Kalindi College

(NAAC Accredited 'A' Grade)

University Of Delhi

DEPARTMENT OF CHEMISTRY

ACADEMIC SESSION

2020-21

1. Brief Introduction of Department:

Department of Chemistry started in 1967 since the inception of Kalindi College, a constituent college of the University of Delhi, situated in the heart of metro city Delhi. The Department has been working as an integral part from the very beginning of various interdisciplinary courses in the College that comes under Bachelor of Science in General and/or Life Sciences, Honours in Physics and Mathematics. The Department has remained engaged actively in the successful journey of these courses. Right now, Department has run B.Sc. (H) Chemistry and B.Sc. Life Sciences under choice based credit system (CBCS).

Chemistry is an incredibly fascinating field of study which helps us to understand our world and make life easier. This field is essential for meeting our daily needs of food, clothing, shelter, health, energy, clean air, water, soil etc. Chemical technologies improve our quality of life in numerous ways. Furthermore, it is the central science as it connects biology, physics, geology, environmental science. Chemistry is the study of matter and changes it can undergo.

The past decades are considered as the witness for the global perspective of Chemistry in all branch sciences and even in daily life. This era is directly related to the wellbeing of human being which encompasses various modern areas of **Chemical Sciences** such as Chemical Synthesis, Medical Science, Physical Science, Biological Science, Environmental Science, Agriculture Science, Forensic Science and several applied courses of Chemical Sciences. All these modern areas are offshoots of the major domain of Chemical Science called as Chemistry, which directly concerns wellbeing of everyone.

Chemistry is that physical science which includes the study of a range of matter such as atoms, crystals, molecules and many other collections of matter whether they are in isolation or in combination. It also involves the concepts of energy and entropy that are related to the spontaneity of various chemical processes. Since this is a branch of natural sciences, it is commonly known as “The Science of Matter”.

Professionals working in this field are called chemists. They study the various compositions of matter and its concerned properties like density, size, shape and acidity. Usually the chemists specialize in one or more sub disciplines depending on their interests and the choice of their specialized field.

B.Sc. Chemistry is the under graduate degree awarded by many universities in India for the students after the successful completion of their graduation in chemistry. The course in chemistry is useful for the students in various aspects and offers them with bright career. The course helps the students in improving their diverse skills in various areas such as laboratory skills, numerical and computing skills, ability to approach to the problems both analytically and logically, time management skills, etc.

In the continuation of global efforts towards the development of higher education, India has remained a pioneering country through its leading role in the development of Science and Technology. The potential of India to become an international hub for conducting research, a comprehensive knowledge of Chemistry is essential. There is a great demand for this subject. This can be understood from the fact that more than 30% of students, passing from XII Board, apply for Chemistry (Hons.) Course, and are accommodated in the Colleges of Delhi University. The cut off percentage for admission in this subject never goes down below 75% in any of the college of University of Delhi (in maximum college).

The aim of developing India will always remain a dream until unless due importance is not given to female education. The women in India are still striving to enjoy equal privilege in a patriarchal society. A large percentage of the female population in our country is devoid of higher education even after the implementation of several educational policies and programs. The number of available seats in science stream is much laser as per the demand and this discourage and demoralizes the women students if they fail to get admission in college after passing school examination in their choice subject. Thus, it is imperative that Chemistry Honours to be studied at Kalindi College on a priority basis so as to expedite the wheels of inclusive growth and development to create a gender balance so as to move the country forward.

The three year, i.e. six semester based syllabus designed by University of Delhi, includes a comprehensive series of modules in which the students cover all courses related to Chemistry or corresponding applied Courses. Kalindi College aims to provide the student with a sound training in Chemistry. This includes extensive laboratory work to enable the student for acquiring skills to understand various aspects of Chemistry and related areas. The students will also enhance their ability to understand chemical data, learn to apply statistics in research and improve their presentation and writing skills. The student will not only get benefit from the resources available in a well-equipped laboratory but also receive hands-on training, from experienced and well trained teachers of the college, which is an integral part of the course. Such interactions and training will create inquisitiveness in students and further develop their scientific temperament and skill. .

