Departmental Report **(Term I-AY 2024-25)**

Preliminary information

I Department profile

1. Dr. P.Shetty, Head of Dept
2. Dr. S.Murthy
3. Ms. T.Asha
4. Ms. L.Jeysus
5. Sr. R.Khandagale
6. Ms Vaishnavi Ghugare
7. Dr. Aruna Saddupali
8. Ms. Fleme Rodrigues

II Courses/Papers taught

Undergraduate

FYBSc

Fundamentals of Chemistry-1

Fundamentals of Chemistry Practical -1

OE Serendipity: Discoveries triggered by chance

IKS: Minerals and Metals in Ancient India

SYBSc

Major/Minor

Basics of Physical and Analytical Chemistry -I

Basics of Organic and Inorganic Chemistry -I

General Chemistry

Basics Of Physical and Analytical Chemistry- I Practical

Basics of Organic and Inorganic Chemistry -I

General Chemistry Practical

VSC: Separation And Identification Techniques

TYBSc

Chemistry Paper I -Physical Chemistry

Chemistry Paper II-Inorganic Chemistry

Chemistry Paper III-Organic Chemistry

Chemistry Paper IV- Analytical Chemistry

Applied Component- Drugs and Dyes

Chemistry Practical

Applied Component Practical

Post Graduate

MSc Part I

Physical and Inorganic Chemistry

Physical and Inorganic Chemistry Practical

Organic and Analytical Chemistry

Organic and Analytical Chemistry Practical

Advanced Instrumental Techniques

Advanced Instrumental Techniques Practical

Research Methodology

MSc Part II

Quality in Analytical Chemistry

Advanced Instrumental Techniques

Quality in Analytical Chemistry Practical

Advanced Instrumental Techniques Practical

Bioanalytical Chemistry and Food Analysis

Bioanalytical Chemistry and Food Analysis Practical

Research Proposal

III BOS composition

Name	Designation
Dr. Prabha Shetty	Chairperson
Dr. P. Sirisha Murthy	Faculty Member
Ms. Tanaz Asha	Faculty Member
Ms. Lynelle Jeysus	Faculty Member
Sr. Rajani Khandagale	Co-opted Member
Dr. H.R. Parbhat	Vice Chancellor’s Nominee Associate

	Professor, Head, Department of Chemistry, Wilson College, Mumbai
Dr. R.M. Patil	Subject expert (from outside parent University) Professor, Department of Chemistry, Institute of Science, Dr. Homi Bhabha State University,
Prof.I. N.N. Namboothiri	Subject expert (from outside parent University) Professor, Department of Chemistry, IIT Bombay, Mumbai
Dr. Rajiva Kothurkar	Representative from the Industry or the Corporate Sector/Allied Area Head, Country Quality, Novartis India Limited.
Ms. Ankita Yadav	Post graduate meritorious alumnus PhD student at ICT, Mumbai, Textile Department

IV Dates of BOS meeting

23rd September 2024

Report

1. Activities Conducted by the department:

Name of activity	**Date**	**Number of students**	**Guest Speaker Description Proof**
Approach to Good Health and Success	5th July, 2024	50	Guest Lecture by Dr Mukesh Gupta. https://docs.google.com/document/d/1ZUQp_hX2RW5Cs6E-8T1GXWUKc_RrHc49vR2ay9JvlUE/edit?usp=sharing
'CHEMQUEEN'	16th August 2024.	45	Intra collegiate Chemistry Quiz for the UnderGraduate College students organised by the MSc Part II students on general chemistry https://docs.google.com/document/d/1vBP0U-tuUg5OH7PpFgM0SR9FwtBbHKgMKUOv_gZrMKo/edit?usp=sharing
"Positive Health in Women"	16th to 26th July 2024.	46	2 credits online life skill course/Co-curricular course in

			collaboration with Le Nest for the students of Sophia College on from https://docs.google.com/document/d/1EHnHTxYl0EIvRP_OZUDNNBMdhKaOHO3PibFwbq5CHsA/edit?usp=sharing

2. Field trips done by the department :**NIL**

3. Special pedagogical tools used, other than the lecture method

i. **Ball and stick, molecular models, solid state models, chemistry molecular model kit:** Molecular models give a 3-D view of the molecule and thus help students to visualize the molecule and understand the molecular structure better. These were used for topics like:

- Neighbouring group participation for TYBSc class-LJ
- Stereochemistry for TYBSc class-SM
- Molecular symmetry TYBSc -VG
- Stereochemistry for FYBSc class-LJ

ii. **Demonstrations:**

- Azo, Vat and Mordant dyeing methods for a better understanding of the classification of dyes -LJ
- Sampling of free-flowing solid using a sample thief working model for TYBSc class-PS
- Solvent extraction for the separation of copper and methyl red for TYBSc class-PS
- Minerals and semi-gem samples were brought to the IKS class for students to understand better - RK

iii. **Use of PowerPoint presentations by staff:**

FYBSc

- VSC-Food additives and adulteration (all lectures)-TA
- OE Serendipity: Discoveries triggered by chance-LJ
- IKS - minerals and metals of ancient India - RK

