Sonopant Dandekar Shikshan Mandali's
Sonopant Dandekar Arts, V. S. Apte Commerce
& M. H. Mehta Science College, Palghar

# Certificate Course
# In
# Gas Chromatography

## Department of Chemistry

# INDEX

# Certificate course in Gas Chromatography

**Duration:** 40 hours

**Aim:** To study gas chromatography techniques.
(Theoretical and Lab work)

**Features of the course:**

• Specially designed to give hands on training.

• Customized for the industry.

• Delivered by experts from the industry.

**Objectives:**

- To identify instrumental components and
- To develop skills of handling various analytical instruments.

**Eligibility:**

Any science students having chemistry as a subject.

**Intake Capacity – 200 Students**

# Proposal

26th June, 2019

To,

The Principal

Sonopant Dandekar Arts, V.S. Apte Commerce

And M.H. Mehta Science College,

Palghar

Subject: Approval for Certificate Course in Gas Chromatography

Respected Sir,

For developing instrumental skills in students, we have designed a certificate course in Gas Chromatography for T.Y.B.Sc. and M.Sc. students in collaboration with Aarti Labs. The course is designed to provide a platform to students which will avail their instrumental skills in handling gas chromatography. This training will close the employment gap between academic and industry. The details are provided along with this letter. I request you to kindly grant the permission to start this course.

Thanking you,

Approved

26/06/2019

Yours faithfully,

Dr. Suhas Janwadkar

Head, Department of Chemistry

## MOU

# DRAFT MEMORANDUM OF UNDERSTANDING (MOU)

**Between**

***Sonopant Dandekar Shikshan Mandali's***

**SONOPANT DANDEKAR ARTS, VAMAN SHRIDHAR APTE COMMERCE, M.H. MEHTA SCIENCE COLLEGE, PALGHAR**

**[PARTY OF THE FIRST PART]**

***And***

**AARTI LABS**

**[PARTY OF THE SECOND PART]**

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This MEMORANDUM OF UNDERSTANDING between Sonopant Dandekar Shikshan Mandali's Sonopant Dandekar Arts, Vaman Shridhar Apte Commerce, M.H. Mehta Science College, Palghar, herein after called as "**PARTY OF THE FIRST PART**" and AARTI LABS herein after called "**PARTY OF THE SECOND PART**".

## I. PURPOSE & SCOPE

This MOU aims to clearly identify the roles and responsibilities of each PARTY of the first parts they relate to a course named "**CERTIFICATE COURSE IN GAS CHROMATOGRAPHY**".

**In particular, this MOU is intended to:**

The objective of this MOU is to express the willingness of both parties to engage in an effort to start a certified course in hands-on training on gas chromatography through collaborative activities in the areas of training, and education to enhance safe and effective operations in chemical industries and applied research.

## II. GENERAL TERMS OF MOU

### 2.1 PROGRAM HIGHLIGHTS:

- Tremendous career opportunities in the Pharmaceutical or Chemical Industry with lucrative Salaries.
- Excellent growth prospects, Industry-focused curriculum.
- Full hands on experience on advance analytical instrument and training as per Industrial Standards.

## 2.2 METHOD OF DELIVERY:

Theory Lectures through presentations

Workshops / Assignments / Expert Guest lectures

A clear presentation of training objectives at the beginning of each session Soft skill development programs - Exploration of personal attitudes.

Demonstration using reliable sources and Hands-on training on each and every instrument.

## ELIGIBILITY:

Third year B.Sc. / M.Sc. Chemistry, Botany, Biochemistry, Microbiology, Life Science, Zoology, Biotechnology, Bachelor of Pharmacy, and Master of Pharmacy.

## RESOURCES:

Well-equipped lab, Library, and industrial resource persons.

## EVALUATION:

Continuous Evaluation during the course theory as well as practicals.

