

Programme Specifications



Programme : Analytical Chemistry
Department: Chemistry

Faculty of Science and Humanities
M. S. Ramaiah University of Applied Sciences

University House, New BEL Road, MSR Nagar, Bangalore – 560 054

www.msruas.ac.in

Programme Specifications: M.Sc. (Analytical Chemistry)

Faculty	Faculty of Science and Humanities (FSH)
Department	Chemistry
Programme	M.Sc. (Analytical Chemistry)
Dean of Faculty	Prof. M. R. Srinivasan
HOD	Prof. M. R. Srinivasan (I/C)

1. Title of the Award

M.Sc.(Analytical Chemistry)

2. Modes of Study

Full-Time

3. Awarding Institution /Body

M S Ramaiah University of Applied Sciences-Bangalore, India

4. Joint Award

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5. Teaching Institution

Faculty of Science and Humanities (FSH)

M S Ramaiah University of Applied Sciences-Bangalore, India

6. Date of Programme Specifications

August 2014

7. Date of Programme Approval by the Academic Council of MSRUAS

August 2014

8. Next Review Date

June 2016

9. Programme Approving Regulatory Body and Date of Approval

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10. Programme Accrediting Body and Date of Accreditation

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11. Grade Awarded by the Accreditation Body

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12. Programme Accreditation Validity

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13. Programme Benchmark

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14. Rationale for the Programme

Analytical chemistry is the study of separation, identification, and quantification of chemical components of natural and artificial materials. Qualitative analysis gives an indication of the identity of the chemical species in the sample and quantitative analysis determines the amount of one or more of these components. Modern analytical chemistry is dominated by instrumental analysis e.g. spectroscopy and chromatography. . Analytical chemistry has applications in forensics, bio analysis, clinical analysis, environmental analysis, and materials analysis. Analytical chemistry plays an increasingly important role in the pharmaceutical industry where it is used in discovery of new drug candidates and in clinical applications where understanding the interactions between the drug and the patient are critical. There are a lot of career opportunities analytical chemists in pharmaceutical industries, government laboratories and Industries involved in manufacturing/processing of food/beverage products.

The Faculty of Science and Humanities of MSRUAS offers the M.Sc.(Analytical Chemistry) Programme with an outcome based curriculum emphasizing the Critical, Analytical and Problem Solving skills to equip the students to pursue their scientific and research career with better preparedness and a mature professional outlook. The presence of other allied Faculties of the University provides for a multi-disciplinary approach which is emerging as a key differentiator in the success of modern scientific and engineering endeavors.

In the coming years, the government intends to boost up funds for basic sciences. There is an acute shortage of qualified teaching staff. The job prospects for candidates with M.Sc. (Analytical Chemistry) looks good in academia and industry.

15. Programme Aim

The aim of the programme is to train postgraduates with advanced knowledge and understanding of analytical chemistry with higher order critical, analytical, problem solving and research skills; ability to think rigorously and independently to meet higher level expectations of academia and research with sufficient transferrable skills.

16. Programme Objectives

The Programme objectives of M. Sc. (Analytical Chemistry) are to:

- Impart higher level knowledge and understanding of analytical chemistry
- Prepare students to evaluate the soundness of chemical concepts proposed
- Train students to perform chemical experiments using the standard laboratory

- equipment/modern instrumentation and gather reliable data
- Enable students carry out data processing, computation, data analysis and numerical simulations.
- Teach students proper procedures and regulations for safe handling and use of chemicals.
- Hone students' skills to pursue chemistry as a teaching and research career
- Train students in team work and in lifelong learning for continuous professional development

17. Intended Learning Outcomes of the h

The intended learning outcomes are listed under four headings:

1. Knowledge and Understanding, 2. Cognitive Skills 3. Practical Skills and 4. Capability/ Transferable Skills.

17.1 Knowledge and Understanding

After undergoing this programme, a student will be able to:

- KU1: Outline fundamental and applied aspects of chemical analysis
- KU2: Choose an appropriate method of analysis for selected analytes in a variety of matrices.
- KU3: Describe the principles of atomic and molecular spectroscopy, NMR and mass spectrometry.
- KU4: Recognise the uncertainties/errors associated with measurements and data collection

17.2 Cognitive Skills

After undergoing this programme, a student will be able to:

- CS1: Analyse and solve problems related to chemical analysis compounds
- CS2: Distinguish key techniques in separation sciences such as liquid and gas chromatography
- CS3: Apply fundamentals of analytical chemistry to pharmaceutical, environmental and materials analyses.
- CS4: Explain the principles of NMR, mass spectrometry, Raman and IR spectroscopy.

