

M.Sc. (Analytical Chemistry)

1. INTRODUCTION

Chemical Analysis is widely applied in Industry, Agriculture, Medicine (Medical diagnosis), Investigation, Archaeology, Geology and in many Research Projects. The accuracy of the final figure produced after a chemical analysis is important. The analytical inaccuracy of the results will lead to decisions which may be detrimental to the development of the country. Therefore, chemical analysis holds an important position in the economic development in our modern society. In Sri Lanka chemical analysis is very often entrusted to personnel who handle analysis as an art and their knowledge is only confined to the set procedure. The problems leading to inaccurate results cannot be solved by these personnel due to the lack of their knowledge in the theoretical basis of the procedure. It is essential to train personnel who possess a sound theoretical knowledge of procedures and an adequate training on the laboratory work. Such a person is called an Analytical Chemist, who will undoubtedly produce accurate results. The personnel with the said qualifications will undoubtedly fit to one of the requirements in obtaining laboratory accreditation certificate under ISO 17025.

The aim of the M.Sc. (Analytical Chemistry) is to train graduates to become analytical chemists since the undergraduate courses in Sri Lanka are not designed to achieve this objective. The analytical chemist could assist in solving problems in the routine analytical procedures which would have led to inaccurate results. The accurate results produced by an analytical chemist will help the authorities to draw conclusion(s) on the correct path. Thus, he plays an important role in our industrial structure and the advancing science, that without his service our present day economy could not exist.

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 broad knowledge in analytical chemistry who could trace.
- * Determine errors and finally 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.

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

This is offered in two parts. The part I Consists of theory modules and practical modules conducted on Friday evenings (5 - 7 pm) and Saturdays (8 am to 6 pm). The duration of part I is for two semesters (each having 20 weeks). Students who have achieved the minimum requirements in the part I will be allowed to proceed to part II. This 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 continuous basis as well as by periodical tests mainly based on the laboratory work carried out during the course. There will be a written examination at the end of the first year. The written examination will consist of 6 question papers. Candidates will be allowed to proceed to part II when he/she has obtained a minimum GPA of 2.50.

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. COURSE FEE

Application fee	- Rs. 500/=
Registration fee	- Rs. 2,500/=
Library fee	- Rs. 2,000/=
Library Deposit(refundable)	- Rs. 5,000/=(Rs.2,500/= per card)

Part 'I'

Rs. 200,000/= to be paid in two installments. The first instalment of Rs. 150,000/= should be paid at the beginning of the course and the second instalment of Rs. 50,000/= to be paid within 06 months of the commencement of the course.

Part 'II'

Rs. 40,000/= payable at the commencement of the directed studies.

Part 'III'

Rs. 75,000/= payable at the commencement of the research project.

Examination fees:

Rs. 9,000/= payable on application for part 'A' examination.

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

For further information contact;

Dr. L. Hasini R. Perera,
Course Coordinator,
Department of Chemistry,
University of Colombo.
Tel & Fax: 0112503367



University of Colombo

Sri Lanka



Master of Science Degree Course

In

Analytical Chemistry

(SLQL 8, 9 & 10)

Department of Chemistry

2020