## EXAMINATIONS:

Seminars, Interim exams, Viva, Practical and Final examinations

## III. [PARTY OF THE FIRST PART]

## RESPONSIBILITIES AND OBLIGATIONS UNDER THIS MOU

Shall undertake the following activities:

- ✓ ***The PARTY of the first part agrees*** to provide rent-free infrastructure facilities, including the required premises, electrification, and water facility.
- ✓ ***The PARTY of the first part further agrees*** any damage to the instruments in absence of Trainer will be under the responsibility of college.
- ✓ ***The PARTY of the first part agrees*** to promote and propagate the said course to the students studying in the college.
- ✓ ***The PARTY of the first part shall*** maintain a record of the students enrolled in the said course.
- ✓ ***The PARTY of the first part agrees*** to evaluate the students studying in the said course.
- ✓ ***The PARTY of the first part will*** collect the necessary course fees from the students.

## IV. [PARTY OF THE SECOND PART]

### RESPONSIBILITIES AND OBLIGATIONS UNDER THIS MOU

Shall undertake the following activities:

***The PARTY of the Second part agrees*** to provide necessary instruments including the necessary software required for the said course.

The maintaining and repairing of the instruments shall always be of ***The PARTY of the Second part.***

***The PARTY of the Second part agrees*** to provide experts and technical support to conduct the instrumentation course.

***The PARTY of the Second part further agrees*** to provide the samples and specialists' chemicals necessary for experimental work.

***The PARTY of the Second part will*** train faculty members and the supporting staff of the Chemistry Department of the college to work on instrumentations.

## V. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

1. Modification
2. Termination

## VI. FUNDING

This MOU does (does not) include the reimbursement of funds between the two parties.

## VII. EFFECTIVE DATE AND SIGNATURE

This MOU is hereby signed and sealed by the respective parties hereto on the 27th of June 2019 at Palghar. **In the presence of,**

DAMODAR ARTS, APTE COMM. & MEHTA SC. COLLEGE * PALGHAR DIST. PALGHAR

**Dr.Kiran J. Save**
Principal,
Sonopant Dandekar Arts,
Apte Commerce and M.H. Mehta
Science College

PRINCIPAL
Sonopant Dandekar Arts College,
V. K. Apte Commerce College &
M. H. Mehta Science College
Palghar (W.R.)
Dist. Palghar, Pin - 401 404.

**Mr. Arun**
Director,
AARTI LABS
Boisar

For AARTI LABS
Proprietor

## Notice

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*Sonopant Dandekar Shikshan Mandali's*

**Sonopant Dandekar Arts, V. S. Apte Commerce & M. H. Mehta Science College, Palghar, Dist: Palghar**

ACADEMIC YEAR 2021-22

# Department of Chemistry

# NOTICE

**Date: 27/05/2022**

**Following students are hereby informed that their GC course will commence as per following schedule.**

| Batch | Roll number | Date | Timing |
|---|---|---|---|
| 1 | 401,402,403,404,406,408,409,410,411,412 | 15.06.2022 to 24.06.2022 | 8.30-11.00 am |
| 2 | 414,415,423,424,425,428,448,427,601,602 | 15.06.2022 to 24.06.2022 | 11.30-2.00 pm |
| 3 | 429,430,431,432,433,434,435,436,437,438 | 25.06.2022 to 02.07.2022 | 8.30-11.00 am |
| 4 | 416,417,418,419,420,440,441,442,443,444 | 25.06.2022 to 02.07.2022 | 11.30-2.00 pm |
| 5 | 421,422,423,446,445,407,439,447,626,640 | 04.07.2022 to 11.07.2022 | 8.30-11.00 am |
| 6 | 603,604,605,606,607,608,609,610, 611,612 | 04.07.2022 to 11.07.2022 | 11.30-2.00 pm |
| 7 | 613,614,615,616,617,618,619,620, 621,622 | 12.07.2022 to 19.07.2022 | 8.30-11.00 am |
| 8 | 623,625,627,628,629,630,631,632, | 12.07.2022 to 19.07.2022 | 11.30-2.00 pm |
| 9 | 633,634,636,639,641,642,644,645 | 20.07.2022 to 27.07.2022 | 8.30-11.00 am |

