



Shri Shivaji Education Society's,
MAHASATEE ARTS, COMMERCE & SCIENCE
COLLEGE, ULGA, KARWAR

ADD ON CERTIFICATE COURSE IN ADVANCE CHROMATOGRAPHIC TECHNIQUE

These techniques utilize various physical and chemical principles to achieve high-resolution separation, allowing for accurate analysis of substances at trace levels. Advanced chromatography is crucial across industries such as pharmaceuticals, biotechnology, food safety, environmental monitoring, and chemical production. The ultimate goal is to ensure the purity, quality, and safety of products and materials, while also providing efficient tools for research and development.

DEPARTMENT OF CHEMISTRY





Shri Shivaji Education Society's,
Mahasatee Arts, Commerce and Science College, Ulaga, Karwar
Uttar Kannada, Karnataka-581328

Ref:MACS/2023-24/

DATE: 11-01-2024

Proceedings of BOS of Add-on Course

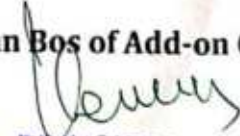
Proceedings of the meeting of BOS of Add on course Entitled "**Advance Chromatographic Technique**" By the Dept. of Chemistry, held on 12-01-2024 at 3.30 pm in IQAC Room Agenda:

1. To approve the Ad-on courses
 2. To frame syllabus for Ad-on courses
 3. Implementation of Ad-on courses
 4. Preparation of Time Table
 5. Conduction of course, class/Exams
- The following members were present:
1. Dr. V.V. Nayak-Principal Charman
 2. Dr. I.R. Kajagar. Dept. of Pol-Science-Convener IQAC Co-ordinator
 3. Smt. S.S. Gaonkar. HOD of Economics-Member
 4. Smt. Roopa D. Kudtarkar. HOD, Commerce-Member
 5. Shri. Prasad S. Naik, FDC-Member
 6. Shri. Raghavendra Shet- Entrepreneur
 7. Shri. Sudheer Nagekar-member-Alumni
- Resolutions:
1. Read and confirmed the minutes of last meeting held on 12.01-2024. After detailed discussion the following resolutions were passed as under:
 1. The panel of BOS scrutinized Add on course and finalized
 2. The panel of BOS of Add on course recommended the syllabus model of different Add on course
 3. The members expressed that Time table should be stipulated on Sunday and working days.
 4. The panel of BOS of Add on course is approved to implement all the Add on courses as early as possible.

The meeting was concluded with the chairman thanking all the members for their active participation and co-operation.



Chairman Bos of Add-on Course


PRINCIPAL
MAHASATEE ARTS,
COM. & SCI. COLLEGE
ULGA, KARWAR - 581 328



ಶ್ರೀ ಶಿವಾಜಿ ಶಿಕ್ಷಣ ಸಂಸ್ಥೆಯು

ಮಹಾಸತಿ ಕಲಾ,ವಾಣಿಜ್ಯ ಹಾಗೂ ವಿಜ್ಞಾನ ಮಹಾವಿದ್ಯಾಲಯ ಉಳಗಾ,ಕಾರವಾರ-581328

ShriShivaji Education Society's,

MAHASATEE ARTS,COMMERCE& SCIENCE COLLEGE,ULGA,KARWAR,

Uttar Kannada,Karnataka-581328

E-mail:sesmahasateuk@gmail.com Website:www.sesmacs.co.in

Date:12-1-2024

DEPARTMENT OF CHEMISTRY

STUDENT NOTICE


This is to inform all the students of B.Sc that Department of Chemistry is organizing an Add-on Certificate program in "Advance Chromatographic Technique" from the 19TH JANUARY-2024.

Interested student should immediately contact Smt.Sonali Savant, Head of the Chemistry Department on or before 18TH JANUARY-2024. for further details in connection with the time Table or other related matters.



