

Department of Chemistry

Introduction

The Department of Chemistry is one of the oldest Departments of the GC University, Lahore. It is housed in two blocks, the Old Block was erected in 1896 and the New Postgraduate Chemistry Block was built in 1997. The Department has well-equipped laboratories with state-of-the-art research facilities. A galaxy of distinguished scientists has walked through the corridors of the Department of Chemistry including Prof. H.B. Dunningcliff, Prof. H.G. Khorana (Nobel Laureate) and many others. The department has been a hub of research activities since its inception in 1896. A large number of alumni are serving at prestigious institutions across the world including academia, research and private sector organizations. The graduates of this Department are well respected and much sought after in job markets.

Academic Programs

The Department of Chemistry offers following programs:

- Certificate in Forensic Science
- Diploma in Forensic Science
- BSc (Hons.) Chemistry
- MSc Chemistry (Two Year) Evening Programme
- MPhil Chemistry
- MS Forensic Chemistry
- PhD Chemistry

Research Groups

The Department has established research groups in the following areas:

- Biochemistry & Biochemical Processes
- Chemical and Biochemical Process Development
- Organo-Pharmaceutical Synthesis
- Oxidative Stress Studies
- Pharmaceutical Analysis
- Supramolecular and Coordination Chemistry
- Natural Product Chemistry
- Industrial Chemistry
- Nano materials/Functional materials
- Surface Chemistry/Catalysis

Facilities

Instruments

Following are the instruments which are currently available in teaching and research labs:

- Single Crystal X-ray Diffractometer
- CHNS Elemental Analyzer
- Gas Chromatograph-Mass Spectrometer (GCMS)
- High Performance Liquid Chromatograph's (HPLC)
- Flame Atomic Absorption Spectrophotometer (FAAS)
- Fast Protein Liquid Chromatograph (FPLC)
- UV/Visible Spectrophotometers
- Bio-Fermenter

Laboratories

The Department has the following teaching and research laboratories:

Teaching Labs

- Organo-Pharmaceutical Lab

- Physical Chemistry Lab
- Inorganic Chemistry Lab
- FSc Laboratories
 - ✦ FSc Lab-I
 - ✦ FSc Lab-II
 - ✦ FSc Lab-III
 - ✦ FSc Lab-IV

Research Labs

- Atomic Absorption Lab
- Biochemistry/Forensic Chemistry Lab
- Plant Product Research Lab
- Process Development Lab
- Advance Research Lab-I
- Advance Research Lab-II
- Materials Chemistry Lab
 - ✦ Spectroscopy Lab
 - ✦ X-Ray diffraction Lab
 - ✦ Elemental Analyzer Lab
- Scale up Studies Lab
- Nano Chemistry Lab
- Applied Chem Lab

Library

The Library at the Department of Chemistry was established in the last decade of the 19th century. It is well-stocked with latest books, journals, professional periodicals as well as access to HEC e-library. Books pertaining to all disciplines of Chemistry are readily available for students, teachers and research scholars. The library is electronically linked with the University's Central Library through LIMS system. It facilitates the users to promptly locate their required material placed anywhere on the GCU premises.

Special Features

The Department of Chemistry is currently operating a prestigious society namely "Dunningcliff Chemical Society (DCS)". DCS is a forum for learning and skill development of students in the Department. It encourages co-curricular activities and organizes study tours, seminars and technical workshops. In last year, the society organized activities in collaboration with anti-narcotic force, Punjab Forensic Science Agency (PFSA) and other law enforcement agencies. The Department also encourages the research projects at the undergraduate and postgraduate levels. Currently, the Department is running many research projects in collaboration with industry and R & D organizations.

Career Scope

Beyond BSc (Hons.), M.Sc. Chemistry and MPhil Chemistry programs, the Department of Chemistry is also offering specialized market oriented programs in Forensic Sciences. The Forensic graduates can join police force, hospitals, Punjab Forensic Science Agency (PFSA), Law enforcement agencies, government laboratories, policy making/regulatory bodies and other such organizations, where collection, interpretation and presentation of scientific data is required. Government College University, Lahore has recently signed a Memorandum of Understanding (MoU) with Punjab Forensic Science Agency (PFSA) to instigate new academic programs and to train our graduates of Forensic Chemistry in crime scene investigation, evidence preservation, crime mapping, fingerprinting, DNA marker-technologies and analytical techniques.