2. Scope of the Subject:

- Chemistry is a leading course designed to encourage aspiring students to pursue an undergraduate programme that will challenge their critical thinking, give practical exposure and prepare them for other rewarding professional careers.
- The course helps the students in improving their diverse skills in various areas such as laboratory skills, numerical and computing skills, ability to approach to the problems both analytically and logically, time management skills, etc.
- The syllabus of Chemistry course (both Honours and Programme) is designed giving a balance of all three modules of chemistry i.e., inorganic, organic, physical. It ensures the fundamental knowledge as well as application to other science disciplines.
- The importance of chemistry would not diminish over time, so it will remain a promising career path. In a nutshell, the study of chemistry provides a vehicle for obtaining an education for life in a broad sense, so welcome to the great world of chemistry.
- After completion of Bachelor Degree in Chemistry (Honours) Course, a large number of Higher Education avenues open up for the student and pursue higher studies such as:
  - **M.Sc. Chemistry**
  - **M.Sc. Analytical Chemistry**

- **M.Sc. Drug Chemistry**
- **M.Sc. Organic Pharmaceutical Chemistry**
- **M.Sc. Physical & Materials Chemistry**
- **M.Sc. Forensic Science**
- **M.Sc. Biochemistry**
- **M.Sc. Polymer Science**
- **Master of Business Administration (MBA)**
- **Research Training and Ph.D.**-A student of Chemistry develops an analytical bend of mind which makes them a good candidate to pursue research training and Ph.D. at renowned National and International Institutes and universities such as University of Delhi, Jawaharlal Nehru Centre for Advanced Scientific Research, Indian Institute of Sciences, Jawaharlal Nehru University, WWF (World Wildlife Fund) and TERI (The Energy and Research Institute) as well as various CSIR (Council for Scientific and Industrial Research) institutes for summer training programs and internships.
- **Teaching assignment**- students can go for school teaching and can teach in various Colleges/Department of University and schools after completion of Ph. D and B.Ed. respectively.
- **Scientists**- various funding agencies especially UGC, DST and CSIR offers a number of Women's Scientist positions particularly aimed at motivating more women to take up research positions. Being a women's college, this is an area which would be tapped by our students if they are adequately exposed to in depth knowledge of the subject.

3. Detail of the Faculty members

S. No.	Name	Designation	Qualification	Area of Specialization
1.	Dr. Aprajita Gaur	Associate Professor	M.Sc., M.Phil., Ph.D.	Inorganic Chemistry
2.	Dr. RenuBala	Associate Professor	M.Sc., M.Phil., Ph.D.	Organic Chemistry
3.	Dr. Shilpika Bali Mehta (Teacher-In-Charge)	Assistant Professor	M.Sc., Ph.D.	Organic Chemistry

4. Details of the Laboratory Staff

S. No.	Name	Designation
1.	Mr. Ashok Kumar	Laboratory Assistant
2.	Mr. Yaspal	Laboratory Assistant
3.	Mr. Bhuvan Chandra	Laboratory Attendant
4.	Ms. Prakashi Das	Laboratory Attendant
5.	Mr. Nitin Kumar	Laboratory Attendant

5. Medium of Instruction: ENGLISH

6. Course Detail:

For Honours Course: B.Sc. (H)Chemistry

1st Year

Semester	Core	Generic Elective	AECC
I	**Core Course I** (Inorganic Chemistry-I): Atomic Structure & Chemical Bonding, Core Course I Practical Lab; **Core Course II** (Physical Chemistry-I): States of Matter & Ionic Equilibrium, Core Course II Practical Lab	GE-1 GE-1 Practical	AECC-I (AECC- Ability Enhancement Compulsory Courses) : English Communications/Environmental Science
II	**Core Course III** (Organic Chemistry-I): Basics and Hydrocarbons, Core Course III Practical Lab; **Core Course IV**	GE-2 GE-2 Practical	AECC-I (AECC- Ability Enhancement Compulsory Courses) : English Communications/Environmental Science

