INSTITUTE OF CHEMISTRY CEYLON

COLLEGE OF CHEMICAL SCIENCES

Post Graduate Diploma Program in Chemical Analysis

The Post Graduate Diploma Program in Chemical Analysis will be helpful to gain the key skills required in the specialized area of analytical chemistry, including good measurement and scientific practice, evaluation interpretation of data, and other professional and organizational skills.

The modules in the program are:

Information and Communication skills, Laboratory Accreditation, statistical treatment of analytical data including sampling statistics, ISO's professional skills required for analysts, laboratory skills, separation techniques, atomic, molecular and mass spectroscopy, literature studies: Innovation in chemical analysis and submission of a dissertation and oral Examination.

Duration:

One Calendar year (Conducted only on Saturdays and Sundays).

Eligibility:

Graduateship in chemistry or B.Sc. degree from a recognized University with Chemistry as a subject or any other qualification acceptable to the Council of the Institute of Chemistry Ceylon.

Commencement:

Those who intend to enroll are requested inform the Coordinator, PG Diploma in Ch. An., Institute of Chemistry Ceylon, 'Adamantane House', 341/22, Kotte road, Welikada, Rajagiriya giving the information as requested at the end of this brochure.

Post Graduate Diploma Program in Chemical Analysis
Benefits:

Chemical analysis plays a vital role in virtually all aspects of everyday life throughout the world. With analytical techniques and instrumentation becoming ever more sophisticated, there is an increasing demand for qualified analytical chemists. This industrially relevant course will provide you with a strong background in the theory of analytical techniques and give you the ability to apply these techniques to complex analytical problems. In addition, this course provides **an in-service training activit**y for personnel who are engaged in chemical analysis and also compelled to obtain laboratory accreditation under either ISO 17025 (calibration. chemical and microbiological) or ISO 15189 (medical). Adequate training will also be provided on ISO 17043 – proficiency testing and some aspects of ISO 9000 – system management, ISO 14000-environmental management, ISO 18000 – occupational hygiene standards and ISO 22000 – food safety management standards with the incorporation of hazard analysis and critical control point (HACCP) system.

This Program will be helpful to gain the key skills required in the specialized area of analytical chemistry, including good measurement and scientific practice, evaluation interpretation of data, and other professional and organizational skills. You will also study core analytical techniques and their applications. In addition, there is also scope to study and explore recent trends in analytical sciences.

Module	Title	Credits
C 5011	Information and Communication Skills	1
C 5023	Laboratory Accreditation, Statistical Treatment of analytical data including sampling statistics and ISO's Professional Skills required for Analysts.	3
C 5035	Laboratory Skills	5
C 5043	Introduction to Analysis	3
C 5053	Separation Techniques	3
C 5063	Atomic, Molecular and Mass Spectroscopy	3
C 5072	Literature Studies: Innovation in Chemical Analysis and submission of a Dissertation, Oral Examination	2
	Total	20

Detailed Course Content

C 5011: Information and Communication Skills - 1C (10 L, 10 P):

Interpersonal relationships: team-working; logical problem solving.

Communication Skills: technical report writing; use of electronic communication via e-mail and discussion groups; the scientific publication process; oral presentations; summarizing information; Developing reasoned arguments.

Computer skills: Office/Internet; data collection/manipulation/LIMS systems.

Information retrieval: database searching and the scientific literature; information correlation, critical appraisal and summarizing technical information; correct citation and avoidance of plagiarism.

C 5023 Laboratory Accreditation, Statistical Treatment of analytical data including sampling statistics and ISO's Professional Skills required for Analysts – 3C (30 L, 30P):

Propagation of errors, accuracy and uncertainty; Rejection of data, hypothesis testing and ANOVA. System theory and experimental design; Parametric modeling, calibrations and uncertainty. Optimization, software tools, and personal toolkits.