Academic Programmes

Certificate in Forensic Science		
Course Code	Course Title	Credit Hours
CFS-1101	Forensic Science and Criminology	3
CFS-1102	Forensic Analysis	3
CFS-1103	Forensic Law	3
CFS-1104	Practical Training	3

Diploma in Forensic Science		
Semester-I		
Course Code	Course Title	Credit Hours
DFS-1101	Forensic Science and Criminology	3
DFS-1102	Forensic Analysis	3
DFS-1103	Forensic Law	3
DFS-1104	Practical Training	3

Semester-II (Student will opt four courses out of six in second semester)		
Course Code	Course Title	Credit Hours
DFS-1201	Law of Evidence & International Security	3
DFS-1202	Quality Assurance, Quality Control and Ethics	3
DFS-1203	Crime Scene Investigation & Death Scene Investigation	3
DFS-1204	Forensic Toxicology and Narcotics	3
DFS-1205	Criminalistics	3
DFS-1206	Serology and Forensic DNA Analysis	3

BSc (Hons) Program		
Year-1		
Semester-I		
Course Code	Course Title	Credit Hours
CHEM-2101	Organic Chemistry-I	2
CHEM-2101P	Organic Chemistry-I	1

Semester-II		
Course Code	Course Title	Credit Hours
CHEM-1101	Biochemistry-I	2
CHEM-1101P	Biochemistry-I	1

Year-2		
Semester-III		
Course Code	Course Title	Credit Hours
CHEM-3101	Physical Chemistry-I	3
CHEM-3101P	Physical Chemistry-I	1



Semester-IV		
Course Code	Course Title	Credit Hours
CHEM-2202	Analytical Chemistry-I	2
CHEM-2202P	Analytical Chemistry-I	1
CHEM-3102	Inorganic Chemistry-I	3
CHEM-3102P	Inorganic Chemistry-I	1

Year-3		
Semester-V		
Course Code	Course Title	Credit Hours
CHEM-3201	Physical Chemistry-II	3
CHEM-3201P	Physical Chemistry-II (P)	1
CHEM-2201	Organic Chemistry-II	3
CHEM-2201P	Organic Chemistry-II (P)	1
CHEM-3202	Inorganic Chemistry-II	3
CHEM-3202P	Inorganic Chemistry-II (P)	1
CHEM-3104	Analytical Chemistry-II	3
CHEM-3104P	Analytical Chemistry-II (P)	1
CHEM-3106	Applied Chemistry	3

Semester-VI		
Course Code	Course Title	Credit Hours
CHEM-3206	Physical Chemistry-III	3
CHEM-3206P	Physical Chemistry-III (P)	1
CHEM-3103	Organic Chemistry-III	3
CHEM-3103P	Organic Chemistry-III (P)	1
CHEM-3207	Inorganic Chemistry-III	3
CHEM-3207P	Inorganic Chemistry-III (P)	1
CHEM-1201	Biochemistry-II	3
CHEM-1201P	Biochemistry-II (P)	1
CHEM-3105	Environmental Chemistry	3

Year-4		
Students will study four courses, (three courses from area selected as specialization and one elective course selected from area other than the field of specialization)		
Areas of specializations: Inorganic/Organic/Physical/Analytical/Biochemistry/ Applied/Fuel Chemistry		

Course Code	Course Title	Credit Hours
CHEM-xxxx	Elective Course	3+1
CHEM-4299	Project/Internship/Dissertation	3

Inorganic Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4126	Paper-I: Inorganic Reaction Mechanism	3
CHEM-4127	Paper-II: TT-Acceptor Ligands and Inorganic Polymers	3
CHEM-4128	Paper-III: Inorganic Spectroscopy	3
CHEM-4129P	Lab-I	1

Organic Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4130	Paper-I: Heterocyclic and Organometallic Compounds	3
CHEM-4131	Paper-II: Reactive Intermediates	3
CHEM-4132	Paper-III: Organic Spectroscopy	3
CHEM-4133P	Lab-I	1