	(Physical Chemistry-II): Chemical Thermodynamics and its Application, Core Course IV Practical Lab		

2nd Year

Semester	**Core**	**Generic Elective**	**SEC**
III	**Core Course V**(Inorganic Chemistry-II): s- and p-Block Elements, Core Course V Practical Lab; **Core Course VI** (Organic Chemistry-II): Oxygen containing Functional Groups, Core Course VI Practical Lab; **Core Course VII** (Physical Chemistry-III): Phase Equilibria and Electrochemical cells, Core Course VII Practical Lab	GE-3 GE-3 Practical	SEC-1
IV	**Core Course VIII** (Inorganic Chemistry-III): Coordination Chemistry, Core Course VIII Practical Lab; **Core Course IX** (Organic Chemistry-III): Heterocyclic Chemistry, Core Course IX Practical Lab;	GE-4 GE-4 Practical	SEC-2

	Core Course X (Physical Chemistry-IV): Conductance and Chemical Kinetics, Core Course X Practical Lab		

3rd Year

Semester	**Core**	**DSE-I**	**DSE-II**
V	**Core Course XI** (Organic Chemistry-IV): Biomolecules, Core Course XI Practical Lab; **Core Course XII** (Physical Chemistry-V): Quantum Chemistry and Spectroscopy, Core Course XII Practical Lab;	DSE-1 DSE-1 Lab	DSE-2 DSE-2 Lab
VI	**Core Course XIII** (Inorganic Chemistry-IV): Organometallic Chemistry, Core Course XIII Practical Lab; **Core Course XIV** (Organic Chemistry-V): Spectroscopy, Core Course XIV Practical Lab	DSE-3 DSE-3 Lab	DSE-4 DSE-4 Lab

List of Generic Elective Chemistry Papers (GE -1 to GE-4) for other Departments/Disciplines:

S.No.	**Odd Semester (I, III)**	**Even Semester (II, IV)**
1.	**GE I:** Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons	**GE IV:** Chemistry of s- and p-block elements, States of matter and Chemical Kinetics
2.	**GE II:** Chemical Energetics, Equilibria & Functional Group	**GE V:** Chemistry of d-block elements, Quantum Chemistry and

	Organic Chemistry-I	Spectroscopy
3.	**GE III:** Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry-II	**GE VI:** Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy
4.	-	**GE VII:** Molecules of life

List of Generic Elective papers (GE-1 to GE-4) from other Discipline to be selected by Chemistry students: (any four)-

1. Mathematics + Tutorial

2. Physics + Lab

3. Economics + Tutorial

4. Computer Science + Lab

Note 1: At least two mathematics papers are compulsory for admission for M.Sc. Chemistry in Delhi University. Discipline (Two Mathematics papers compulsory, two papers of one other discipline may be selected).

List of SEC (Skill Enhancement Courses) :- SEC-1 & SEC-2 (any two)

1. IT Skills for Chemists

2. Basic Analytical Chemistry

3. Chemical Technology & Society

4. Chemoinformatics

5. Business Skills for Chemists

6. Intellectual Property Rights

7. Analytical Clinical Biochemistry

8. Green Methods in Chemistry

9. Pharmaceutical Chemistry

10.Chemistry of Cosmetics & Perfumes

11.Pesticide Chemistry

12.Fuel Chemistry

List of Discipline Specific Elective Papers (DSE-1 to DSE-4):

DSE 1: Any one of the following

1. Novel Inorganic Solids + Lab

or

2. Inorganic Materials of Industrial Importance + Lab

In semester V, apart from the compulsory DSE 1 paper, the options for DSE 2 are

- Green Chemistry
- Industrial Chemicals & Environment
- Analytical Methods in Chemistry
- Applications of Computers in Chemistry.