17.3 Practical Skills

After undergoing this programme, a student will be able to:

- PS1: Conduct experiments with various spectroscopic instruments to analyse a material
- PS2: Perform chemical separation with liquid and gas chromatography

PS3: Validate analytical methods

PS4: Carry out necessary computational and simulation work

17.4 Capability /Transferable Skills

After undergoing the programme, a student will be able to

TS1: Manage information, develop technical reports and make presentations

TS2: Build, Manage and Lead a team to successfully complete a project and communicate across teams and organizations to achieve professional objectives

TS3: Work under various constraints to meet project targets

TS4: Adopt to the chosen profession by continuously upgrading his/her knowledge and understanding through Life-long Learning philosophy

18. Structure

The following are the modules a student is required to successfully complete for the award of the degree. The programme is delivered as per the Time-Table for every batch.

h : M.Sc.(Analytical Chemistry)			
Module Code	Modules	Credits	Duration Weeks
Department- Common Modules			
CHY501	1. Physical Chemistry	5	5
CHY502	2. Inorganic Chemistry	5	5
CHY503	3. Synthetic Methods in Organic Chemistry	5	5
CHY504	4. Instrumental Methods of Analysis	5	5
CHY505	5. Mathematics for Chemists	5	5
h - Specialisation Modules			
ACY501	1. Data Analysis and Statistical Inference	5	5
ACY502	2. Advanced Analytical Chemistry Techniques	5	5
ACY503	3. Clinical and Forensic Analysis	5	5
ACY504	4. Analysis of Biopharmaceuticals and Foods	5	5
ACY505	5. Environmental Analytical Chemistry	5	5
Faculty-Common Modules			
FSH501	1. Research Methodology	4	4
FSH502	2. History of Science and Technology	3	3
FSH503	3. Soft Skills	3	3
Elective Modules			
FSH504	1. Teaching	5	5
FSH505	2. Seminar/Internship	5	5
ACY600	1. Dissertation	25	25
Mandatory Module			
FSH506	Conference/Journal Publication	5	5
Total		100	100

Note:

1. The Vacations and other activities shall be as per the Time-Table for the corresponding batch.

19. Module Delivery Structure- Full-Time

A module is delivered from Monday to Friday of the week. The lecture classes will be normally held from 9.30 AM to 1.00 PM with 30 minutes of break. The laboratory classes will be held in the afternoon from 2.00PM to 5.00 PM during the first two weeks of the module.

Module 1 to Module 10				
Week-1	Week-2	Week-3	Week-4	Week-5
Module Delivery	Module Delivery	Study Work	Examination	Assignment submission & Presentation

20. Teaching and Learning Methods

The module delivery comprises of combination of few or all of the following:

1. Face to Face Lectures using Audio-Visuals
2. Workshops, Group Discussions, Debates, Presentations
3. Demonstrations
4. Guest Lectures
5. Laboratory/Field work
6. Industry Visit
7. Seminars/Conferences
8. Group Exercises
9. Project Exhibitions
10. Management Festivals

21. Elective Module**FSH504 Teaching**

A student can teach a module in his / her area of specialisation in any institute approved by the department. The student must submit the teaching notes and also make a presentation to a team of examiners.

FSH505 Seminar/Internship**Seminar**

A student can deliver a seminar of one hour duration of his/her original study on a contemporary topic. Topic of the seminar should be registered at the beginning of the elective module. At the end, seminar must be delivered to a team of examiners and also a word processed report must be submitted for assessment.

Internship

Internship is to be done with a research organization for a period of 5 weeks. The student is required to submit a report for assessment and also make a presentation to a team of examiners. The internship should be related to the Programme. A student is required to find internship on his/her own but the student placement office may assist in getting internship.

FSH506 Journal/Conference Publication**Conference Publication**

A student can submit a paper and make a presentation in a conference which is approved by the department. The same paper shall be presented for assessment and the student is required to make a presentation to a team of examiners.

Journal Publication

A student can publish a paper in an Indian or International journal. The proof of submission to the journal publication and a copy of the paper shall be submitted

followed by a presentation for assessment.