**Note: There will be no hands on training on 18th & 19th June 2022.**

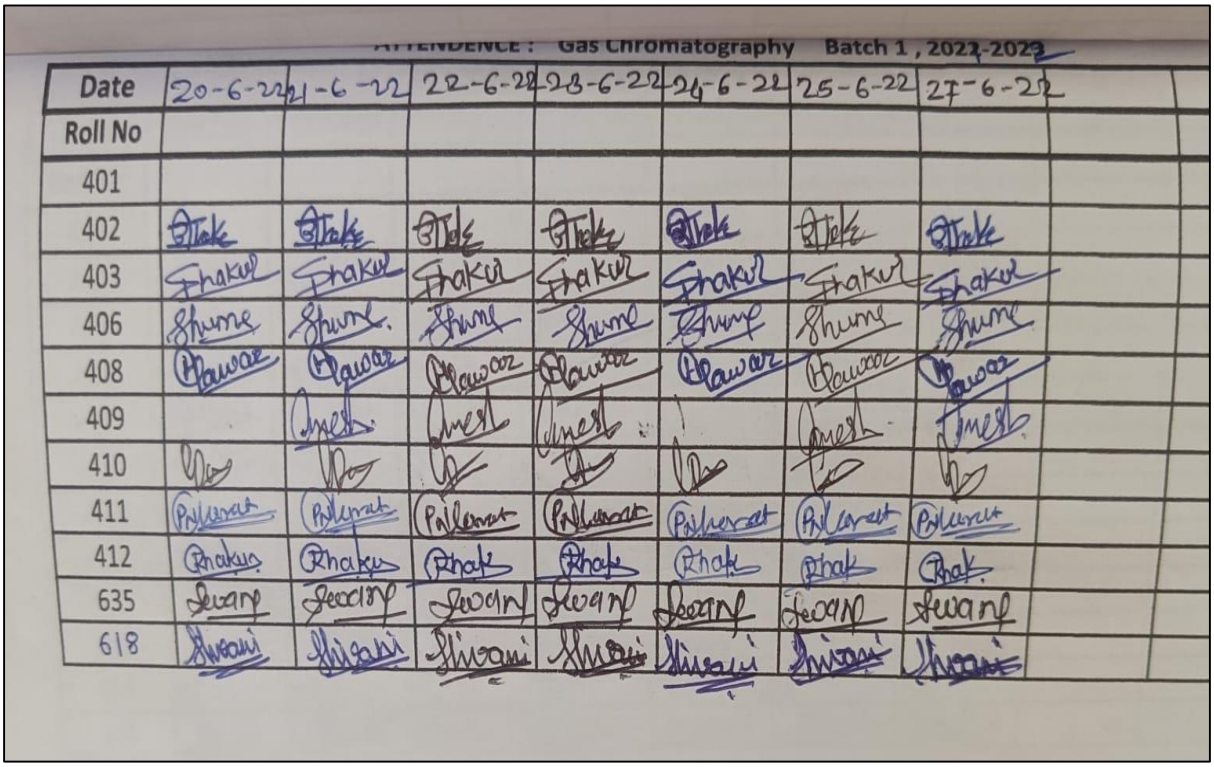
Dr. Suhas Janwadkar

Head, Chemistry Department

# Syllabus

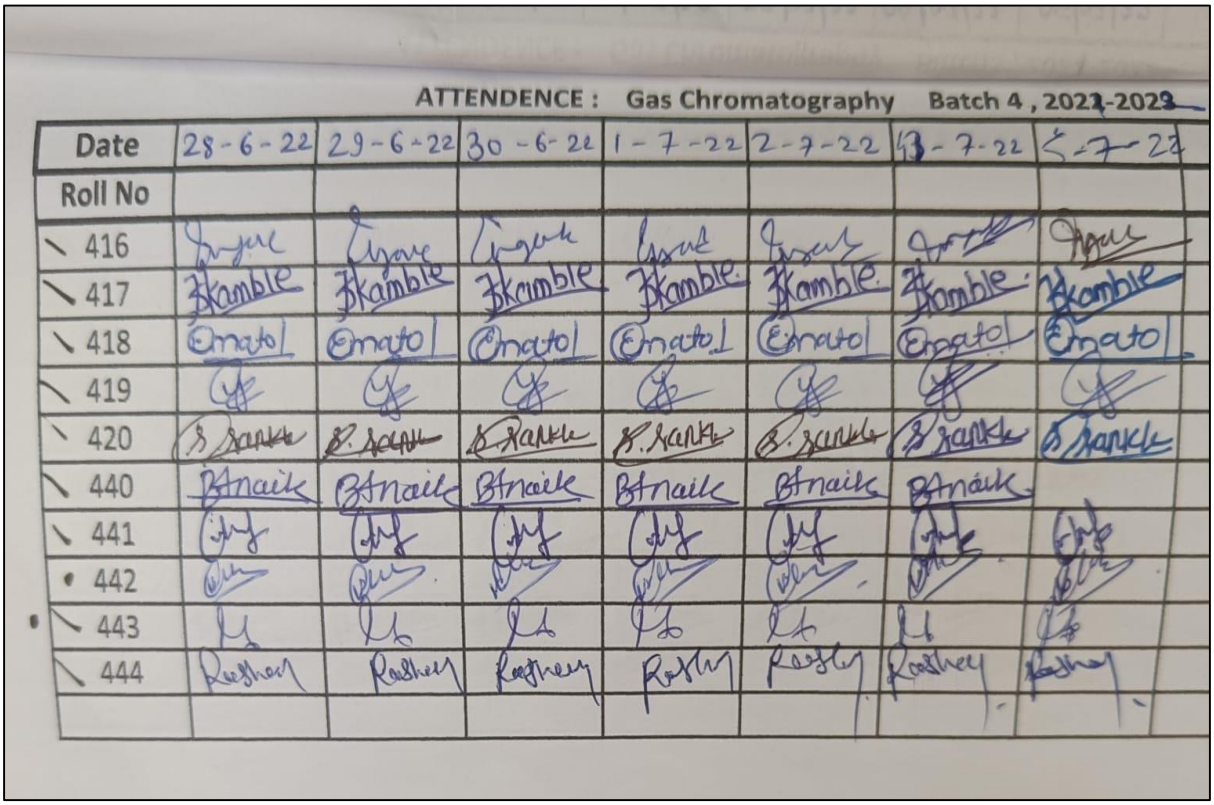
| | Content | Theoretical | Practical | Duration |
|---|---|---|---|---|
| 1 | Gas Chromatography | **Theory**<br>• Introduction to GC<br>• Role of gases in GC<br>• Types of GC injectors<br>• Types of GC columns<br>• Types of stationary phases<br>• Types of GC detectors<br>• Applications<br>• Block diagram<br>• Instrumentation | To determine the purity of the given solvent by GC | 40 hours |
| | | | Total hours = | 40 hours |

# Attendance



ATTENDENCE : Gas Chromatography Batch 1 , 2022-2023

| Date | 20-6-22 | 21-6-22 | 22-6-22 | 23-6-22 | 24-6-22 | 25-6-22 | 27-6-22 |
|---|---|---|---|---|---|---|---|
| Roll No | | | | | | | |
| 401 | | | | | | | |
| 402 | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur |
| 403 | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur |
| 406 | Thune | Thune | Thune | Thune | Thune | Thune | Thune |
| 408 | Thawar | Thawar | Thawar | Thawar | Thawar | Thawar | Thawar |
| 409 | | Thest | Thest | Thest | | Thest | Thest |
| 410 | | | | | | | |
| 411 | Pallewar | Pallewar | Pallewar | Pallewar | Pallewar | Pallewar | Pallewar |
| 412 | Thakur | Thakur | Thak | Thak | Thak | Thak | Thak |
| 635 | Tiwari | Tiwari | Tiwari | Tiwari | Tiwari | Tiwari | Tiwari |
| 618 | Thivani | Thivani | Thivani | Thivani | Thivani | Thivani | Thivani |