DSE 3, 4: Any three of the following

S.No.	Group A	Group B
1.	Analytical Methods in Chemistry	Applications of Computers in Chemistry
2.	Instrumental Methods of Analysis	Molecular Modelling & Drug Design
3.	Polymer Chemistry	Green Chemistry
4.	Industrial Chemicals & Environment	Research Methodology for Chemistry

In semester VI, the two papers, DSE 3 & 4 can be chosen one from Group A & one from Group B.

Note 2: Options of GE, SEC and DSE papers offered are as per Department of Chemistry, University of Delhi.

For more details regarding syllabus follow the link:

http://chemistry.du.ac.in/locf.html

For Programme Courses: B.Sc. Life Science (Only Chemistry Paper)

1st Year

Semester	Core	AECC
I	Chemistry-I: Atomic Structure, Bonding, General Organic Chemistry &Aliphatic	Ability Elective Compulsory Courses(AECC-1): English/MIL Communication/ Environmental

	Hydrocarbons, Core Course III Practical Lab	Science
II	Chemistry-II: Chemical Energetics, Equilibria& Functional Group Organic Chemistry-I, Core Course VI Practical Lab	Ability Elective Compulsory Courses (AECC-2): English/MIL Communication/ Environmental Science

2nd Year

Semester	**Core**	**SEC**
III	Chemistry-III: Solutions, Conductance, Electrochemistry & Functional Group Organic Chemistry-II, Core Course IX Practical Lab	SEC-1
IV	Chemistry-IV: Chemistry of s-and p-block elements, States of matter and Chemical Kinetics, Core Course XII Practical Lab	SEC-2

3rd Year

Semester	**DSE**	**Generic Elective**	**SEC**
V	**DSE Chemistry-I**: Chemistry of d-block elements, Quantum Chemistry and Spectroscopy, DSE Chemistry-I Lab	**NA**	SEC-3
VI	**DSE Chemistry-II**, DSE Chemistry-II Lab	**NA**	SEC-4

List of Discipline Specific Electives (DSE-I to II): Chemistry

DSE I:

Chemistry of d-block elements, Quantum Chemistry and Spectroscopy + Lab (compulsory)

DSE II: (any one)

1. Applications of Computers in Chemistry + Lab
2. Analytical Methods in Chemistry + Lab
3. Molecular Modelling & Drug Design + Lab
4. Novel Inorganic Solids + Lab
5. Polymer Chemistry + Lab
6. Research Methodology for Chemistry + Lab
7. Green Chemistry + Lab
8. Industrial Chemicals & Environment + Lab
9. Inorganic Materials of Industrial Importance + Lab
10. Instrumental Methods of Analysis + Lab
11. Organometallics, Bio-inorganic Chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy + Lab
12. Molecules of Life + Lab
13. Dissertation+ Lab

List of Skill Enhancement Courses (SEC-1 to 4): (any four): **Chemistry**

1. IT Skills for Chemists
2. Basic Analytical Chemistry
3. Chemical Technology & Society
4. Chemioinformatics
5. Business Skills for Chemists
6. Intellectual Property Rights
7. Analytical Clinical Biochemistry
8. Green Methods in Chemistry
9. Pharmaceutical Chemistry

10. Chemistry of Cosmetics & Perfumes

11. Pesticide Chemistry

12. Fuel Chemistry

Note: Options of SEC and DSE papers offered as per Department of Chemistry, University of Delhi.

For more details regarding syllabus follow the link:

http://chemistry.du.ac.in/locf.html

7. Infrastructure:

One Lecture Room, Two Chemistry Laboratories, One Instrument Room, One Store Room, Three Teacher Rooms.