Sign. of HOD Chemistry



PRINCIPAL

PRINCIPAL
MAHASATEE ARTS,
COM. & SCI. COLLEGE
ULGA, KARWAR - 581 328



ಶ್ರೀ ಶಿವಾಜಿ ಶಿಕ್ಷಣ ಸಂಸ್ಥೆಯ

ಮಹಾಸತಿ ಕಲಾ,ವಾಣಿಜ್ಯ ಹಾಗೂ ವಿಜ್ಞಾನ ಮಹಾವಿದ್ಯಾಲಯ ಉಳಗಾ,ಕಾರವಾರ-581328

ShriShivaji Education Society's,

MAHASATEE ARTS, COMMERCE & SCIENCE COLLEGE, ULGA, KARWAR,
Uttar Kannada, Karnataka-581328

E-mail: sesmahasateek@gmail.com Website: www.sesmacs.co.in

Date: 10-1-2024

DEPARTMENT OF CHEMISTRY

STUDENT NOTICE

This is to inform all the students who have registered their name for the Add on Certificate course on "Advance Chromatographic Technique" classes will start from 19TH JANUARY-2024.

Add on Certificate course on "Advance Chromatographic Technique" classes will engaged at 4.00pm to 5.00pm on all working days.

HOD

Sign. of HOD Chemistry



PRINCIPAL
PRINCIPAL
MAHASATEE ARTS,
COM. & SCI. COLLEGE
ULGA, KARWAR - 581 328



Shri Shivaji Education Society's,
MAHASATEE ARTS, COMMERCE & SCIENCE COLLEGE, ULGA, KARWAR,
Uttar Kannada, Karnataka-581328
Phone: 08382-257033
E-mail: sesmahasateek@gmail.com Website: www.sesmacs.co.in

DEPARTMENT OF CHEMISTRY
Add-on Certificate course-2023-24

List of students enrolled for "ADVANCED CHROMATOGRAPHIC TECHNIQUE"

Sl.No	Name of the Students
1	Sri.Nikhil Purushottam Naik
2	Miss.Nikita Nagesh Talekar
3	Sri.Sanjeev Shantaram Billekar
4	Miss.Bharati Ravikant Marathe
5	Sri.Latesh Muralidhar Naik
6	Miss.Sneha Sainath Majalika
7	Sri.Ambish Chandraksh Gaonkar
8	Sri.Sharat surendra gurav
9	Sri.Akshay Shantaram Naik
10	Sri.Narendra suresh yellekar
11	Sri.Prakash Hanamant Bevoor
12	Miss.Bhagyalaxmi Shankar Kundapur
13	Sri.Muttanna Hanumantaraya Police patil
14	Sri.Sujal Anandu wagdhare
15	Miss.Saniya Ibrahim Shaikh
16	Sri.Santosh.K.Gavada
17	Miss.Swati.U.Kankonkar
18	Miss.Pooja.P.Pagi
19	Sri.Rahul.D.Naik
20	Sri.Roshan.S.Bandekar
21	Sri.Shivanand.K.Achari
22	Sri.Pranay.B.Naik
23	Sri.Yogesh.A.Gavada
24	Miss.Neeta Dsouza



Deep
PRINCIPAL
MAHASATEE ARTS,
COM. & SCI. COLLEGE
ULGA, KARWAR - 581328



PROPOSAL FOR ADD-ON COURSE
Entitled

**ADVANCED
CHROMATOGRAPHIC TECHNIQUES
IN PHARMACEUTICAL INDUSTRY**



submitted by

**DEPARTMENT OF CHEMISTRY
MAHASATEE ARTS, COMMERCE AND SCIENCE
COLLEGE, ULGA KARWAR**



INTRODUCTION

Chromatography is a laboratory technique for the separation of a mixture. The mixture is dissolved in a fluid called the mobile phase, which carries it through a structure holding another material called the stationary phase. The various constituents of the mixture travel at different speeds, causing them to separate. The separation is based on differential partitioning between the mobile and stationary phases. Subtle differences in a compound's partition coefficient result in differential retention on the stationary phase and thus affect the separation.

The add-on course in Chromatography provides the fundamentals of separation Science theory, the concepts of separation Science, and their applications in solving analytical problems. The add-on course also introduces the operating principles and applications of state-of-the-art TLC, Paper, Column and LC/GC instrumentation and analysis. Covered topics include chromatographic fractionation extraction, emerging methods for the separation and analysis of complex mixtures, TLC, paper, column, gas and liquid chromatography, optimization of TLC, paper, column, LC and GC separations, and the diverse range of analytical applications amenable to TLC, paper, column, GC/LC analysis. This course was developed to provide the student with understanding of the theory, practices and instrumentation associated with chromatographic separation techniques. The focus is primarily on High Performance Liquid Chromatography (HPLC) and Gas Chromatography (GC). The interfacing of hyphenated techniques involving Mass Spectrometry (MS), such as LC-MS and GC-MS, is also covered.

