(4-YEAR) PROGRAM IN CHEMISTRY

Duration:	**8-12 Semesters**
Theory Course:	**118 Credits**
Laboratory +Thesis (Cr.03)	**19 Credits**
Total	**137**

:

Scheme of Studies; BS 4-Year Program in Chemistry

Course Title	Credit hours	
Semester-I	**Theory**	**Lab.**
Compulsory courses		
CHEM-1104: Inorganic Chemistry	3	1
ENG-1107: English-I	3	0
MAT-1115: Mathematics-I	3	0
COM-1105: Computer Applications	3	0
List General Courses: Out of the following courses only two courses will be offered depending on the availability of faculty.		
Psychology	3	0
Cell biology	3	0
ZOO-1123 Principles of Animal Life-I	3	0
BOT-1103 Diversity of plants	3	0
Geography	3	0
Total	**18**	**1**
Semester-II	**Theory**	**Lab.**
Compulsory Courses		
ENG-1207: English-II (Functional)	3	0
ISL-1212: Islamic Studies / Ethics	2	0
STA-1220: Statistics	3	0
CHEM-1204: Organic Chemistry	3	1
List General Courses: Out of the following courses only two courses will be offered depending on the availability of faculty.		
Biodiversity	3	0
Genetics	3	0
History of Science	3	0
BOT-1203: Plant systematics, Anatomy and Development	3	0
ZOO-1223: Principles of Animal Life-II	3	0
Total	**17**	**1**
Semester –III	**Theory**	**Lab.**
Compulsory courses		

ENG-2307: English-III (Report Writing)	3	0
PS-2317: Pakistan Studies	2	0
CHEM-2398: Environmental Chemistry	3	0
CHEM-2304: Physical Chemistry	3	1
List General Courses: Out of the following courses only two courses will be offered depending on the availability of faculty.		
Calculus	3	0
Physics-I	3	0
Risk Management	3	0
Household Management	3	0
ZOO-2323: Diversity of animal life-I	3	0
BOT-2303: Cell Biology, Genetics and Evolution	3	0
Total	**17**	**1**

Semester –IV	**Theory**	**Lab.**
Compulsory courses		
ARA-2401: Arabic	3	0
CHEM-2404: Analytical Chemistry	3	1
CHEM-2491: Applied Chemistry	2	0
CHEM-2481: Biochemistry	2	1
List General Courses: Out of the following courses only two courses will be offered depending on the availability of faculty.		
Physics-II	3	0
Human Resource Management	3	0
Entrepreneurship	3	0
BOT-2403: Plant Physiology and Ecology	3	0
ZOO-2423: Diversity of Animal Life-II	3	0
Ethics	3	0
Total	**16**	**2**

Only four disciplines to be selected for 5th and 6th semesters each, with option between Biochemistry and Analytical Chemistry.

Semester-V*

Course code	Course title	Credit hours	Description
CHEM-3501	Physical Chemistry-I	4(3,1)	Theory + Lab
CHEM-3521	Inorganic Chemistry-I	4(3,1)	Theory + Lab
CHEM-3541	Organic Chemistry-I	4(3,1)	Theory + Lab
CHEM-3561	Analytical Chemistry-I	4(3,1)	Theory + Lab
CHEM-3581	Biochemistry-I	4(3,1)	Theory + Lab

Total Credit Hours: (16)

Semester-VI*

Course code	Course title	Credit hours	Description
CHEM-3601	Physical Chemistry-II	4(3,1)	Theory + Lab
CHEM-3621	Inorganic Chemistry-II	4(3,1)	Theory + Lab
CHEM-3641	Organic Chemistry-II	4(3,1)	Theory + Lab
CHEM-3661	Analytical Chemistry-II	4(3,1)	Theory + Lab
CHEM-3681	Biochemistry-II	4(3,1)	Theory + Lab
CHEM-3699	Applied Computer for Chemist	2(1,1)	Theory/Lab

Total Credit Hours: (18)

* Only four disciplines to be selected for 5th and 6th semesters each, with option between Biochemistry and Analytical Chemistry

Semester-VII

Students may opt for any one of the five sections namely, Physical, Inorganic, Organic, analytical and Biochemistry.