ATTENDENCE : Gas Chromatography Batch 4 , 2022-2023

| Date | 28-6-22 | 29-6-22 | 30-6-22 | 1-7-22 | 2-7-22 | 4-7-22 | 5-7-22 |
|---|---|---|---|---|---|---|---|
| Roll No | | | | | | | |
| 416 | Thyare | Thyare | Thyare | Thyare | Thyare | Thyare | Thyare |
| 417 | Thamble | Thamble | Thamble | Thamble | Thamble | Thamble | Thamble |
| 418 | Thato | Thato | Thato | Thato | Thato | Thato | Thato |
| 419 | | | | | | | |
| 420 | Thankle | Thankle | Thankle | Thankle | Thankle | Thankle | Thankle |
| 440 | Thnaik | Thnaik | Thnaik | Thnaik | Thnaik | Thnaik | |
| 441 | | | | | | | |
| 442 | | | | | | | |
| 443 | | | | | | | |
| 444 | Rathore | Rathore | Rathore | Rathore | Rathore | Rathore | Rathore |
| | | | | | | | |

**ATTENDENCE : Gas Chromatography Batch 5 , 2021-2023**

| Date | 6/7/22 | 7/07/22 | 8/07/22 | 9/07/22 | 11/7/22 | 12/7/22 | 13/7/22 |
|---|---|---|---|---|---|---|---|
| Roll No | | | | | | | |
| 421 | | | | | | | |
| 422 | | | | | | | |
| 423 | | | | | | | |
| 446 | | | | | | | |
| 445 | | | | | | | |
| 407 | | | | | | | |
| 439 | | | | | | | |
| 447 | | | | | | | |
| 626 | | | | | | | |
| 640 | | | | | | | |

**ATTENDENCE : Gas Chromatography Batch 2 , 2021-2023**

| Date | 20/06/2022 | 21/06/2022 | 22/06/2022 | 23/06/2022 | 24/06/2022 | 25/06/2022 | 27/06/22 |
|---|---|---|---|---|---|---|---|
| Roll No | | | | | | | |
| 414 | | | | | | | |
| 415 | | | | | | | |
| 426 | | | | | | | |
| 424 | | | | | | | |
| 425 | | | | | | | |
| 428 | | | | | | | |
| 448 | | | | | | | |
| 427 | | | | | | | |
| 601 | | | | | | | |
| 602 | | | | | | | |
| 604 | | | | | | | |
| 605 | | | | | | | |

**ATTENDENCE : Gas Chromatography Batch 6 , 2021-2023**

| Date | 06/07/22 | 7/07/22 | 8/07/22 | 9/07/22 | 11/07/22 | 12/07/22 |
|---|---|---|---|---|---|---|
| Roll No | | | | | | |
| 603 | | | | | | |
| 606 | | | | | | |
| 607 | | | | | | |
| 608 | | | | | | |
| 609 | | | | | | |
| 610 | | | | | | |
| 611 | | | | | | |
| 404 | | | | | | |

ATTENDENCE : Gas Chromatography Batch 7 , 2021-2023

| Date | 16/7/22 | 18/7/22 | 19/7/22 | 20/7/22 | 21/7/22 | 22/7/22 | 8/8/22 | 10/08 |
|---|---|---|---|---|---|---|---|---|
| Roll No | | | | | | | | |
| 613 | Salunke | Salunke | Salunke | Salunke | Salunke | Salunke | | |
| 614 | | | | | | | | |
| 615 | Bhuvad | Bhuvad | Bhuvad | Bhuvad | Bhuvad | Bhuvad | | |
| 616 | Shinde | Shinde | Shinde | Shinde | Shinde | Shinde | Shinde | |
| 617 | A.J.Kore | A.J.Kore | A.J.Kore | A.J.Kore | A.J.Kore | A.J.Kore | A.J.Kore | |
| 618 | | | | | | | | |
| 619 | Patil | Patil | Patil | Patil | Patil | Patil | Patil | |
| 620 | Utini | Utini | Utini | Utini | Utini | Utini | | |
| 621 | Doli | Doli | Doli | Doli | Doli | Doli | | |
| 622 | Kavle | Kavle | Kavle | Kavle | Kavle | Kavle | | |
| | | | | | | | | |