Physical Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4134	Paper-I: Electrochemistry and Statistical Thermodynamics	3
CHEM-4135	Paper-II: Polymer Chemistry	3
CHEM-4136	Paper-III: Quantum Chemistry and Molecular Spectroscopy	3
CHEM-4137P	Lab-I	1
Analytical Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4138	Paper-I: Atomic Spectroscopy	3
CHEM-4139	Paper-II: Electroanalytical Techniques	3
CHEM-4140	Paper-III: Advanced Separation Techniques	3
CHEM-4141P	Lab-I	1
Biochemistry		
Course Code	Course Title	Credit Hours
CHEM-4142	Paper-I: Biomedical Chemistry	3
CHEM-4143	Paper-II: Molecular Biology	3
CHEM-4144	Paper-III: Physical Techniques in Biochemistry	3
CHEM-4145P	Lab-I	1
Applied Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4146	Paper-I: Common Industries-I	3
CHEM-4147	Paper-II: Agro Based Industries and Pollution Control	3
CHEM-4148	Paper-III: Common Industries-II	3
CHEM-4149P	Lab-I	1
Fuel Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4150	Paper-I: Chemistry of Coal Conversion Processes-I	3
CHEM-4151	Paper-II: Petroleum and Petrochemicals-I	3
CHEM-4152	Paper-III: Characterization of Fossil Fuels	3
CHEM-4153P	Lab-I	1
Semester-VIII		
Student will study four courses, (Three courses from area selected as Specialization and One Elective Course selected from area other than the field of specialization).		
Areas of Specializations: Inorganic/ Organic/ Physical/ Analytical/ Biochemistry/ Applied/ Fuel Chemistry		
Course Code	Course Title	Credit Hours
CHEM-xxxx	Elective Course	3 + 1
CHEM-4299P	Project/Internship/ Dissertation	3

Inorganic Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4226	Paper-I: Organometallics	3
CHEM-4227	Paper-II: Symmetry and Magnometochemistry	3
CHEM-4228	Paper-III: Radio and Nuclear Chemistry	3
CHEM-4229P	Lab-II	1
Organic Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4230	Paper-I: Natural Products	3
CHEM-4231	Paper-II: Organic Synthesis	3
CHEM-4232	Paper-III: Medicinal Chemistry	3
CHEM-4233P	Lab-II	1
Physical Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4234	Paper-I: Reaction Dynamics	3
CHEM-4235	Paper-II: Radiation and Photochemistry	3
CHEM-4236	Paper-III: Colloid and Surface Chemistry	3
CHEM-4237P	Lab-II	1
Analytical Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4238	Paper-I: Luminescence Spectroscopy and Thermal Analysis	3
CHEM-4239	Paper-II: Nuclear Analytical Techniques	3
CHEM-4240	Paper-III: Food and Drug Analysis	3
CHEM-4241P	Lab-II	1
Biochemistry		
Course Code	Course Title	Credit Hours
CHEM-4242	Paper-I: Microbiology and Immunology	3
CHEM-4243	Paper-II: Bionanotechnology	3
CHEM-4244	Paper-III: Nutritional Chemistry	3
CHEM-4245P	Lab-II	1
Applied Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4246	Paper-I: Organic Based Industries	3
CHEM-4247	Paper-II: Industrial Processes	3
CHEM-4248	Paper-III: Metallurgy and Explosives	3
CHEM-4249P	Lab-II	1
Fuel Chemistry		
Course Code	Course Title	Credit Hours
CHEM-4250	Paper-I: Chemistry of Coal Conversion Processes-II	3
CHEM-4251	Paper-II: Petroleum and Petrochemicals-II	3
CHEM-4252	Paper-III: Alternate Energy Resources	3
CHEM-4253P	Lab-II	1

Note: Each year a number of specializations will be offered to the students of BSc (Hons.) in Chemistry provided that at least 10 students opt for a particular specialization. This arrangement shall be ratified by departmental academic committee.