The analytical process: looking at the whole process, reason for the analysis, quality of results and method validation, fitness for purpose and appropriateness of the assay methods, costs of assays, safety, environmental concerns and waste disposal. Sampling, statistical criteria of sampling and preservation of samples

Quality and regulation: total quality management; overview and comparison of quality systems: ISO 9000, GLP; quality assurance; auditing; laboratory accreditation, ISO 17025 & ISO 15189, proficiency testing; ISO 17043, food safety standards, ISO 22000, safety audits.

C 5035 Laboratory Skills – 5C (150 P):

Experiments based on Titrimetry (Acid-base, Complexometry, Redox etc.), Gravimetry, Spectroscopy (UV, Atomic Absorption, Advanced nmr and IR techniques), Separation Methods (Chromatography, GC and HPLC), Electro-analytical Methods. Bio-analytical methods.

C 5043 Introduction to Analysis – 3C (45 L):

Acid base equilibria, Complexometry & conditional constants, Redox equilibria, Precipitation methods, Electroanalytical Chemistry & Chemical Sensors, Bioanalytical methods: Electrophoresis, PCR techniques.

C 5053 Separation Techniques – 3C (45 L):

Development of chromatography; efficiency, resolution, retention and separation theory. Method selection based on structure and physical properties of analytes. Physico-chemical properties: recognition and estimation of volatility, partition properties and distribution coefficients, log P, structure, ionisability and effects of pH, spectroscopic properties, chromophores and fluorophores.

Theory of separations in the gas phase, instrumentation, columns, detectors including universal and selective detection, GC-MS, GC-AED and GC-FTIR. Quantitative analysis, internal standards.

Liquid chromatography: instrumentation, columns, detectors including LC-MS and LC-NMR; method development; normal and reversed phase chromatography, TLC. Analysis of ionisable and ionic compounds, ion-pair chromatography, ion chromatography and ion exchange chromatography.

Electrically driven separations CE and MEKC. Chirality and chiral separations by LC and GLC.

Sample preparation from matrices and problem compounds: derivatisation, head space analysis, pyrolysis, solvent extraction, solid phase extraction, SPME. Comparison of techniques and applications in pharmaceutical, health care , environmental, food and solvent/petrochemical areas.

C 5063 Selected Topics in Advanced Analytical Techniques – 3C (45 L):

Atomic spectrometric analysis employing atomic absorption, emission and mass spectrometry with the ICP source, and X-ray fluorescence analysis.

Molecular spectroscopic methods employing UV/visible and fluorescence techniques; IR and Raman techniques with particular emphasis on: FTIR, solid sampling and NIR, laser and Raman microscopy.

Advanced NMR spectroscopy: Thoery and instrumentations, Examples of applications in enviormental, natural products, pharmaceutical products and biomedical. Instrumentation for mass spectrometry and associated techniques, ionization processes and mass analysers. Examples of the application of mass spectrometry and associated techniques in biomedical, environmental, forensic and pharmaceutical science. Surface analytical techniques: AES, XPS, UPS, desorption techniques (TPD, SIMS), optical techniques (ellipsometry, SPR), scanning probe microscopy (AFM, STM). electrostatic force microscope (EFM),magnetic force microscope (MFM), Material Testing methods.

C 5072 Literature Studies: Innovation in Chemical Analysis – 2C (60 P):

Students will be assigned a topic in an area of current or recent innovation in analytical science. The student will conduct a literature review and produce a report (approximately 4000 words) and an oral presentation, that provides, (i) the history of the development of the particular instrumental technique or type of analysis (ii) an in-depth critical evaluation of the existing state of knowledge of the topic and (iii) an appreciation of the contribution the innovation(s) have made to the development of analytical science.

Note Below: A provision is available for the award of a Certificate in the event that a Post Graduate Diploma student is unable to complete course.

H.D. Gunawardhana
Co-ordinator, PG Programme on Chemical Analysis

Please send the following information to:

Coordinator,
PG Diploma in Chemical Analysis,
Institute of Chemistry Ceylon,
'Adamantane House', 341/22, Kotte road,
Welikada, Rajagiriya

***Name*:**.....

***Degree*:**.....

***Institution/University*:**.....

***Year*:**.....

***Present Employment*:**.....

***Telephone Number*:**.....