

Scheme of studies for Bachelor of Science in Chemistry

Nomenclature: Bachelor of Science in Chemistry

Semesters: 8-14

Total Credit Hours: 131

Session: 2023 and onwards

Semester-I

Course Code	Course Title	Course Category	Credit Hours	
			Theory	Lab.
CHEM-1104	Inorganic Chemistry	Major	3	1
ENG-1107	Functional English	General	3	0
PHY-1118	Fundamentals of Physics	General (Natural Sciences)	2	1
ARA-1101	Arabic	General (Arts and Humanities)	2	0
Allied	Allied Course (One Course from the list given below) ^{a*}	Allied	3	0
HQT-1128	Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total			13	2

^{a*} List of Allied Courses

BIOT-1102: Introduction to Biotechnology

BOT-1103: Diversity of Plants

ZOO-1123: Principles of Animal Life-I

Semester-II

Course Code	Course Title	Course Category	Credit Hours	
			Theory	Lab.
CHEM-1204	Organic Chemistry	Major	3	1
PS-.....17	Pakistan Studies	General	2	0
ICT-1226	Applications of Information and Communication Technologies (ICT)	General	2	1
ISL-1212	Islamic Studies / Ethics	General	2	0
MAT-1215	Mathematics	Allied	3	0
STA-1220	Statistics	Allied	3	0
HQT-1128	Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total			15	2

Semester-III

Course Code	Course Title	Course Category	Credit Hours	
			Theory	Lab.

CHEM-2304	Physical Chemistry	Major	3	1
CHEM-2398	Environmental Chemistry	Major	3	0
Civics and Community Engagement	Civics and Community Engagement (One Course from the list given below) ^{b*}	General	2	0
Social Sciences	Social Sciences (One Course from the list given below) ^{c*}	General	2	0
QTR-2324	Quantitative Reasoning-I	General	3	0
Allied	Allied Course (One Course from the list given below) ^{d*}	Allied	3	0
HQT-1128	Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total			16	1

^{b*} List of Civics and Community Engagement Courses.

CCE-2325: Civics and Community Engagement

LAW-1205: Moral and Ethics

^{c*} List of Social Sciences Courses (Course contents approved by the Departmental Councils of the respective Departments).

PSY-2319: Educational Psychology (Course contents: EDU-5506: Educational Psychology)

EDU-2304: Educational Leadership and Management (Course contents: EDU-5104: Educational Leadership and Management)

SOC-2321: Introduction to Sociology

LAW-2303: Political Science

^{d*} List of Allied Courses

PHY-2318: Electricity and Magnetism

BOT-2303: Cell Biology, Genetics and Evolution

ZOO-2323: Animal Diversity-I

Semester-IV

Course Code	Title	Course Category	Credit Hours	
			Theory	Lab
CHEM-2404	Analytical Chemistry	Major	2	1
ENG-2407	Expository Writing	General	3	0
ETRE-2408	Entrepreneurship	General	2	0
QTR-2424	Quantitative Reasoning-II	General	3	0
CHEM-2481	Biochemistry	Major	3	1
CHEM-2491	Applied Chemistry	Major	2	0
HQT-1128	Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total			15	2

Semester-V

Course Code	Course Title	Course Type	Credit Hours	
			Theory	Lab
CHEM-3501	Physical Chemistry	Major	3	1

CHEM-3521	Inorganic Chemistry	Major	3	1
CHEM-3541	Organic Chemistry	Major	3	1
CHEM-3561	Analytical Chemistry	Major	3	1
HQT-1128	Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total			12	4

Semester-VI

Course Code	Course Title	Course Type	Credit Hours	
			Theory	Lab
CHEM-3601	Physical Chemistry	Major	3	1
CHEM-3621	Inorganic Chemistry	Major	3	1
CHEM-3641	Organic Chemistry	Major	3	1
CHEM-3681	Biochemistry	Major	3	1
HQT-1128	Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total			12	4

Semester-VII (Specialization (Inorganic/Organic/Physical/Analytical/Biochemistry))

Course Code and Title	Course Type	Credit Hours	
		Theory	Lab
Paper-I	Major	3	0
Paper-II	Major	3	0
Paper-III	Major	3	0
Elective Course-I (other than the field of specialization)	Major	3	0
Advanced Lab	Major	0	3
Field Experience/Internship (CHEM-4799)		0	3
HQT-1128 Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total		12	6

Semester-VIII (Specialization (Inorganic/Organic/Physical/Analytical/Biochemistry))