ATTENDENCE : Gas Chromatography Batch 8 , 2021-2023

| Date | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roll No | 16/07/22 | 18/07/22 | 19/07/22 | 20/07/22 | 21/07/22 | 22/07/22 | 8/8/22 | 10/8/22 | |
| 623 | Shaikh | Shaikh | Shaikh | Shaikh | Shaikh | Shaikh | | | |
| 625 | Sahil | Sahil | Sahil | Sahil | Sahil | Sahil | | | |
| 627 | Awais | Awais | Awais | Awais | Awais | Awais | | | |
| 628 | Fahim | Fahim | Fahim | Fahim | Fahim | Fahim | | | |
| 629 | | | | | | | | | |
| 630 | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | |
| 631 | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur | Thakur | |
| 632 | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | |
| 612 | Pinali | Pinali | Pinali | Pinali | Pinali | Pinali | Pinali | | |
| 643 | Ankita | Ankita | Ankita | Ankita | Ankita | Ankita | | | |
| 413 | | | | | | | | | |

ATTENDENCE : Gas Chromatography Batch 9 , 2021-2023

| Date | 22/07/2022 | 08/08/2022 | 10/08/22 | 16/08/2022 | 17/08/22 | 18/08/22 | 8-8-22 | 10-8-22 |
|---|---|---|---|---|---|---|---|---|
| Roll No | | | | | | | | |
| 633 | NAS | NAS | NAS | NAS | NAS | NAS | | |
| 634 | Bhore | Bhore | Bhore | Bhore | Bhore | Bhore | | |
| 636 | Bhoi | Bhoi | Bhoi | | | Bhoi | | |
| 637 | | | | | | | | |
| 638 | BR | BR | BR | | | BR | | |
| 639 | Sharma | Sharma | Sharma | | | Sharma | | |
| 641 | Jpatil | Jpatil | Jpatil | Jpatil | Jpatil | Jpatil | Jpatil | Jpatil |
| 642 | Dalavi | | | | | | | |
| 644 | Bodhi | Bodhi | Bodhi | Bodhi | Bodhi | Bodhi | | |
| 645 | | | | | | | | |
| | | | | | | | | |

# Learning Outcomes

**Learning Outcomes:**

- Understand principles and applications of gas chromatography
- Practical experience of adjusting parameters and adjustment of each GC components.
- Learn about the different components of a gas chromatograph, including the injector, column, detector, and data acquisition system.
- Learn techniques for developing and optimizing gas chromatography methods for different sample types and analytes.
- Learn various sample preparation techniques, such as extraction, derivatization, and dilution, to ensure the analytes of interest are in a suitable form for injection into the gas chromatograph.

## Compliance Report

Certificate Course in Gas Chromatography provides a platform to enrich in various aspects:

Gas chromatography is a widely used analytical technique that separates and analyzes volatile compounds in a sample. Students developed a solid understanding of the fundamental principles underlying gas chromatography, including the theory, instrumentation, and methodologies involved.

Total 86 students are enrolled and all completed the course successfully. Students received hands-on experience with operating GC instruments, setting up analytical methods, and analyzing samples. This practical training enhanced their skills and confidence in working with gas chromatography techniques.

This course covered method development and optimization strategies. These techniques helped students in tailoring GC methods to specific sample types, optimizing separation conditions, and selecting appropriate detectors. By learning these techniques, students were able to improve the efficiency and accuracy of your analyses.

Students were able to interpret and analyze chromatograms, identify peaks, quantify compounds, and perform data analysis. These skills are valuable for evaluating results and drawing meaningful conclusions from experiments.

