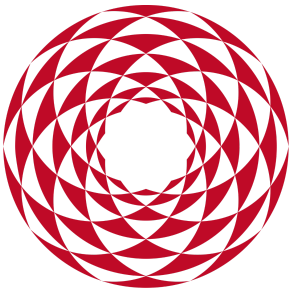

ASHOKA UNIVERSITY

Chemistry Department

Student Handbook

Updated Monsoon 2023

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Chemistry at Ashoka

The Chemistry curriculum for the Monsoon 2023 semester in the undergraduate program at Ashoka University has been meticulously designed to cater to students of all levels. Its benefits extend beyond those pursuing a major in Chemistry, reaching individuals interested in a minor, concentration, or even those with a general curiosity about the subject. The core emphasis of this syllabus is to foster a comprehensive understanding of Chemistry among all students.

Chemistry occupies a fundamental role in our daily lives, transcending the boundaries of one's profession. Ordinary activities like cooking, baking, using household products, or taking medication inherently involve chemical processes. The study of Chemistry provides insights into molecular intricacies, a grasp of chemical bonding, and a vivid comprehension of bond formation and rupture, encapsulating the entirety of a reaction. At Ashoka, our mission involves teaching Chemistry through an integrative and holistic approach that intersects with other scientific domains, including physics, biology, computer science, and environmental science. Our consistent effort is to establish meaningful connections with these disciplines, thus nurturing the diverse interests of our students. We are eagerly anticipating the Chemistry department's integral role in shaping the fabric of Ashoka University in the near future.

Moreover, the Chemistry department is devoted to advancing innovative and contemporary research. Successful chemistry research is built upon a strong foundation of fundamental principles. Our aim is to nurture your potential as an aspiring researcher by grounding you in the essential concepts of organic, inorganic, and physical chemistry during this semester. We hold great confidence that this knowledge will serve as a catalyst for your success across various fields of science and humanities.

The Undergraduate Major

The chemistry major at Ashoka University is crafted with the fundamental belief that acquiring a degree in chemistry equips students with the versatility to chart their own course, be it within academia, industry, immediate professional pursuits, or continued exploration in the realm of chemistry or related fields. This program offers something valuable for every individual, ensuring a pathway tailored to their aspirations and ambitions.

The chemistry major must complete a **total of 14 courses** to get a graduate degree from Ashoka University. This includes **6 core theory courses, 4 lab courses, and any 4 electives.** Courses offered by the chemistry department or cross-listed with the chemistry department will be counted. The final year students will be offered a proposal writing course and can pursue independent research in the department.

Core (theory) courses:

- Topics in Chemistry (Semester II)
- Energetics of Change (Semester II)
- Atoms, Quanta, and Light
- Structure and Understanding of Metals (Semester III)
- Concepts in Organic Chemistry (Semester III)
- Organic Chemistry: From Nature to Laboratory

Lab courses:

- Introductory Laboratory Course - Lab 1 (Semester II)
- General Chemistry Laboratory - Lab 2 (Semester IV)
- General Chemistry Laboratory II - Lab 3 (Semester V)
- Advanced Chemistry Laboratory - Lab 4 (Semester VI)

Note: Topics in Chemistry and Introductory Laboratory Course are **gateway courses**. These courses are designed to instil a fundamental comprehension of the subject and to initiate students into the realm of chemistry at the undergraduate level.

Electives

Elective courses play a crucial role in expanding the scope of knowledge acquired from core courses, thereby enhancing students' comprehension of the subjects. Within the Chemistry Department at Ashoka, a diverse array of elective options is available, frequently intersecting with other academic disciplines. This approach ensures a comprehensive and all-encompassing advancement of individuals' knowledge, contributing to a well-rounded and holistic educational experience.

A major in chemistry must choose **at least 4 electives** to graduate.

Suggested Electives

- Rate, Order, and Mechanism
- Computational Aspects of Drug Discovery
- Computational Chemistry and Molecular Simulation
- Applied Organometallic & Coordination Chemistry
- Modern Methods of Analysis and Characterization
- Nanomaterials
- Energy Materials: Batteries, Supercapacitors etc.
- Chemistry of Materials
- Green Chemistry
- Environmental Analysis
- Chemical Biology
- Research Project/ISM

Minor & Concentration

The Chemistry Department warmly welcomes students from diverse academic backgrounds to engage with chemistry at any level. This encouragement stems from the belief that an understanding of chemistry can profoundly enrich one's comprehension of science in our daily lives, shed light on research methodologies, and cultivate an appreciation for scientific inquiry

To pursue a **minor** in Chemistry at Ashoka, students must take **6 courses** that are either offered by, or cross-listed with the Department of Chemistry. **4 theory courses and any 2 electives** can be chosen to complete a minor in Chemistry. Lab courses shall be considered as elective courses.

To pursue a **concentration** in Chemistry, students must complete a minimum of **4 courses, of which at least 1 may be an elective.** A lab course will also be accepted as an elective.