SYBSc

- Basics of analytical chemistry, ways of expressing accuracy and precision-PS

TYBSc

- Photochemistry, structural determination of citral and nicotine-LJ
- Classification of dyes based on application, types of fibers, dye-fibre attachment, dyeing methods,basic processes of dyeing.-LJ
- Rotational, vibrational and Raman spectroscopy, surface chemistry, colloids - RK
- Statistical treatment of data, sampling techniques, ion-exchange chromatography, HPLC, chemical calculations, methods of separation-PS

MSc Part I

- DSE Unit 2 all lectures -TA
- DSC Physical Organic Chemistry- LJ

- Language of Analytical Chemistry- TQM and Good lab practices-RK
- Chemical calculations and Stoichiometry-PS

MSc Part II

- MSc Part 2 Paper 2 Unit 2 all lectures-TA

iv. Creative activities/methodologies used for teaching chemistry:

- Recapitulation of basic concepts in chemistry were conducted to bridge the gap in knowledge of students.
  -Six pillars of Chemistry- SM
  - Lewis dot structures and formal Charge- LJ
- Bridge practical session for FY practicals for titration experiment and lab apparatus-RK
- Creative Activities
  - Infographic and PPT on Pharmaceutical Chemistry for TYBSc class-SM
  - Group activity on creation of videos of annulenes using ball and stick models for MSc Part 1 students -LJ
  - Poster making on serendipitous discoveries for OE class.TA, LJ
  - Infographs on Minerals and metals of ancient India and wonders of ancient India for IKS- RK
- Participative Learning
  - Group activity on solving numericals of optical methods for TYBSc class -TA
  - Brain teasers were assigned on NGP reactions and later discussed was held on approach towards the questions in the TYBSc class-LJ
  - A set of questions on a particular concept were given which were solved by the students and then explained to the SYBSc class. SM.
  - Students were asked to solve exercises and share them with the SYBSc class.-SM
  - Group activity on identifying the difference between qualitative and quantitative analysis of components on product labels in SYBSc class-PS.
  - Group activity on Photochemistry for TYBSc class-LJ
- Flipped classroom
  - Inorganic Chemistry for FYBSc class-TA
  - Basics of mechanisms in organic chemistry and natural products for TYBSc class.-LJ
  - Nomenclature for TYBSc class- SM
  - Metallurgy, Vedic era, Minerals, Chalcolithic and paleolithic age for IKS class - RK
- Experiential learning
  - Students made clay models for various concepts like hybridisation, stereochemistry of molecules to understand the concepts for TYBSc class. SM
- POGIL
  - Stereochemistry for TYBSc class-SM
  - Significant figures for SYBSc class-PS
  - Co-ordination complexes - TY Inorganic practical - RK
  - Aromaticity for MSc part-I class.-LJ
- Inquiry based learning
  - Activity various classes of dyes based on application for TYBSc class-LJ
  - Dyeing of natural and synthetic fabric using natural and synthetic dyes for SYBSc class-PS,LJ
- Open book test

- Symmetry elements and point group for TYBSc class.-VG
- Nuclear Chemistry-AS

- Peer Learning:
  - MSc students presented on topics related to environmental Chemistry. -LJ
  - Stereochemistry of substituted chair conformations for TYBSc class-SM
  - Students made flash cards for various catalysts and reagents and its use for conversions which was explained in the TYBSc class-SM
  - Presentation of literature review on applications of surface chemistry - RK
- Use of digital resources
  - Showed videos on topics like photochemistry, basic dyeing processes, various topics in serendipitous discoveries, extraction of essential oil from natural products. LJ
  - Videos on IUPAC and stereochemistry -SM
  - Videos on Pharmaceutical Chemistry-SM
  - Youtube and animation videos-PS,RK
  - Simulations-RK
  - Stereochemistry of cyclohexanes was explained using the gaming app 'Chairs'-SM
  - Used applications like pubchem, chemtube to show the 3D structures of molecules for better understanding.-LJ
  - The following applications were used for administering the quizzes: kahoot testmozz and Quizizz.-LJ
  - Interactive PDF from various sites-PS
  - Shared e-books and important links of reference material and videos-PS,RK
  - BBC Documentary on formation of minerals, how earth was made, fire and metallurgy for FY IKS - RK
  - Material on real world applications of the topics in the syllabus was shared in the G-classroom for further reading.-LJ
- Other methods:
  - Conducted an informal test on Mechanism of organic reactions for TYBSc students.-LJ
  - Use of concept map to teach some topics-LJ
  - Conducted pre and post lab sessions for a few practical sessions.-RK
  - Use of comic- strip for introducing the topic of errors-PS
  - Story telling method for FY-OE lectures-TA

v. Other teaching strategies

Worksheets were provided to students on topics like:

FYBSc

- IUPAC Nomenclature-LJ
- Stereochemistry-LJ
- Thermodynamics-TA

SYBSc

- Thermodynamics and Electrochemistry-AS
- Valence Bond Theory and Molecular Orbital Theory.-VG
- Types and sources of errors, mean, median, standard deviation, range, variance, deviation, relative average deviation, error: absolute error and relative error.-PS

