

CURRICULUM & SYLLABUS



CHOICE BASED CREDIT SYSTEM (CBCS)

FOR

MASTER OF SCIENCE (M.Sc.)

(2 Year Postgraduate Degree Programme) IN

CHEMISTRY

[w. e. f. 2023 onwards]

FACULTY OF SCIENCE & HUMANITIES SRM UNIVERSITY

DELHI-NCR, SONEPAT

Plot No.39, Rajiv Gandhi Education City, P.S. Rai, Sonapat Haryana-131029

Vision

Department of Chemistry is committed to provide intellectual, innovative & motivational surroundings to students and faculty members. Department is focused to contribute for academic, scientific, research and experimental knowledge through excellence and to produce scientist, researchers and bureaucrats. Department wants to strive and achieve reputation of seeking attention of Government of India and use of others to be invited to provide services on the subjects involving Chemistry and allied areas.

Mission

- To improve the problem-solving capability of students through continuous learning to produce quality Chemists, Scientists, Academic intellectuals etc. in the field of Science and Technology.
- To bridge the gap between industry and academia by imparting technical/experimental knowledge along with its application in the practical world.
- To encourage innovation through multidisciplinary research and development activities.
- To inculcate human values and ethics into students to serve the society and nation with utmost devotion.
- To develop the overall personality of students along with the learning process simultaneously.

PROGRAM REQUIREMENT

General Education Requirements: Applied Science and Humanities (ASH)

Basic Science Requirements: Fundamental Sciences (FS) Core Sciences (ES) through regular/online mode

Disciplinary Requirements comprising of:

Department Name: Department of Chemistry-Core courses (through regular/online mode)

Department Name: Department of Chemistry/Mathematics/CSE-Electives (through regular/online mode)

Department Name; Department of Chemistry-Open Electives (through regular/online mode)

Practical and Research component:

1. Regular Practical and Research
2. Summer Internships
3. Specialized courses through the Study Abroad program
4. Minor and Major Project
5. Industry internship through the semester.

CHEMISTRY POST GRADUATE EMPLOYABILITY ATTRIBUTES

- Sound Knowledge and Understanding of the Domain Area.
- Analytical & Critical Thinking and Problem-Solving Skills.
- Scientific Temperament Towards Research & Innovation for the Betterment of Society.
- Efficient Communication & Presentation Skills.
- Dependability, Reliability, Responsibility and Independent Leadership Abilities.
- Awareness about Recent and Modern Applications and Techniques.

PROGRAM EDUCATIONAL OBJECTIVES

Degree is awarded to candidates who have completed the course and who have met the assessment criteria for all written, major/minor projects and practical examination/assignments. The overall assessment aims for each topic are that candidates should be able to:

- ❖ Grasp the concepts while teaching in classes.
- ❖ Interpret and analyze the questions.
- ❖ Bridge the multiple concepts of various topics via numerical and Practicals/Projects.
- ❖ Extract critical knowledge from the comprehensive topics.
- ❖ Ability to write & review of scientific articles.

PROGRAM LEARNING OUTCOMES

On successful completion of this program, students will:

- ❖ Have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistry.
- ❖ Think critically and analyze chemical problems.
- ❖ Present scientific and technical information resulting from laboratory.
- ❖ Should broaden their professional foundations through activities such as teaching, internships, and fellowships.
- ❖ Use technologies/instrumentation to gather and analyze data.
- ❖ Should be able to communicate scientific results in writing and in oral presentation.
- ❖ Should acquire the basic tools needed to carry out independent chemical research. Students should become proficient in their specialized area of chemistry and successfully complete an advanced research project.
- ❖ Will be able to describe the common methods of spectroscopic and chromatographic analysis, and discuss how they can be applied to pharmaceuticals.

MAPPING OF PROGRAM EDUCATIONAL OBJECTIVES AND PROGRAM LEARNING OUTCOMES

| Program Education al Objectives (PEOs) | Program Learning Outcomes (PLOs) | | | | | | | |
|--|----------------------------------|----------|----------|----------|----------|----------|----------|----------|
| | PLO 1 | PLO 2 | PLO 3 | PLO 4 | PLO 5 | PLO 6 | PLO 7 | PLO 8 |
| PEO1 | | | | | | | | |
| PEO2 | | | | | | | | |
| PEO3 | | | | | | | | |
| PEO4 | | | | | | | | |
| PEO5 | | | | | | | | |

PROGRAM STRUCTURE

| Category of Course | Abbreviations | No. of Courses | Credits |
|------------------------------------|---------------|-----------------|-----------|
| Core Courses | CC | 22 | 74 |
| Discipline Specific Elective (DSE) | DSE | 2 | 8 |
| Open Elective (OE) | OE | 2 | 8 |
| Total Courses Offered | | 26 (T+P) | 90 |

Program Credit Structure

| Category/Semester | I | II | III | IV | No. of Courses | Credits | % |
|-------------------------------------|-----------|-----------|------------|-----------|-----------------------|----------------|--------------|
| Core course (CC) | 18 | 18 | 20 | 18 | 22 | 74 | 82.22 |
| Open Elective (OE) | 4 | 4 | - | - | 2 | 8 | 8.88 |
| Discipline Specific Elective | - | - | 4 | 4 | 2 | 8 | 8.88 |
| Total | 22 | 22 | 24 | 22 | 26 | 90 | 100 |