To cater to the need, and to groom the interest of students towards science, the Department of Chemistry has two well-equipped laboratories (space for 60 students in laboratory-1, 40 students in laboratory-2) for conducting practical classes which are managed by well experienced and capable staff. The Laboratories have been upgraded and well equipped with the instruments, glassware to make learning more interesting and congenial with new advancements and separate facilities like Filtration Room, Balance Room, Fuming Cupboard, Preparation Room, Instrument Room, etc. Moreover, the laboratory has all the necessary infrastructure and equipment to conduct practical as per the requirements, which are also prescribed in the various syllabus of interdisciplinary courses. In addition to the laboratory a instrument room has been designated for various instrumental chemistry practical. Department of Chemistry has also a good collection of books.

- **Details of Infrastructural Facilities**

a) ***Laboratory*****:** The Department has 2-spacious well-furnished laboratories: Lab-1 for 40 students and Lab-2 for 20 students with water, electricity and gas connections on each working bench along with following provisions:

b) ***Preparatory & Balance Room:*** Attached with laboratory, **these rooms are** fabricated with concrete slabs furnished with tiles to stock the entire chemicals and glassware necessary for conducting practical classes. Balance Room is equipped with electronic single pan balance.

c) ***Store Room:***The chemistry store room is spacious and furnished with shelves and cupboards to store glassware and chemicals safely.

d) ***Filtration Room:***It is equipped with 3 filtration units.

e) ***Instrument Room:*** Is a cosy, neat and air-conditioned room having tiled slabs, sufficient almirahs and electrical points for use & storage of delicate equipments

f) Equipment in Laboratories

- Spectrophotometer with printer
- Potentiometer
- Polarimeter
- Flame-Photometer with printer
- Digital pH meter
- Conductometer
- Electric balances
- Colorimeter instruments
- Facility for chemical complex/ compounds synthesis
- Desktop

g) Class rooms with ICT facility: The College has provided the class rooms in the academic block with ceiling mounted LCD projectors for use of audio visual aids in teaching.

h) Students' Cyber Centre: As the computational approach became the integrated part of education system and it connects the students and faculty to outside the class at a rapid rate. College has a fully air conditioned **Cyber Centre** with the facilities of ICT that acts as a medium to disseminate our curriculum which includes papers like Bioinformatics and Evolutionary Biology.

8. Award and Achievements:

- **Teacher (Academic only)**

Dr. Shilpika Bali Mehta become Life time member of "**Society for Promotion of Education and Science (SPES)**", Delhi, India

9. University Rank Holder (name of students, if any) **& No. of O Grade and A+ grade Achievers** (Number only for last year 2018-19 result)

S. No.	Course	O Grade (No. of Students Under CBCS)	A+ Grade (No. of Students Under CBCS)
1	B.Sc. (H) Chemistry	22	74
2	B.Sc. Life Science	2	33

10. Research in Department:

In-house Project Code: 02/2019

Number of Undergraduate students Involved in the project: 15 Students

Faculty Members: Dr. Aprajita Gaur, Associate Professor, Department of Chemistry, Kalindi College, University of Delhi

Dr. Swati, Assistant Professor, Department of Chemistry, Kalindi College, University of Delhi

Dr. Rajesh Kumar, Assistant Professor, Department of Chemistry, Kalindi College

Students:

- B.Sc. (H) Chemistry 3rd Year: Arushi, Sophiya Saifi, Princi Singhal, Sakshi Pal, Kalpana Poonia, Yashika Aggarwal

Synthesis of ZnO nanomaterial by precipitation method and Characterization for Photocatalytic degradation of contaminants in water

Rs.20,000/-

11. Highlights of Department Society Activity:

The Chemical Society, **'□□□ion'** of Kalindi College was formed on 29th August, 2018 in Chemistry Laboratory - II. It is an academic organization which includes the undergraduate students of B. Sc. (H) Chemistry as their members. The vision of the society is to show students the true light of chemistry and how it plays a vital role in our daily lives.