RATIONALE FOR INTRODUCING THE COURSE

The add-on course in Chromatographic Techniques was developed based on an analysis of the importance of the pharmaceutical and related industries in Karnataka and within the north region and also using feedback given from a large number of pharmaceutical/biotechnology, medical device and food industries. One of the companies survey indicated that 40-45% of required training in HPLC techniques while 35-40% required GC training. Recognizing this demand, the add-on course in Chromatographic Techniques was devised to provide advanced level training and address this skills deficit. Availability of chromatographic instruments in the partner Institution, suggestions and feedback from the industrial stakeholders made us to undertake this topic as the add-on course.



COURSE OVERVIEW

The student will be exposed to state-of-the-art developments in associated instrumentation, and will learn to competently operate, calibrate and qualify associated laboratory instrumentation. The student will be exposed to the application of advanced chromatographic techniques in a wide range of industrial environments focusing mainly, but not exclusively, on applications in the pharmaceutical and biopharmaceutical industries. This will enable them to select an appropriate separation technique for a given analysis in a range of industrial environments. The student will also learn to resolve sample preparation and method development issues for the chromatographic separation of samples in complex matrices. Add-on Course will include instruction in theory, application and hands on practice of chromatography. The add-on course in Chromatography program provides the fundamentals of separation science theory, the concepts of separation science, and their applications in solving analytical problems. The program also introduces the operating principles and applications of state-of-the-art TLC, paper, column, LC/GC instrumentation and analysis. Students enrolled in this add-on course learn processes to determine separation procedures.

AIMS OF THE COURSE

The overall aim of this course is to produce graduates with the necessary knowledge, skills and expertise in chromatography and quality management. Another goal of the course is that it will also confer on the graduates a set of personal and professional attributes that will allow them greater flexibility in the development of their own career options, over the span of their career.

Specifically, the aims of the course are:

- ❖ To graduate individuals who have advanced knowledge of the disciplines of quality management and analytical science.
- ❖ To graduate the students who can lead their company's quality programmes.
- ❖ To enable graduates to assess the potential of and implement new analytical technology within an industrial environment.
- ❖ To graduate the students with advanced research skills.



On successful completion of this course, the learner should be able to:

1. Evaluate and apply advanced analytical techniques in a regulated scientific laboratory environment.
2. Demonstrate a systematic understanding of quality systems or standards and be capable of evaluating the effectiveness of these in a manufacturing environment.
3. Compare and evaluate a range of advanced quality methodologies and analytical techniques, including novel and emerging techniques.
4. Critically appraise new and next generation solutions to best practice management principles in order to take significant responsibility for quality management in the workplace.
5. Demonstrate the ability to lead in group projects, initiate and carry out problem-solving activities and conduct critical reviews of work accomplished.
6. Successfully undertake individual and group projects involving research, project management and presentation of results.
7. Produce an academic dissertation based on a body of research work, containing aims and objectives, methodology, literature survey and critical evaluation of it, a description of the work and findings and conclusions together with references and citations.
8. Be capable of progression to course leading to a higher qualification such as a Doctoral Degree as a result of advanced research training skills.

CAREER OPPORTUNITIES

Chromatography is a field with many practical applications, such as forensics, environmental testing, explosive detection and other laboratory technology fields. Also, Chemists work in a variety of industries including pharmaceuticals, petroleum, government laboratories, food, agriculture, and consumer products.

- Analytical chemist
- Quality control chemist
- Quality assurance chemist
- Agricultural chemist
- Soil and plant chemist
- Analytical development scientist
- Technologist



SYLLABUS

UNIT-1: Introduction to Chemical Analysis and Evaluation of Analytical Data [15 Hours]

- **Introduction to Chemical Analysis:** approaches, definition of terms, concentration units. Classification of analytical methods. Preparing standard solutions and primary standards. Principles and applications of volumetric and Gravimetric analysis.
- **Errors and Evaluation of Analytical Data:** Errors-Types and sources of errors, propagation of errors, accuracy and precision, minimization of errors, significant figures. Mean, median & standard deviation. Significance of t- and F-tests and least square analysis.