Course code	Course title	Course Description	Credit Hours
CHEM-47aa	Physical Chemistry	Theory + Lab	3 (3,0), 3(0,3)
CHEM-47bb	Inorganic Chemistry	Theory + Lab	3 (3,0), 3(0,3)
CHEM-47cc	Organic Chemistry	Theory + Lab	3 (3,0), 3(0,3)
CHEM-47dd	Analytical Chemistry	Theory + Lab	3 (3,0), 3(0,3)
CHEM-47ee	Biochemistry	Theory + Lab	3 (3,0), 3(0,3)

Total Credit Hours: (12+3=15)

Semester-VIII

Course code	Course title	Credit hours	Description
CHEM-48aa	Physical Chemistry	3 (3,0), 3(0,3)	Theory + Lab
CHEM-48bb	Inorganic Chemistry	3 (3,0), 3(0,3)	Theory + Lab
CHEM-48cc	Organic Chemistry	3 (3,0), 3(0,3)	Theory + Lab
CHEM-48dd	Analytical Chemistry	3 (3,0), 3(0,3)	Theory + Lab
CHEM-48ee	Biochemistry	3 (3,0), 3(0,3)	Theory + Lab

	(OR)		
CHEM-48bb	Research Report	3 (0,3)	Research

*****Three courses will be opted from the selected discipline and there will be option between research report **OR** a course from any other discipline.

Total Credit Hours (12+3=15)

Course codes (Semester VII-VIII):

1-20 Physical Chemistry; 21-40 Inorganic Chemistry; 41-60 Organic Chemistry; 61-80 Analytical Chemistry, 81-95 Biochemistry; aa, bb,cc and dd : Define the choice of the section

Course Codes and Titles, Semesters VII and VIII

Physical Chemistry

Semester-VII

CHEM-4701	POLYMER CHEMISTRY	(Cr.3)
CHEM-4702	QUANTUM CHEMISTRY AND MOLECULAR SPECTROSCOPY	(Cr.3)
CHEM-4703	CHEMICAL KINETICS	(Cr.3)
CHEM-4704	PHOTOCHEMISTRY	(Cr.3)
CHEM-4705	PHOTOCHEMICAL REACTIONS AND THEIR KINETICS	(Cr.3)
CHEM-4706	MOLECULAR SPECTROSCOPY	(Cr.3)
:CHEM-4720	PHYSICAL CHEMISTRY Lab-III	(Cr. 0+3)

Semester VIII

CHEM-4801	Surface Chemistry and Catalysis	(Cr. 3)
CHEM-4802	Colloidal and Solution Chemistry	(Cr. 3)
CHEM-4803	Electrochemistry	(Cr. 3)
CHEM-4804	Radiation and Nuclear Chemistry	(Cr. 3)
CHEM-4805	Chemical Thermodynamics	(Cr.3)
CHEM-4806	Statistical Thermodynamics	(Cr. 3)
CHEM-4807	Solid State Chemistry	(Cr. 3)
CHEM-4808	Statistical Mechanics	(Cr. 3)
CHEM-4809	Thermodynamics and Statistical Mechanics	(Cr.3)
CHEM-4820	Physical Chemistry Lab-IV	(Cr. 0+3)

Thesis CHEM-4899 (Cr.3)/a Course from any other discipline (Cr.3)

INORGANIC CHEMISTRY

Semester VII

CHEM-4721	Coordination Chemistry	(Cr.3)
CHEM-4722	Group Theory and Spectroscopy	(Cr.3)
CHEM-4723	Inorganic Polymers	(Cr.3)
CHEM-4724	Inorganic Chemistry-III	(Cr. 3)
CHEM-4725	Industrial Chemistry	(Cr. 3)
CHEM-4740	Inorganic Chemistry Lab-III	(Cr. 0+3)

