 8. Inverse image of subsets under functions. 9. Identifying type of relation, obtaining equivalence classes of an equivalence relation. 10.Using induction principles to establish statements.	

	11. Solving systems of linear equations using elementary operations. 12. Reducing a matrix to row – echelon form using Gaussian algorithm. 13. Solving homogeneous systems of equations. 14. Computing determinants using the properties of determinants. 15. Solving a system of equations using Cramer's rule.
Electronics	As listed above under hands-on experiments
Physics	As listed above under hands-on experiments

Department	List of Publications (Scopus indexed) / Patents
Mathematics	Lobo JZ, Valaulikar YS (2024) Group Classification of Second-Order Linear Neutral Differential Equations, Contemporary Mathematics, 5(2) pp. 1447-1467

Department	List of Training received by faculty
Biotechnology	Anjelica Matias: 5-day National Workshop 'Operation and Maintenance of Laboratory equipment' via Western Regional Instrumentation Centre (WRIC), Mumbai (8-12th Jan 24)
Microbiology	1. Ruella D'Souza: Bioprocess Technology Workshop. BITS Pilani, Goa (20-22nd Feb 24) 2. Arina Frank: Refresher 'Env. Sci. Interdisciplinary' (3-16th Oct 23) at Goa Univ. 3. Dr. Valerie Gonsalves and Nadine de Souza: National Workshop "Operation and Maintenance of Laboratory Equipment" from 8-12th Jan 2024 at St. Xavier's College. 4. Nadine de Souza: National Workshop 'Research Paper Writing and Publication Ethics' on 8-9th September 2023 at Govt. College of Arts, Science & Commerce, Sanquelim 5. Nadine de Souza: State-level Workshop 'Hands-on Training on Sophisticated Analytical Instruments' at St. Xavier's College, Goa (5-7th Feb 2024)
Botany	1. Sabina Sales: Workshop "Learning Outcomes based Curriculum Framework for Undergraduate Education" organised by NEP Cell Goa University on 10-11th Oct 2023 2. Sabina Sales, Dr. Harshala Gad, Dr. Maria D'Souza: Symposium on "Vriksha Vygnanika Sadassu" on 21st April 2024, at Rajbhavan, Goa. 3. Dr. James D'Souza, Dr. Maria D'Souza: Online Refresher Course in Life Science (24th Nov – 8th Dec 2023 organized by UGC-MMTTC, Goa University. 4. Dr. Suraksha Dongrekar, Dr. Seema Fernandes: Inter-disciplinary Refresher course in life sciences from 10-23rd Jan 2023 organised by Goa University. 5. Dr. Maria D'Souza, Dr. Suraksha Dongrekar: 5-day National Workshop 'Operation and Maintenance of Laboratory equipment' via WRIC, Mumbai (8-12th Jan 24) 6. Dr. Seema Fernandes: Training for 'National Deworming Day" by Urban Health Centre Mapusa on 5th Feb 2024 at State Institute of Health and Family Welfare, Mapusa.
Chemistry	1. Shivta Mhamal, Flavia Travasso: Interdisciplinary Refresher Course in Environmental Sciences by Goa University (online) from 3-6th October 2023. 2. Mahesh Nair, Clarence Rodrigues: Refresher Course at the Indian Institute of Science, Challakere Campus, Karnataka from 26th October to 10th November 2023. 3. Dr. Andrew D'Souza: Three-day DBT BUILDER Bioprocess Technology Workshop from 20-22nd February 2024 at BITS Pilani, Goa Campus. 4. Dr. Mira Parmekar, Milagrina D'Souza: NEP 2020 Orientation & Sensitization Programme by UGC-MMTTC, Goa University (16-26th October 2023) in online mode.
Computer Science	1. Prajoti Chimulkar: Refresher in Computational Sciences. Goa Univ. 17 Jan to 1 Feb 24 2. Avani Kharde, Melissa Rodrigues: Inter-disciplinary Refresher Course in Advanced Research Methodology (23 Mar – 5th Apr, 2024) at Ramanujan College, Univ. of