UNIT-2: CHROMATOGRAPHY [15 Hours]

- **Fundamentals of Chromatography:** General principles and classification of chromatographic methods, criteria for selection of stationary and mobile phase and nature of adsorbents.
- **Thin-layer Chromatography:** Definition, mechanism, efficiency of TLC plates, methodology, selection of stationary and mobile phases, development, spray reagents, identification and detection, reproducibility of R_f values, qualitative and quantitative analysis.
- **Paper Chromatography:** Principles and applications
- **Column Chromatography:** Theories, plate theory, rate theory, band broadening-eddy diffusion, longitudinal diffusion and resistance to mass transfer, column efficiency, Van Deemter's equation and its modern version, interrelationships, capacity factor, selectivity factor, column resolution, distribution constant and applications of conventional column chromatography, advantages and limitations.
- **Liquid Chromatography:** HPLC – Principles, Basic components of HPLC, Mobile-phase supply system, Sample injection system, Column and Detectors. Applications of HPLC.
- **Gas Chromatography:** Principles, Instrumentation, GC Columns, Stationary phases, carrier gas used in GC, GC detectors. Applications of GC.
- **GC-MS and HPLC-MS:** Principles and applications

RECOMMENDED BOOKS

1. Fundamental of Analytical Chemistry, D. A. Skoog, D.M. West, Holler and Crouch, 8th edition, Saunders College Publishing, New York (2005).
2. Analytical Chemistry, G.D. Christian, 6th edition, Wiley-India (2007).
3. Instrumental Methods of Analysis, H. H. Willard, L. Merrit, J. A. Dean and F. A. Settle, CBS Publishers 1996.



LAB COURSE IN CHROMATOGRAPHY

1. Demonstration of TLC and Paper chromatography.
2. Demonstration of Column Chromatography.
3. In this course, students will gain hands-on experience using analytical instruments.

RECOMMENDED BOOKS

1. Vogel's Textbook of Quantitative Chemical Analysis, J.Mendham, R.C.Denney, J.D.Barnes and M.J.K.Thomas, 6thedition, Third Indian Reprint2003. Pearson Education Pvt. Ltd., New Delhi.

This proposal is submitted to the Chairman, Kanara Welfare Trust, through the Principal, Gokhale Centenary College, Ankola, for kind consideration and approval.



Coordinator
[Signature]
PRINCIPAL
MAHASATEE ARTS,
COM. & SCI. COLLEGE
ULGA, KARWAR - 581 329



Shri Shivaji Education Society's,

MAHASATEE ARTS, COMMERCE & SCIENCE COLLEGE,

Ulga, Karwar, Uttar Kannada, Karnataka - 581328

Affiliated to Karnatak University Dharwad

IQAC Initiative

ADD-ON COURSE

Conducted by

DEPARTMENT OF CHEMISTRY

ADVANCED CHROMATOGRAPHIC TECHNIQUE

This is to certify that ~~Mr.~~/Ms Bharati R. Marathe

Class B.Sc II satisfactorily completed the course during the year 2023-24

Brent
HOD. CHEMISTRY

[Signature]
PRINCIPAL
**MAHASATEE ARTS, COMMERCE &
SCIENCE COLLEGE, Ulga, Karwar**



Shri Shivaji Education Society's,

MAHASATEE ARTS, COMMERCE & SCIENCE COLLEGE,

Ulga, Karwar, Uttar Kannada, Karnataka - 581328

Affiliated to Karnatak University Dharwad

IQAC Initiative

ADD-ON COURSE

Conducted by

DEPARTMENT OF CHEMISTRY

ADVANCED CHROMATOGRAPHIC TECHNIQUE

This is to certify that Mr./~~Ms~~ Ambish C. Gaonkar

Class B.sc II satisfactorily completed the course during the year 2023-24

Prat

HOD. CHEMISTRY

Prat

PRINCIPAL

**MAHASATEE ARTS, COMMERCE &
SCIENCE COLLEGE, Ulga, Karwar**