TYBSc

- Pyrolytic elimination pericyclic reactions, Natural products, Construction of Molecular Orbitals-LJ
- Nuclear Chemistry-AS
- Molecular Symmetry.-VG
- 2.5d, 4d and Q test, Null hypothesis:t-test and F-test, graphical representation of data: Method of averages, method of least squares, confidence limit, confidence interval, normality, molarity, ppm, interconversion of concentration units empirical formula, mole fraction and percentage composition, single step, multistep extraction and percentage extraction.-PS
- Substituted cyclohexanes-SM
- IUPAC nomenclature

MSc-I

- Thermodynamics-AS
- Phase Rule-AS
- Oxidation and reduction reactions-LJ

II] <u>Teaching learning in the laboratory (Star College Experiments) :</u>

- Estimation of Ibuprofen content from commercial drug samples for TYBSc class.
- Vitamin C estimation in different samples by redox titration for TYBSc class
- Estimation of antacid content from commercial drug samples for TYBSc class.
- Dyeing of fabric using Natural dyes and checking for washing fastness for TYBSc students
- Separation of plant pigments using TLC for SYBSc class
- Dyeing of fabric with different classes of synthetic dyes based on their application: mordant, azoic, basic, direct for TYBSc students.

4. Any special programs conducted for either /both slow learners and advanced learners.

- Encouraged students to participate in 40th Aptitude Test conducted by Indian Chemical Society whenein 8 students participated from which Ms. Samika Pandey secured 14th Rank
- Ms. Sanan Ansari was selected for the NIUS Chemistry Programme

5. Mentor Mentee programs conducted by the department.

- Every student studying chemistry is assigned a contact teacher who follows up their academic progress/ problems through the year.
- At FY and SY level the practical teacher is the contact teacher whereas T.Y.B.Sc. students are divided into groups and assigned one staff member each as the contact teacher.
- MSc students are assigned to the practical In-charge and Co-ordinator

6. Research Papers Presented NIL

7. Research Grants Received NIL

8. Research Guide for PhD students NIL

9. National or International awards/fellowships received. NIL

10. **Department/ lecturers having research projects funded by Government (include RUSA), Non-Government agencies, college during the year.**
    - Awarded RUSA 2.0 research grant of 1.1 lakhs for project on "Synthesis of CuO Nanoflowers for High-Performance Supercapacitor Applications"
    - Awarded RUSA 2.0 outreach project (2 nd Cycle) grant of 1.79 lakhs. Three schools have been adopted for this cycle which are as follows: Don Bosco, Matunga, Barfiwala School, Andheri and G.E School, Kalyan.

11. **Workshops/seminars/ Conferences conducted during the year. NIL**

12. **Workshops/seminars/ Conferences conducted on Intellectual Property Rights (IPR), during the year. NIL**

13. **Workshops/seminars/ Conferences conducted on Gender related issues during the year. NIL**

14. **Extension activities carried out in the neighborhood sensitizing students to social issues for their holistic development NIL**

15. **E-content development.**
    Created an open textbook on "Thermal methods of analysis" under Open Education for Better World –(OE4BW) 2024. The book is available on OE4BW and ChemLibre platform under campus bookshelves.
    E book link:
    https://chem.libretexts.org/Courses/Sophia_College_for_Women/Thermal_Methods_of_Analysis_(Shetty)

16. **Capacity Development and Skill Enhancement activities organised for improving students' capabilities; like Soft Skills, Language and Communication Skills, Life Skills (Yoga, Physical fitness, Health and Hygiene) & Awareness of Trends in Technology.**

Name of activity	**Date**	**Number of students**	**Skill Enhanced**	**Guest Speaker Description Proof**
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CHEMQUEEN	16th August 2024.	45	Soft Skills	Intra collegiate Chemistry Quiz for the UnderGraduate College students organised by the MSc Part II students on general chemistry https://docs.google.com/document/d/1vBP0U-tuUg5OH7PpFgM0SR9FwtBbHKgMKUOv_gZrMKo/edit?usp=sharing

"Positive Health in Women"	16th to 26th July 2024.	46	Life Skills	2 credits online life skill course/Co-curricular course in collaboration with Le Nest for the students of Sophia College https://docs.google.com/document/d/1EHnHTxYl0EIvRP_OZUDNNBMdhKaOHO3PibFwbq5CHsA/edit?usp=sharing

17. Guidance/coaching for competitive examinations and career counseling offered to students.

Five PMRF (Prime Ministers Research Fellows) students from IIT-B were providing UG and PG students of Sophia College (students registered:50) with guidance for competitive examinations via online sessions six days a week from to 29th July 2024 onwards.
The number of students attending gradually reduced.

18.Patent Filed.

Filed an Indian Patent for a work on Nanocomposite mask in the month of June, it is published on Govt Portal in July

Dr. Prabha Shetty
Associate Professor
Head Department of Chemistry
Sophia College for Women
(Empowered Autonomous)
Date: 23/12/2024