	Delhi.
Mathematics	1. Gajanan Parab: FDP 'Enhancing Final Year Student Projects' at Goa Univ. (8 Jun 2023) 2. Gajanan Parab: FDP 'Introduction to Abstract and Linear Algebra' NPTEL-AICTE Swayam from July to September 2023. 3. Gajanan Parab: State Level Seminar 'Emerging Trends in Mathematics and Computer Science' at Gopal Govind Raiturkar College of Commerce & Economics, Goa (27/09/23). 4. Gajanan Parab: Refresher Course at Indian Institute Of Science, Chellakere Campus, Karnataka from 26 October 2023 to 10 November 2023. 5. Gajanan Parab, Dr. Zen Lobo: MTA Regional Conference Goa 2024 (27-28th Jan 2024) at SCERT Building, Porvorim–Goa. 6. Dr. Zen Lobo: Deputed to IIT Goa (Facul. Enrichmt. Internship Prog.) 19 Jul-4 Dec 2023 7. Dr. Zen Lobo: Short-Term Course "Perspectives on How to do Research" by IIT Goa 19-21st Jul 2023. 8. Dr. Zen Lobo: Refresher in Math. Sci. by Ramanujan College (31 Oct-14 Nov 2023) 9. Dr. Zen Lobo: Workshop "AI & amp; Automation in MS Excel" Skill Nation (4 Feb 2024) 10. Dr. Zen Lobo: Workshop "Research and Review Paper Writing Using Modern and AI Tools" My Research Support, on 18th February 2024. 11. Rahul Naik: Workshop "NEP 2020 Syllabus of FYBCom/BSc Math. organised by Government College of Commerce and Economics, Goa, on 4-20th July 2023 12. Rahul Naik: Refresher "Python and Vedic Mathematics" by Ramanujan College, University of Delhi from 13 July 2023 to 26 July 2023 13. Swapnil Belekar: Deputed at IIT Goa, Farmagudi-Ponda, Goa (FEIP) 08/01/24-03/05/24
Electronics	Operation and Maintenance of Laboratory Equipment (8-12th January 2024)
Physics	1. Avani Talkatkar, Sujay Rane: National Conference on "Physics of Materials & Materials based Device Fabrication 2023" (25-26th Nov 2023) at Shivaji University Kolhapur 2. Avani Talkatkar, Sujay Rane: 5-day National Workshop 'Operation and Maintenance of Laboratory equipment' via WRIC, Mumbai (8-12th Jan 24) 3. Seven faculty members attended "One day workshop on Undergraduate Physics syllabus as per NEP structure" on 8th December 2023 at Goa University

Department	List of Exhibitions/seminars/training courses conducted
All Depts.	Exhibition of Interdisciplinary Innovations on National Science Day (28/02/24)
Biotechnology	1. Field trip to Maka Di Brewery, Goa on 10th April 2023 2. Field trip to Goa Dairy, Ponda-Goa on 27th September 2023 3. Field trip to sewage treatment plant in Tonca, Goa on 29th September 2023 4. Field trip to Mr. Farmer's, Mapusa on 4th October 2023 5. Field trip to Maka Di Brewery, Goa on 14th March 2024
Microbiology	1. Internships: At hospitals, industries and Research Institutes May-June 2023 2. 'Micro Conversations: Exploring Choices and Crafting Futures' – a panel discussion of alumni of the Department of Microbiology (09/09/23) 3. Hands-on training on Microbiological kitchen waste composting (15th Sep, 2023) 4. Natl. Seminar "Expanding the Horizons of Microbiology" cum MBSI meet (07/10/23) 5. "Food for Thought": Quiz on Food and Dairy Microbiology on 18th October 2023 6. Competition on preparation of fermented foods "MicroChef 2023 – The Second

	Helping!" on 19th October 2023 7. Lab to Field Study – Prep. of compost & testing efficacy on kitchen plants (20/02/24) 8. Study Trip for TY students to ICAR-CCARI, Old Goa on 13th and 14th March 2024 9. 'Journal Club 2024' for FY, SY and TY students of Microbiology on 16th March 2024 10. Field Trip to Pathology Lab, District Hospital, Mapusa TY students (20-21st Mar 2024) 11. Career Guidance session "Micro-SCOPE" for SYBSc students on 21st March 2024 12. Water Filter Competition for FY, SY and TY students on 4th September 2023 13. 5-Day Interdisciplinary National-level Workshop for Staff and Research Scholars "Operation and Maintenance of Laboratory Equipment" with Western Regional Instrumentation Centre (WRIC), Mumbai (8-12th Jan 2024) 14. Poster Competition 'Indigenous Technologies for a Developed India' (28th Feb 2024) 15. Hand painting Competition "Climate Change Impacting Our Future" (28th Feb 2024) 16. 'Microbe Masterpieces' – Pebble painting competition on 28th February 2024 17. Inter-departmental "Science Superhero" Competition on 28/02/24 18. Inter-departmental Skit Competition "Science for a Sustainable Future" on 28/02/24 19. 'Proteus 2.0' an Inter-Collegiate Life Science Festival on 6-7th March 2024 20. Consultancy service for Testing potability of water in May 2023
Botany	1. Plant of the week 2023-24 (1st August 2023 to 30th April 2024) 2. Observance of a Day in College (World Habitat Day) Plant Habitat 3rd October 2023 3. Certificate course: Collection, Isolation, Identification of Microfungi (25-28 Oct 2023) 4. Field visit to Mr. Farmer Nursery, Mapusa on 27-30th Sep 2023. 5. Field Trip to Kuddem Kabderam farm on 2nd October 2023 6. Field Trip to Mollem Biodiversity Park, Mollem on 12th October, 2023 7. Field trip to the hill and plateaus at Camurlim on 05th October 2023 8. Field trip to Joggers Park- Medicinal Garden, Althinho, Panjim on 6th October 2023. 9. Field trip to Cazcar Distillery, Nanora, Goa on 27th March 2024
Chemistry	1. 8th State-level Workshop 'Festival of Innovations: Goa's Young Innovators' (15/02/24) 2. GU-ART Exam Training sessions for TYBSc Chemistry on 27th January 2024 3. GU-ART Exam Training sessions for TYBSc Chemistry on 3rd February 2024
Computer Science	1. Workshop: Product Design: Design Thinking by Numadic_Panjim on 25-08-2023 2. Exhibition: IOT-based Mini-Projects at St. Xavier's College on 14th October 2023 3. Exhibition: E-Waste Working Models at St. Xavier's College (9th March 2024)
Mathematics	National Mathematics Day (20/12/2023)
Electronics	"One day State level workshop on NEP 2020 Syllabus meeting" on 07/12/23