Gas chromatography instruments require regular maintenance and troubleshooting to ensure optimal performance. This course trained students with the knowledge and skills to diagnose and solve common problems that may arise during instrument operation. Understanding troubleshooting techniques can save time and resources in the laboratory.

Gas chromatography has numerous applications across various industries, including environmental analysis, pharmaceuticals, food and beverage, forensics, and petrochemicals. This course covered the application areas, providing students with insights into the practical uses of GC and its relevance in different industries.

Gas chromatography is a widely used analytical technique, and professionals with expertise in GC are in demand in industries and research settings. By acquiring knowledge and skills in gas chromatography through a dedicated course, students were able to enhance their career prospects and open doors to job opportunities in analytical chemistry, quality control, research and development, and related fields.

**Note:** Since it was pandemic year the course took longer than expected to cover the syllabus of the course

Dr. Suhas Janwadkar

HOD & Course Coordinator

# Feedback Form

5/7/22

Sonopant Dandekar Arts, V.S. Apte Commerce and M.H.Mehta Science College, Palghar

Internal Quality Assurance Cell

Feedback Form on Certificate Course for GC Course

Name: Vismay Gharat

Class: M.Sc. II Analytical

Roll No.: 442

| Sr.No. | Parameters | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 1 | The instructor was punctual and well organized for class. | ✓ | | | | |
| 2 | The instructor demonstrated knowledge on the subject. | ✓ | | | | |
| 3 | The student material was informative and easy to follow. | ✓ | | | | |
| 4 | There was sufficient time provided for individual hands-on practice. | ✓ | | | | |
| 5 | The equipment was clean and in proper working order. | ✓ | | | | |
| 6 | The course developed my understanding of concepts and principles of Gas Chromatography. | ✓ | | | | |

Vismay

Signature of student

23/7/22

Sonopant Dandekar Arts, V.S. Apte Commerce and M.H.Mehta Science College, Palghar

Internal Quality Assurance Cell

Feedback Form on Certificate Course for GC Course

Name: Ashraya Thakur

Class: M.Sc. II Organic

Roll No.: 631

| Sr.No. | Parameters | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 1 | The instructor was punctual and well organized for class. | ✓ | | | | |
| 2 | The instructor demonstrated knowledge on the subject. | ✓ | | | | |
| 3 | The student material was informative and easy to follow. | ✓ | | | | |
| 4 | There was sufficient time provided for individual hands-on practice. | ✓ | | | | |
| 5 | The equipment was clean and in proper working order. | ✓ | | | | |
| 6 | The course developed my understanding of concepts and principles of Gas Chromatography. | ✓ | | | | |

Thakur

Signature of student

## Certificate

Sonopant Dandekar Shikshan Mandali's

**Sonopant Dandekar Arts,**
**V. S. Apte Commerce &**
**M. H. Mehta Science College, Palghar**

# Certificate

This is to certify that,

Mangela Megharaj Santosh

has successfully completed

7 Days Hands on Traning on Gas Chromatography

Between 6|7|22 to 13|7|22

Principal
Sonopant Dandekar Arts,
V. S. Apte Commerce,
M. H. Mehta Science College,
Palghar

Place : Palghar
Date : 25|8|22

Head of Chemistry Department
Sonopant Dandekar Arts,
V. S. Apte Commerce,
M. H. Mehta Science College,
Palghar

Sonopant Dandekar Shikshan Mandali's

**Sonopant Dandekar Arts,**
**V. S. Apte Commerce &**
**M. H. Mehta Science College, Palghar**

# Certificate

This is to certify that,

Machhi Urmila Laxman

has successfully completed

7 Days Hands on Traning on Gas Chromatography

Between 06|07|22 to 13|07|22

Principal
Sonopant Dandekar Arts,
V. S. Apte Commerce,
M. H. Mehta Science College,
Palghar

Place : Palghar
Date : 25|08|22

Head of Chemistry Department
Sonopant Dandekar Arts,
V. S. Apte Commerce,
M. H. Mehta Science College,
Palghar

# Photo