24. Assessment and Grading

A module assessment will have two components:

Component - 1

Assignment 50% weight

Component - 2

Examination 50% weight

(Note: For more details on the break-ups, please refer to the Module Specifications)

A student is required to score a minimum of 40% in each of the components and an overall 40% for successful completion of a module and earning the credits.

Note: Final marks awarded in each of the modules will be confirmed only after SAB/PAB as explained in Academic Regulations of M.Sc. Programme.

25. Failure and Re-registration

If a student fails in a module, he/she is required to re-attend the module when offered next time by re-registering to the module.

26. Attendance

A student is required to have a minimum of 85% attendance to be eligible to write the examination and assignment submission. Less than 85% attendance is considered to be FAIL; such a student is required to follow the same procedure as that of a failed student.

Any condoning of shortfall of the attendance is as per the Academic Regulations for M.Sc. Programme.

27. Award of Class

As per the Academic Regulations for M.Sc. Programme.

28. Student Support for Learning

Students are given the following support:

1. Module Notes
2. Reference Books in the Library
3. Magazines and Journals
4. Internet Facility
5. Computing Facility
6. Laboratory Facility
7. Workshop Facility
8. Staff Support
9. Lounges for Discussions
10. Any other support that enhances their learning

29. Quality Control Measures

The following are the Quality Control Measures:

1. Review of Module Notes
2. Review of Question Papers and Assignment Questions
3. Student Feedback
4. Moderation of Assessed work
5. Opportunities for the students to see their assessed work
6. Review by External Examiners and External Examiners Reports
7. Staff Student Consultative Committee Meetings
8. Student Exit Feedback
9. Subject Assessment Board
10. Programme Assessment Board

30. Curriculum Map

Module Code	Intended Learning Outcomes											
	Knowledge and Understanding				Cognitive (Thinking) Skills (Critical, Analytical, Problem Solving, Innovation)				Practical skills			
	KU1	KU2	KU3	KU4	CS1	CS2	CS3	CS4	PS1	PS2	PS3	PS4
CHY501											X	X
CHY502	X	X		X	X						X	X
CHY503	X	X					X				X	X
CHY504		X							X	X	X	X
CHY505		X			X					X		
ACY501	X	X	X	X	X	X	X	X	X			
ACY502	X	X	X	X	X	X		X	X	X	X	X
ACY503	X	X	X	X	X	X	X	X			X	
ACY504	X	X	X		X	X	X	X	X	X	X	
ACY505	X	X	X	X	X	X	X	X	X		X	
FSH501											X	X
FSH502	X	X	X	X	X	X	X	X	X	X	X	X
FSH503	X	X	X	X	X	X	X	X	X	X	X	X
FSH504	X	X	X	X	X	X	X	X	X			
FSH505												
FSH506												
ACY600	X	X	X	X	X	X	X	X	X	X	X	X

31. Capability/ Transferable Skills Map

Module Code	Group work	Self learning	Research Skills	Written Communication Skills	Verbal Communication Skills	Presentation Skills	Behavioral Skills	Information Management	Personal management/ Leadership Skills
CHY501		X	X	X	X	X		X	
CHY502		X	X	X	X	X		X	
CHY503		X	X	X		X		X	
CHY504	X	X	X	X	X	X	X	X	
CHY505	x		x			x			
ACY501		X	X	X	X	X		X	
ACY502		X	X	X	X	X		X	
ACY503		X	X	X	X	X		X	
ACY504		X	X	X	X	X		X	
ACY505		X	X	X	X	X		X	
FSH501		X		X	X	X		X	
FSH502		X	X	X	X	X		X	
FSH503		X	X	X	X	X	X	X	X
FSH504	X	X	X	X	X	X	X	X	X
FSH505		x	x	x	x	x		x	
FSH506		x	x	x	x	x		x	
ACY600	X	X	X	X	X	X	X	X	X

32. Co-curricular Activities

Students are encouraged to take part in co-curricular activities like seminars, conferences, symposium, paper writing, attending industry exhibitions, project competitions and related activities for them to enhance their knowledge and network.

33. Cultural and Literary Activities

To remind and ignite the creative endeavors annual cultural festivals are held and the students are made to plan and organise the activities.

34. Sports and Athletics

Students are encouraged to develop a habit of taking part in outdoor and indoor games on daily basis.