Semester VIII

CHEM-4821	Inorganic Reaction Mechanism	(Cr. 3)
CHEM-4822	Organometallic Chemistry	(Cr. 3)
CHEM-4823	Bioinorganic Chemistry	(Cr. 3)
CHEM-4824	Chemical Crystallography	(Cr. 3)
CHEM-4825	Nuclear Chemistry	(Cr. 3)
CHEM-4826	Material Chemistry	(Cr.3)
CHEM-4840	Inorganic Chemistry Lab-IV	(Cr.0+3)
CHEM-4899	Thesis(Cr.3)/ a Course from any other discipline	(Cr.3)

ORGANIC CHEMISTRY

Semester-VII

CHEM-4741	Reaction Mechanism-I	(Cr. 3)
CHEM-4742	Spectroscopy-I	(Cr. 3)
CHEM-4743	Stereochemistry	(Cr. 3)
CHEM-4744	Name Reactions in Organic Chemistry	(Cr.3)
CHEM-4745	Chemistry of Heterocyclic Compounds	(Cr. 3)
CHEM-4746	Organic synthesis-I	(Cr. 3)
CHEM-4747	Organic Chemistry Lab-III	(Cr. 0+3)

Semester-VIII

CHEM-4841	Reaction Mechanism-II	(Cr. 3+0)
CHEM-4842	Spectroscopy-II	(Cr. 3+0)
CHEM-4843	Natural Products	(Cr. 3+0)
CHEM-4844	Introduction to Organic Polymers	(Cr. 3+0)
CHEM-4845	Pericyclic Reactions and Photochemistry	(Cr. 3+0)
CHEM-4846	Basic Organometallic Chemistry	(Cr. 3+0)
CHEM-4847	Organic synthesis-II	(Cr. 3+0)
CHEM-4848	Organic Chemistry Lab-IV	(Cr. 0+3)

Thesis CHEM-4899 (Cr.3)/a Course from any other discipline (Cr.3)

ANALYTICAL CHEMISTRY

Semester-VII

CHEM-4761	Spectroscopic Methods of Analysis	(Cr. 3)
CHEM-4762	Thermal Methods of Analysis	(Cr. 3)
CHEM-4763	Nuclear Techniques	(Cr. 3)
CHEM-4764	Introduction to Chromatography	(Cr. 3)
CHEM-4780	Analytical Chemistry Lab–III	(Cr. 0+3)

Semester-VIII

CHEM-4861	Advanced Hyphenated Techniques	(Cr. 3)
CHEM-4862	Advanced Mass spectrometry	(Cr. 3)
CHEM-4863	Molecular Spectroscopy	(Cr. 3)
CHEM-4864	Atomic Spectroscopy	(Cr. 3)
CHEM-4880	Analytical Chemistry Lab-IV	(Cr. 0+3)

Thesis CHEM-4899 (Cr.3)/a Course from any other discipline (Cr.3)

BIOCHEMISTRY

Semester VII

CHEM-4781	Metabolism	Cr.3)
CHEM-4782	Immunobiochemistry	(Cr.3)
CHEM-4783	Physiological Biochemistry	(Cr.3)
CHEM-4784	Hematology	(Cr.3)
CHEM-4785	Molecular Biology	(Cr.3)
CHEM-4786	Applied Microbiology	(Cr.3)
CHEM-4787	Enzymology	(Cr.3)
CHEM-4795	Biochemistry Lab-III	(Cr.0+3)

Semester VIII

CHEM-4881	Animal and Plant Biotechnology `	(Cr.3)
CHEM-4882	Protein Chemistry	(Cr.3)
CHEM-4883	Clinical Biochemistry	(Cr.3)
CHEM-4884	Clinical Pharmacology	(Cr.3)
CHEM-4885	Cell Biology	(Cr.3)
CHEM-4886	Nucleic Acids	(Cr.3)
CHEM-4887	Bioenergetics	(Cr.3)
CHEM-4888	Nutritional Biochemistry	(Cr.3)
CHEM-4889	Endocrinology	(Cr.3)
CHEM-4895	Biochemistry lab-IV	(Cr.0+3)