Course Timeline

Courses offered in Monsoon 2023: (Semester III +V)

- ✧ Atoms, Quanta and Light (Theory)
- ✧ Structure and Understanding of Metals (Theory)
- ✧ Concepts in Organic Chemistry (Theory)
- ✧ Organic Chemistry from nature to Laboratory (Theory)
- ✧ General Chemistry Laboratory I (Lab course)
- ✧ General Chemistry Laboratory II (Lab course)
- ✧ Application of Computational Chemistry (Theory/ASP)
- ✧ Structure Elucidation of Organic Molecules (Theory/ASP)
- ✧ Nanomaterials (Theory/ASP)

(Tentative)

Courses to be offered in Spring 2024: (Semester II + IV +VI)

- ✦ Topics in Chemistry (Gateway theory)
- ✦ Introductory Laboratory Course (Gateway Lab Course)
- ✦ Energetics of Change (Theory)
- ✦ Inorganic Chemistry (Theory)
- ✦ Rate, Order and Mechanism (Theory)
- ✦ Elective I (Theory)
- ✦ General Chemistry Laboratory (Lab Course)
- ✦ Mechanistic Organic Chemistry (Theory)
- ✦ Elective II (Theory)
- ✦ Elective III (Theory)

Prerequisites

For gateway courses and those at the 1000-2000 level, there are no specific prerequisites, making them open to all students.When professors require a certain level of prior knowledge from students for a course, you can find information about any prerequisites in the course catalogue or directly inquire with the professors.

Frequently Asked Questions

You can direct your queries to the following persons of contact:

Chemistry Student Representative, Prashuchi Pandey : chem.rep@ashoka.edu.in

UG Programme Coordinator, Dr. Aryya Ghosh : aryya.ghosh@ashoka.edu.in

Head, Department of Chemistry, Dr. Sourav Pal : hod.che@ashoka.edu.in

Can laboratory courses be counted as an elective?

When pursuing a major in chemistry, it is a requirement to complete all 4 laboratory courses, in addition to a minimum of 6 core theory courses and 4 electives. However, for students considering a minor or concentration in chemistry, the laboratory courses have the flexibility to be counted as electives

Will the labs be independent of the theory courses - in terms of number of credits (and hours)?

All labs are stand-alone courses and mandatory for Chemistry major students. They each count for the same number of credits as theory courses.

I am interested in TA'ing for a Chemistry course. How can I apply?

If you're interested in becoming a Teaching Assistant (TA) for a Chemistry course, the process involves contacting the relevant professors either through email or in person during their office hours, based on the specific requirements of the course. Please keep in mind that TA-ships are generally offered based on the existing need for assistance in the course. Additionally, it's important to note that Ph.D. students are mandated to undertake Teaching Fellowships (TF) for courses as an integral component of their program.

I am a Biology/ Physics/ EVS major. Can I take biochemistry, Theoretical chemistry or Physical chemistry and environmental chemistry?

As a Biology, Physics, or EVS major, you are welcome to enroll in courses such as biochemistry, Theoretical chemistry, Physical chemistry, and environmental chemistry. However, before enrolling, we recommend that you reach out to the respective professors or the Head of the Department for guidance and approval.

Do I need to complete electives for different levels?

Not necessarily, the primary objective is to allow you the freedom to select electives based on your individual interests and preferences. Elective courses are available across levels ranging from 2000 to 4000. For a major, you can opt to complete any 4 electives, while for a minor, 2 electives are required, and 1 for a concentration.

I am a Psychology/Math/Physics/Computer Science/Environmental Studies student and I would like to minor in Chemistry. Will any of those courses be cross listed with Chemistry and count towards my Chemistry credits?

Yes, courses that are cross-listed with Chemistry will indeed count toward your Chemistry minor. The Chemistry Department is actively working on introducing additional cross-listed courses in collaboration with various departments. For any inquiries regarding course-related matters or cross-listing requests, you can reach out to the student representative. Additionally, keep an eye out for upcoming cross-listed courses as they are announced.

What about research opportunities? Are Chemistry students expected to learn from hands-on experience or in the classroom?

We are committed to the concept of the ASP year as a dedicated period for undergraduates to engage in substantial year-long research endeavours. Moreover, numerous summer opportunities for science-related research are available, allowing undergraduates to initiate research in labs of their choice at Ashoka University as they progress through their undergraduate degree. We actively encourage students to undertake small projects with professors at any time of the year.

In what research areas will the Ashoka Chemistry programme specialise in?

We are committed to fostering specialisation in various domains of Chemistry, extending into interdisciplinary realms with pure sciences. Our research offerings encompass diverse fields such as Material Science, Inorganic Chemistry, Bioinorganic Chemistry, and Theoretical and Computational Chemistry. This presents a unique opportunity for undergraduates to engage in research alongside esteemed professors, enriching their academic journey through hands-on experience and mentorship.

What is the degree that is offered at Ashoka? Is it a B.Sc. in Chemistry?

The 3-year degree you get if you specialise in Chemistry would be a B.Sc. Hons. However, the additional qualification you get for the fourth year would be named as per the norms of the State Government.