MSc. Chemistry (Two Years) Evening Programme

Year-1		
Semester I (Compulsory)		
Course Code	Course Title	Credit Hours
CHEM-301	Physical Chemistry	3
CHEM-301P	Physical Chemistry (P)	1
CHEM-302	Organic Chemistry	3
CHEM-302P	Organic Chemistry (P)	1
CHEM-303	Chemometrics	3
CHEM-303P	Chemometrics(P)	1
CHEM-304	Bio Chemistry	3
CHEM-304P	Bio Chemistry (P)	1
CHEM-305	Basic Mathematics for Chemistry	3
Semester II (Compulsory Courses)		
Course Code	Course Title	Credit Hours
CHEM-351	Analytical Chemistry	3
CHEM-351P	Analytical Chemistry (P)	1
CHEM-352	Industrial Chemistry	3
CHEM-352P	Industrial Chemistry (P)	1
CHEM-353	Chemical Biology	3
CHEM-353P	Chemical Biology (P)	1
CHEM-354	Inorganic Chemistry	3
CHEM-354P	Inorganic Chemistry (P)	1
CHEM-355	Computational Chemistry	3
Year-2		
Courses of Specialization in Physical / Inorganic / Organic / Analytical / Bio / Applied / Textile Chemistry (Students will study four courses, from the area selected as specialization)		
Semester III		
Course Code	Course Title	Credit Hours
CHEM-401	Physical Chemistry Paper I	3
CHEM-402	Physical Chemistry Paper II	3
CHEM-403	Physical Chemistry Paper III	3
CHEM-404P	Physical Chemistry (P)	2
CHEM-405	Organic Chemistry Paper I	3
CHEM-406	Organic Chemistry Paper II	3
CHEM-407	Organic Chemistry Paper III	3
CHEM-408P	Organic Chemistry (P)	2
CHEM-409	Inorganic Chemistry Paper I	3
CHEM-410	Inorganic Chemistry Paper II	3
CHEM-411	Inorganic Chemistry Paper III	3
CHEM-412P	Inorganic Chemistry (P)	2
CHEM-413	Bio Chemistry Paper I	3
CHEM-414	Bio Chemistry Paper II	3
CHEM-415	Bio Chemistry Paper III	3
CHEM-416P	Bio Chemistry (Practical)	2
CHEM-417	Textile Chemistry Paper I	3
CHEM-418	Textile Chemistry Paper II	3
CHEM-419	Textile Chemistry Paper III	3
CHEM-420P	Textile Chemistry (Practical)	2
CHEM-421	Applied Chemistry Paper I	3
CHEM-422	Applied Chemistry Paper II	3
CHEM-423	Applied Chemistry Paper III	3
CHEM-424P	Applied Chemistry (Practical)	2

Semester III		
Course Code	Course Title	Credit Hours
CHEM-425	Analytical Chemistry Paper I	3
CHEM-426	Analytical Chemistry Paper II	3
CHEM-427	Analytical Chemistry Paper III	3
CHEM-428P	Analytical Chemistry (P)	2
CHEM-499	Project/Internship/Dissertation	3
Semester IV		
Course Code	Course Title	Credit Hours
CHEM-451	Physical Chemistry Paper IV	3
CHEM-452	Physical Chemistry Paper V	3
CHEM-453	Physical Chemistry Paper VI	3
CHEM-454P	Physical Chemistry (Practical)	2
CHEM-455	Organic Chemistry Paper IV	3
CHEM-456	Organic Chemistry Paper V	3
CHEM-457	Organic Chemistry Paper VI	3
CHEM-458P	Organic Chemistry (Practical)	2
CHEM-459	Inorganic Chemistry Paper IV	3
CHEM-460	Inorganic Chemistry Paper V	3
CHEM-461	Inorganic Chemistry Paper VI	3
CHEM-462P	Inorganic Chemistry (Practical)	2
CHEM-463	Bio Chemistry Paper IV	3
CHEM-464	Bio Chemistry Paper V	3
CHEM-465	Bio Chemistry Paper VI	3
CHEM-466P	Bio Chemistry (Practical)	2
CHEM-467	Textile Chemistry Paper IV	3
CHEM-468	Textile Chemistry Paper V	3
CHEM-469	Textile Chemistry Paper VI	3
CHEM-470P	Textile Chemistry (Practical)	2
CHEM-471	Applied Chemistry Paper IV	3
CHEM-472	Applied Chemistry Paper V	3
CHEM-473	Applied Chemistry Paper VI	3
CHEM-474P	Applied Chemistry (Practical)	2
CHEM-475	Analytical Chemistry Paper IV	3
CHEM-476	Analytical Chemistry Paper V	3
CHEM-477	Analytical Chemistry Paper VI	3
CHEM-478P	Analytical Chemistry (Practical)	2
CHEM-499	Project/Internship/Dissertation	3
MPhil Chemistry		
Year-1		
Semester-I		
Course Code	Course Title	Credit Hours
CHEM-7104	Advanced Biochemistry	3
CHEM-7105	Nuclear Magnetic Resonance Spectroscopy	3
CHEM-7106	Separation Techniques	3
CHEM-7214	Organometallic Chemistry	3
Semester-II		
Course Code	Course Title	Credit Hours
CHEM-7206	Organic Polymer Chemistry	3
CHEM-7210P	Instrumental Analysis (A Practical Course)	3
CHEM-7102	Principles of Biochemical Processes	3
CHEM-7108	Radiation Chemistry	3
Optional Courses		
CHEM-7107	Solid State Chemistry	3
CHEM-7209	Nano Chemistry	3
CHEM-7204	Environmental Chemistry	3