Department	List of Outreach activities (Popular lectures)
All Depts.	"Xavier's Open Lab Day" (28/02/24) for 8th and 9th class students of various schools in Goa
Biotechnology	7th annual Inter-HSS event "Biowizards: Potential unleashed" (26/02/24)
Microbiology	1.State-Level Microbiology Event for Schools 'Animalcules 2023' (29th Sep 2023) 2.Career Guidance session (4th Jan 2024) at St. Theresa's High School, Candolim, Goa 3.Hands-on Workshop 'Bioenzyme: an entrepreneur approach' Dhempe College (09/12/23) 4.Scientific talk "Microbes" at Don Bosco High School Panjim (15/07/23)
Physics	Sky Gazing Program on 15th March 2024

Department	List of Invited Lectures
Biotechnology	1. *"Sea anemone"* by Cecilia Menezes, DST-INSPIRE Res. Fellow, NIO, Goa (03/02/24) 2. "Career guidance session" by Asbern Dsilva (JRF, BITS Pilani, Goa) on 03/02/24

	3. Biotechnology in Robotic Surgery by Dirquane Coelho (CMR Surgical India), 03/02/24
Microbiology	1. "Cyber Security" by Adv. Eeshan Usapkar, High Court on 4th April 2023 2. "My Journey after Bachelors in Microbiology at St. Xavier's" by Selvin Solis, University of Surrey, UK (27/07/24) 3. "Competitive Exams: GU-ART/NET/SET": Rachel D'Souza, Goa Univ. (16/02/24) 4. Pursuit of Science in the Arctic Wilderness: Dr. Varada Damare, Goa Univ (16/03/24)
Botany	"Career guidance in Science" by Dr. Wendy Martins at St. Xavier's College on 26/08/2023
Chemistry	1."Hands-on Training on Soil & Water Sampling Techniques" by Satish Patil, Goa College of Agriculture on 16th March 2024 2.'Stress Management & Life Skills' by Zaneta D'Mello & Cipriano Fernandes (30/03/24) 3.'Career Opportunities in Chemistry' by Yekshita Parab, Deccan Fine Chem. (23/03/24) 4.'Essentials in Herbal Topicals' by Dr. Supriya Hyun on 17th February 2024. 5.Soft Core vs Hard Core Chemistry in the light of Education Foresight by Havana Menezes (Wageningen University, Netherlands) & Leo D'Souza (Goa Univ.) (13/01/24)
Computer Science	1. AWS Cloud and IOT 4.0 by Mr. Christopher Rodrigues, Cognizant, UK (09/09/23) 2. Future of AI by Dr. Roopa Praveen, ASM Group of Institutes, Pune (15/01/24) 3. Career Management and Critical Thinking based on Industry Interaction by Abhijit Bhide, Nayan Jadeja and Rahul Bhide on 26th March 2024
Mathematics	"Mathematics and Magic" by Dr. Kalpesh Haria, IIT Goa on 20th December 2023
Physics	"Beyond the Sky" by Dr. Reshma Raut Dessai, Goa University on 15th March 2024.

Course Coordinator
(With Seal)

PROGRAMME COORDINATOR
DBT STAR COLLEGE SCHEME
ST. XAVIER'S COLLEGE
MAPUSA, GOA.

ST. XAVIER'S COLLEGE GRADE "A" MAPUSA - GOA

Head of the Institution
(With Seal)

ACTING PRINCIPAL
ST. XAVIER'S COLLEGE
MAPUSA - GOA.