Course Code and Title	Course Type	Credit Hours	
		Theory	Lab
Paper-IV	Major	3	0
Paper-V	Major	3	0
Paper-VI	Major	3	0
Elective Course - II (other than the field of specialization)	Major	3	0
Capstone Project (CHEM-4899)		0	3
HQT-1128 Holy Quran with Translation, Tajveed and Tafseer	Non-Credit	0	0
Total		12	3

List of Courses (Semester VII-VIII)

Physical Chemistry

BS 4th Year/ Semester-VII

CHEM-4701: Electrochemistry and Statistical Thermodynamics (3+0)
 CHEM-4702: Polymer Chemistry (3+0)
 CHEM-4703: Quantum Chemistry and Molecular Spectroscopy (3+0)
 CHEM-4710: Advanced Physical Chemistry Lab (CH 0+3)
 CHEM-4799: Field Experience/Internship (CH 0+3)

BS 4th Year/ Semester-VIII

CHEM-4801: Reaction Dynamics (3+0)
 CHEM-4802: Radiation and Photochemistry (3+0)
 CHEM-4803: Colloid and Surface Chemistry (3+0)
 CHEM-4899: Capstone Project (CH 0+3)

Inorganic Chemistry

BS 4th Year/ Semester-VII

CHEM-4721: Inorganic Reaction Mechanism (3+0)
 CHEM-4722: Symmetry and Magnetochemistry (3+0)
 CHEM-4723: π -Acceptor Ligands and Inorganic Polymers (3+0)
 CHEM-4724: Computational Chemistry (3+0)
 CHEM-4725: Materials Chemistry and Nanomaterials
 CHEM-4730: Advanced Inorganic Chemistry Lab (CH 0+3)
 CHEM-4799: Field Experience/Internship (CH 0+3)

BS 4th Year/ Semester-VIII

CHEM-4821: Organometallics (3+0)
 CHEM-4822: Inorganic Spectroscopy (3+0)
 CHEM-4823: Radio and Nuclear Chemistry (3+0)
 CHEM-4824: Bioinorganic Chemistry (3+0)
 CHEM-4899: Capstone Project (CH 0+3)

Organic Chemistry

BS 4th Year/ Semester-VII

CHEM-4741: Reaction Mechanism-I (3+0)
 CHEM-4742: Spectroscopic Methods in Organic Chemistry-I (3+0)
 CHEM-4743: Chemistry of Natural Products (3+0)
 CHEM-4744: Stereochemistry (3+0)
 CHEM-4745: Name Reactions (3+0)
 CHEM-4746: Organic Polymer Chemistry (3+0)
 CHEM-4750: Advanced Organic Chemistry Lab (3+0)
 CHEM-4799: Field Experience/Internship (CH 0+3)

BS 4th Year/ Semester-VIII

CHEM-4841: Reaction Mechanism-II (3+0)
 CHEM-4842: Spectroscopic Methods in Organic Chemistry-II (3+0)
 CHEM-4843: Retrosynthesis (3+0)
 CHEM-4844: Chemistry of Heterocycles (3+0)
 CHEM-4845: Quantum Organic Chemistry (3+0)
 CHEM-4899: Capstone Project (CH 0+3)

Analytical Chemistry**BS 4th Year/ Semester-VII**

CHEM-4761: Atomic Spectroscopy (3+0)
 CHEM-4762: Electroanalytical Techniques (3+0)
 CHEM-4763: Advanced Separation Techniques (3+0)
 CHEM-4770: Advanced Analytical Chemistry Lab (CH 0+3)
 CHEM-4799: Field Experience/Internship (CH 0+3)

BS 4th Year/ Semester-VIII

CHEM-4861: Luminescence Spectroscopy and Thermal Analysis (3+0)
 CHEM-4862: Nuclear Analytical Techniques (3+0)
 CHEM-4863: Food and Drug Analysis (3+0)
 CHEM-4899: Capstone Project (CH 0+3)

Biochemistry**BS 4th Year/ Semester-VII**

CHEM-4781: Biomedical Chemistry (3+0)
 CHEM-4782: Molecular Biology (3+0)
 CHEM-4783: Physical Techniques in Biochemistry (3+0)
 CHEM-4790: Advanced Biochemistry Lab (CH 0+3)
 CHEM-4799: Field Experience/Internship (CH 0+3)

BS 4th Year/ Semester-VIII

CHEM-4881: Microbiology and Immunology (3+0)
 CHEM-4882: Bionanotechnology (3+0)
 CHEM-4883: Nutritional Chemistry (3+0)
 CHEM-4899: Capstone Project (CH 0+3)