The Chemistry Department has celebrated one day festival on **"United Nations, International Year of Periodic Table of Chemistry Elements, 2019"** under the Chemical Society, **'□□□ion'**. An invited talk on **Solid State & Its Applications** by **Dr Firasat Hussain**, an Assistant Professor in the Department of Chemistry of University of Delhi and some academic activities were organized during the academic session of 2019-20.

The students have actively participated and showed their zeal and zest. The events were Oral Presentation, Poster Presentation, Paint the symbol of Chemistry Element Competition, Quiz Competition.

Exciting cash prizes and certificates were also given to the students for their performance.

12. Scholarships and Prizes (if any)

B.Sc. (H) Chemistry:

Name	Criteria for Award	Name of Student
Academic Prize	Standing First in B.Sc. (H) Chemistry I Year	NEHA
Academic Prize	Standing First in B.Sc. (H) Chemistry II Year	NITYA
Tamanna Sanjay Srivastava Memorial Prize	Highest marks in B.Sc. (H) Chemistry, Sem I & II	NEHA
Tamanna Sanjay Srivastava Memorial Prize	Second highest marks in B.Sc. (H) Chemistry, Sem I & II	AASTHA
Tamanna Sanjay Srivastava Memorial Prize	Highest marks in B.Sc. (H) Chemistry, Sem I, II, III & IV	NITYA
Tamanna Sanjay Srivastava Memorial Prize	Second highest marks in B.Sc. (H) Chemistry, Sem I, II, III & IV	KASHISH

B.Sc. Life Science:

Chemistry Teachers Prize	Highest Marks in Chemistry in B.Sc. LS Sem I & II	RUSHALI
Chemistry Teachers Prize	Highest Marks in Chemistry in B.Sc. LS Sem III & IV	PRIYAL TANEJA
P. K. Kapoor Prize	Standing Second in Chemistry in B.Sc. Life Sciences I, II, III, IV semesters combined	SHEETAL SINGH
Vishwa Nath Mangal Memorial Prize	Highest Marks in Chemistry in B.Sc. Life Sciences all semesters combined	PRACHI GARG
Academic Prize	Standing First in B.Sc. Life Sciences I Year	POONAM
Academic Prize	Standing Second in B.Sc. Life Sciences I Year	NEHA
Academic Prize	Standing First in B.Sc. Life Sciences II Year	PRIYAL TANEJA
Academic Prize	Standing Second in B.Sc. Life Sciences II Year	RIYA ARORA
Academic Prize	Standing Second in B. Sc. Life Sciences II	SHEETAL SINGH

	Year	
Academic Prize	Standing First in B.Sc. Life Sciences III Year	SHRADDHA GUPTA
Academic Prize	Standing Second in B.Sc. Life Sciences III Year	PRACHI GARG

13. Distinguished Alumni

S. No.	Name of the Alumina	Current Status/Position
1.	Mrs. Vinny Sharma Shah, (B.Sc. Life Science, 2006-2009)	Assistant Professor, Forensic science, Galgotias University, since 2014, associated with ePGPatshala, Editor, Indian Botanist journal, Member Editorial Board, International journal of Forensic Science.
2.	Pratibha, (B.Sc. Life Science, 2006-2009)	A guiding force for new students at the Tokyo Riverside Academy in the heart of culturally important temple town of Asakusa in Tokyo. In a recent life-event, Pratibha moved to the UK after spending a glorious 4 year stint at Japan. She's looking forward to exploring the historical city of London and traveling across the country.
3.	Pankaj, (B.Sc. Life Science, 2006-2009)	Working in KVS Air Force Station Halwara Punjab

14. Images


rsi on : the chemical society
KALINDI COLLEGE
Preparation Room
Balance Room


LABORATORY SAFETY
Preparation Room
rsi on : the chemical society
KALINDI COLLEGE
Balance Room


rsnion : the chemical society
KALINDI COLLEGE
(University of Delhi)
NAAC Accredited with Grade "A"

KALINDI COLLEGE

(UNIVERSITY OF DELHI)

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