Optional Courses

CHEM-7207	Biosynthesis of Natural Products	3
CHEM-7211	Gene Technology	3
CHEM-7213	Atmospheric Chemistry	3
CHEM-7212	Advanced Chemical Kinetics	3

Year-2

Semester-III & IV

Course Code	Course Title	Credit Hours
CHEM-7499	Thesis and Viva Voce	12

MS Forensic Chemistry

Year-1

Semester I

Course Code	Course Title	Credit Hours
FCHEM-7105	Introduction to Forensic Science	3
FCHEM-7106	Crime Scene Investigation	3
FCHEM-7107	Chemistry of Drug of Abuse	3
FCHEM-7108	Analytical Techniques in Forensic Chemistry	3

Semester II

Course Code	Course Title	Credit Hours
FCHEM-7204	Chemistry of Arsons, Explosives and Firearms	3
FCHEM-7205	DNA and Serology	3
FCHEM-7206	Forensic Law	3
FCHEM-7207	Statistics and Quality Control in Forensics	3
FCHEM-7208	Forensic Analysis Lab	3
FCHEM-7209	Nano Forensics	3

Year-2

Semester-III & IV

Course Code	Course Title	Credit Hours
FCHEM-7301	Journal club	Nil
FCHEM-7302	Internship	1
FCHEM-7499	Thesis	12

PhD

Every student as per advice of his/her supervisor will opt three courses of 9 credit hours in each semester.

Semester I

Course Code	Course Title	Credit Hours
CHEM-8101	Modern Organic Synthesis	3
CHEM-8103	Gene Technology	3
CHEM-8104	Advanced Chemometrics	3
CHEM-8105	Spectral Analysis	3
CHEM-8106	Supramolecular Chemistry	3
CHEM-8107	Advanced Chemical Kinetics	3

**Semester II**

Course Code	Course Title	Credit Hours
CHEM-8201	Chemistry of Natural Products	3
CHEM-8202	Quality Assurance in Analytical Chemistry	3
CHEM-8203	Proteomics & Bioinformatics	3
CHEM-8204	Radio Chemistry	3
CHEM-8205	Nanomaterials	3
CHEM-8206	Organotransition Metal Chemistry	3

Faculty**Department of Chemistry****Chairperson**

Prof. Dr. Ahmad Adnan

Professor

Prof. Dr. Islam Ullah Khan

Prof. Dr. Muhammad Zahid Qureshi

Prof. Dr. Peter John

Associate Professor

Dr. Muhammad Athar Abbasi

Dr. Aziz-Ur-Rehman

Assistant Professor

Dr. Muhammad Jahangir

Dr. Muhammad Akhyar Farrukh

Dr. Ayoub Rashid Ch.

Dr. Shazia Khurshid

Dr. Sabahat Zahra Siddiqui

Dr. Shah Hussain

Dr. Abid Nazir Gill

Saba Qaiser

Lecturer

Riffat Parveen

Arshad Mahmood

Sidra Farid

Shaista Ali

Zohaib Saeed

Arshad Raza

Gulzar Muhammad

Sumaira Saleem

Rana Rashad Mahmood Khan

Visiting/Adjunct Faculty

Asif Iqbal

Dr. Samina Shahid

Dr. M.P. Bhatti

Dr. Shagufta Nasir

Dr. Muhammad Mushtaq

Dr. Mukhtar Ali

Dr. Abdul Waheed

