University of Colombo

Sri Lanka

Master of Science

in

Analytical Chemistry

(SLQL 8, 9 & 10)
Department of Chemistry

2025

M.Sc. (Analytical Chemistry)

1. INTRODUCTION

Chemical analysis plays a crucial role across various sectors, including industry, agriculture, medicine (particularly in medical diagnosis), law enforcement, archaeology, geology, and scientific research. The accuracy of the results obtained from chemical analysis is vital, as any analytical inaccuracies can lead to decisions that may harm the development of a country. Consequently, chemical analysis holds a critical position in the economic development of modern society.

In Sri Lanka, chemical analysis is often entrusted to personnel who approach it more as an art than a science, with their knowledge limited to following set procedures. This lack of understanding of the theoretical principles behind the procedures can result in inaccurate results, which cannot be properly addressed by such personnel. Therefore, it is essential to train professionals with both a strong theoretical foundation and practical laboratory experience. These professionals, known as Analytical Chemists, are capable of producing reliable, accurate results. Such expertise is essential for meeting the requirements for laboratory accreditation under ISO 17025.

The goal of the M.Sc. in Analytical Chemistry is to train graduates to become proficient analytical chemists, as undergraduate programs in Sri Lanka are generally not designed to provide this specialized training. Analytical chemists play a vital role in troubleshooting routine analytical procedures and preventing inaccuracies. Their expertise ensures that authorities can make informed decisions based on precise data, thereby contributing significantly to industrial progress and scientific advancement. Without their expertise, our modern economy would not be sustainable.

2. COURSE AIMS

* Provide a thorough understanding of the fundamental principles of all analytical methods.
* Offer the training on the calculation of results and the statistical evaluation of analytical results.
* Develop familiarity with the classical and modern analytical techniques
* Develop the ability for successful execution of research projects in analytical chemistry
* Produce analytical chemists with a strong and broad knowledge, capable of troubleshooting and resolving issues effectively.
* Determine errors and ultimately produce accurate analytical results.

3. COURSE STRUCTURE

Course structure is designed according to the guidelines issued by the Quality Assurance and Accreditation Council of the UGC, SL to fulfil criteria of M.Sc. programs, SLQL 8, 9 & 10. M.Sc. in Analytical Chemistry program offered by the Department of Chemistry, UOC consists of Part I, Part II & Part III. Part I, Part II & Part III correspond to the levels of Postgraduate Diploma (25 credits), M.Sc. with total of 30 credits & M.Sc. with 60 credits including one year research experience.

SLQL 8 level – Part I
SLQL 9 level – Part I & Part II
SLQL 10 level – Part I, Part II & Part III

4. COURSE CONTENTS

4.1 Theory Modules:

MAC 5110 Concepts in Analytical Chemistry

Statistics & sampling theory
Acid base equilibria
Complexometry & conditional constants
Redox equilibria
Electroanalytical chemistry & chemical sensors
Precipitation methods & non aqueous solvents

MAC 5210 Spectroscopic Methods in Analysis

Molecular spectroscopy–absorption, ESR and Mossbauer
Molecular spectroscopy– emission (Fluorescence etc)
Atomic spectroscopy – absorption and Emission

Surface spectroscopic methods for structural elucidation
Instrumentation in Spectroscopy

MAC 5310 Separation Techniques in Analytical Chemistry

Sample preparation methods (LLE, IE and SPE)
Separation methods (PC, TLC, GC, HPLC and SFC)
Electrophoresis in biological applications
RD techniques in microbial analysis

MAC 5410 Analytical Techniques

Thermal analysis
Analysis of air & water quality
Bio-analytical chemistry
Principles of instrumental analysis
Quality of testing laboratories

MAC 5510 Industrial Applications in Analytical Chemistry

Food and drugs
Agrochemicals and soil
Cosmetics
Nanotechnology

MAC 5900 Instrumentation in Analytical Chemistry

Electronics
Mass spectrometry based techniques
Elemental analysis
Analytical method validation

MAC 5111 Scientific writing & Presentation

4.2 Practical Modules

(MAC 5610, 5710 & 5810):

Classical methods in Analytical analysis
Spectroscopic methods (Molecular & Atomic)
Chromatography
Solvent extraction & Ion exchange
Electro analytical methods
Environmental analysis
Analysis of food and drugs
Analysis of soils and agrochemicals
Synthesis of nanoparticles
Electrophoresis and PCR
Instrumentation in Analytical analysis
Computer applications in chemical analysis

5. DURATION

The Part I consists of theory modules and practical modules conducted on Friday evenings (5–7 pm onsite or 7–9 pm online) and Saturdays (8 am to 6 pm, onsite). The duration of Part I is for two semesters (each having 20 weeks). Students who have achieved the minimum requirements in Part I will be allowed to proceed to part II. The Part II consists of a full-time guided study of 3-month duration. The duration for part-time students is longer, depending on the time they devote for research.

6. COURSE EVALUATION

Part I

Throughout the first year, students will be assessed both on a continuous basis as well as by periodical tests mainly based on the laboratory work carried out during the course. There will be a written examinations at the end of each semester for theory modules. The written examinations will consist of 6 question papers. Candidates will be allowed to proceed to part II when he/she has obtained a minimum GPA of 3.00.

Part II

The report addressing the research/industrial problem submitted by the candidate at the end of the study will be evaluated. Candidates those who wish to follow part III, will be allowed to proceed to part III when he/she has obtained a minimum GPA of 3.00.

Part III

Introductory & progress presentations will be evaluated. The research dissertation submitted by the candidate at the end of the project will be evaluated. Presentation and an oral examination will be held on the dissertation.

7. ELIGIBILITY AND SELECTION

Application for admission to the course will be entertained from candidates who have passed in the B.Sc. degree with Chemistry as a subject from recognized University or an equivalent qualification acceptable to the Faculty Board of the Faculty of Science, University of Colombo. The selection will be on the basis of M.C.Q. Examination and/or an interview.

8. FEES

Application fee	- Rs. 2500/=
Course fee (Part I & II)	- Rs. 450,000/=
Course fee (Part III)	- Rs. 200,000/=

Part I and II

Rs. 450,000/= to be paid at the initial registration.

Part 'III'

Only the students who successfully complete Parts I and II will be eligible to proceed to Part III (research project) leading to the M.Sc.(Res.) degree program. Students who wish to proceed to Part III should make an additional payment of Rs. 200,000/= at the time of enrolment for Part III.

****** Please note that fees paid are not refundable and subject to revisions from time to time.**

For further information contact;

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