SEMESTER-I

| Code | Category | Course | L | T | P | C |
|---------------------------------|----------|--|------------|----------|-----------|-----------|
| Theory | | | | | | |
| 23CYMS101 | CORE | Inorganic Chemistry-I (Co-ordination and Rare Earth Metals) | 4 | 0 | 0 | 4 |
| 23CYMS102 | CORE | Organic Chemistry-I (GOC and Stereochemistry) | 4 | 0 | 0 | 4 |
| 23CYMS103 | CORE | Physical Chemistry-I (Quantum Chemistry and Chemical Kinetics) | 4 | 0 | 0 | 4 |
| 23GECY101/ 23GECY102 | GE | GE-I | 4 | 0 | 0 | 4 |
| Practical | | | | | | |
| 23CYMS151 | CORE | Inorganic Chemistry Practical –I | 0 | 0 | 4 | 2 |
| 23CYMS152 | CORE | Organic Chemistry Practical -I | 0 | 0 | 4 | 2 |
| 23CYMS153 | CORE | Physical Chemistry Practical –I | 0 | 0 | 4 | 2 |
| Total | | | 16 | 0 | 12 | 22 |
| Total Contact Hours | | | 330 | | | |

SEMESTER-II

| Code | Category | Course | L | T | P | C |
|---------------------------------|----------|---|-----------|----------|-----------|-----------|
| Theory | | | | | | |
| 23CYMS201 | CORE | Inorganic Chemistry-II (Organometallic Chemistry) | 4 | 0 | 0 | 4 |
| 23CYMS202 | CORE | Organic Chemistry-II (Organic Spectra and Reagents) | 4 | 0 | 0 | 4 |
| 23CYMS203 | CORE | Physical Chemistry-II (Statistical Thermodynamics & Electrochemistry) | 4 | 0 | 0 | 4 |
| 23GECY201/ 23GECY202 | GE | GE -II | 4 | 0 | 0 | 4 |
| Practical | | | | | | |
| 23CYMS251 | CORE | Inorganic Chemistry Practical-II | 0 | 0 | 4 | 2 |
| 23CYMS252 | CORE | Organic Chemistry Practical -II | 0 | 0 | 4 | 2 |
| 23CYMS253 | CORE | Physical Chemistry Practical -II | 0 | 0 | 4 | 2 |
| Total | | | 16 | 0 | 12 | 22 |

SEMESTER-III

| Code | Category | Course | L | T | P | C |
|-------------------------------|-----------------|--|-----------|----------|----------|-----------|
| Theory | | | | | | |
| 23CYMS301 | CORE | Structure and Mechanism in Organic Chemistry | 4 | 0 | 0 | 4 |
| 23CYMS302 | CORE | Inorganic and Physical Spectroscopy | 4 | 0 | 0 | 4 |
| 23CYMS303 | CORE | Bio-Inorganic and Bio-Organic Chemistry | 4 | 0 | 0 | 4 |
| 23CYMS304 | CORE | Photochemistry and Pericyclic Chemistry | 4 | 0 | 0 | 4 |
| 23CYMS305/ 306/307 | DSE | DSE-I | 4 | 0 | 0 | 4 |
| Practical | | | | | | |
| 23CYMS351 | CORE | Chemistry Practical III | 0 | 0 | 4 | 2 |
| 23CYMS352 | CORE | Chemistry Practical IV | 0 | 0 | 4 | 2 |
| Total | | | 20 | 0 | 8 | 24 |

SEMESTER-IV

| Code | Category | Course | L | T | P | C |
|---------------------------|-----------------|---|-----------|----------|----------|-----------|
| Theory | | | | | | |
| 23CYMS401 | CORE | Group Theory | 4 | 0 | 0 | 4 |
| 23CYMS402 | CORE | Natural Products and Protecting Agents | 4 | 0 | 0 | 4 |
| 23CYMS403 | CORE | Retrosynthesis and Disconnection Approach | 4 | 0 | 0 | 4 |
| 23CYMS404/ 405 | DSE | DSE-II | 4 | 0 | 0 | 4 |
| Project | | | | | | |
| 23CYMS471 | CORE | Project | 6 | 0 | 0 | 6 |
| | | Total | 22 | 0 | 0 | 22 |

LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES

| Code | Category | Course | L | T | P | C |
|--|----------|---|----------|----------|----------|----------|
| Discipline Specific Elective-I | | | | | | |
| 23CYMS305 | DSE | Green Chemistry | 4 | 0 | 0 | 4 |
| 23CYMS306 | DSE | Analytical Chemistry | 4 | 0 | 0 | 4 |
| 23CYMS307 | DSE | Pharmaceutical Chemistry | 4 | 0 | 0 | 4 |
| Discipline Specific Elective-II | | | | | | |
| 23CYMS404 | DSE | Polymer Science & Medicinal Chemistry/Chemistry in Industry and Environment | 4 | 0 | 0 | 4 |
| 23CYMS405 | DSE | Nuclear Chemistry & Solid State | 4 | 0 | 0 | 4 |

LIST OF GENERIC ELECTIVE COURSES

| Code | Category | Course | L | T | P | C |
|----------------------------|----------|------------------------------|----------|----------|----------|----------|
| Generic Elective-I | | | | | | |
| 23GECY101 | GE | Mathematics for Chemists | 4 | 0 | 0 | 4 |
| 23GECY102 | GE | Biology for Chemists | 4 | 0 | 0 | 4 |
| Generic Elective-II | | | | | | |
| 23GECY201 | GE | Computers for Chemists | 4 | 0 | 0 | 4 |
| 23GECY202 | GE | Intellectual Property Rights | 4 | 0 | 0 | 4 |