

“Dissemination of Education for Knowledge, Science and Culture”

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

Raje Ramrao Mahavidyalaya, Jath Dist. -Sangli

Post Graduate Department of Chemistry

A REPORT SUBMITTED

TO

Internal Quality Assurance Cell

CERTIFICATE COURSE

IN

ANALYTICAL INSTRUMENTATION

2018-19

“Dissemination of Education for Knowledge, Science and Culture”

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur

Raje Ramrao Mahavidyalaya, Jath

(AFFILIATED TO SHIVAJI UNIVERSITY, KOLHAPUR)

Department of Chemistry

CERTIFICATE COURSE

IN

ANALYTICAL INSTRUMENTATION

To be implemented from

June 2018

“Dissemination of Education for Knowledge, Science and Culture”

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

Raje Ramrao Mahavidyalaya, Jath Dist. - Sangli
Post Graduate Department of Chemistry

Date -08/07/2018

To,
The Principal,
Raje Ramrao Mahavidyalaya, Jath
Tal: Jath Dist.: Sangli - 416404

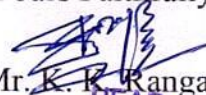
Subject: - Regarding permission to commencement of certificate Course in
Analytical Instrumentation.

Respected sir,

With the reference to above subject, our department is going to conduct certificate course in **Analytical Instrumentation** for M. Sc. Students in this year academic year. So, I request you to give us permission to conduct above said course.

Thanking you,

Yours Faithfully


(Mr. K. K. Rangar)

HEAD
Department of Chemistry
Raje Ramrao Mahavidyalaya, Jath.

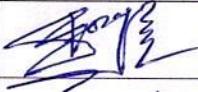

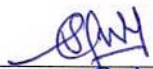

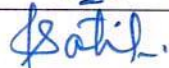
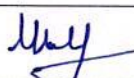
DEPARTMENT OF CHEMISTRY
CERTIFICATE COURSE IN ANALYTICAL INSTRUMENTATION

Academic year 2018-19


Date: - 08/07/2018

Notice of Meeting

The meeting of the members of BOS in Certificate Course in Analytical Instrumentation is conveyed on 15th July 2018 for the preparation of syllabus.

Name	Position	Signature
Mr. K. K. Rangar	Chairman	
Mr. R. B. Sawant	Coordinator	
Dr. S. R. Kulal	Member	
Mr. G. D. Salunke	Member	
Prof. (Dr.) S. S. Patil	Member	
Dr. G. D. Kore	Member	


Mr. K. K. Rangar
HEAD
Department of Chemistry
Raje Ramrao Mahavidyalaya, Jath.


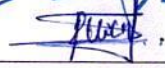
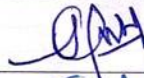

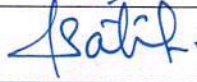
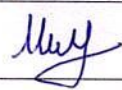

Dr. V. S. Dekhale
I/c. Principal
Raje Ramrao Mahavidyalaya, Jath
Tal-Jath, Dist-Sangli,

DEPARTMENT OF CHEMISTRY
CERTIFICATE COURSE IN ANALYTICAL INSTRUMENTATION

Academic year 2018-19

Minutes of Meeting

The meeting of the members of BOS in Certificate Course in Analytical Instrumentation is held on 15th July 2018 for the preparation of syllabus. The following members are present and prepare the syllabus of above course and submitted to IQAC, Raje Ramrao Mahavidyalaya, Jath.

Name	Position	Signature
Mr. K. K. Rangar	Chairman	
Mr. R. B. Sawant	Coordinator	
Dr. S. R. Kulal	Member	
Mr. G. D. Salunke	Member	
Prof. (Dr.) S. S. Patil	Member	
Dr. G. D. Kore	Member	




Mr. K. K. Rangar
(HEAD)
Department of Chemistry
Raje Ramrao Mahavidyalaya, Jath.

Aims and Objectives:

In recent times, analytical chemistry has attracted interest in Pharma and Biotech Industry owing to strengthen the stringent regulatory guidelines. In view of this, the present course has been effectively designed to provide skilled manpower to Industry and Academia. The course will cover the aspects such as Introduction to Analytical Techniques, Basic Principles of Chromatography, Spectrometry and Spectroscopy, Analytical Method Development and Validation, Quality Assurance and Quality Control aspects relevant to Industry, Introduction to regulatory aspects related to analytical techniques, Basic operation of instruments such as HPLC, FT-IR, GC-MS, LC-MS and ICP, etc. Practical training on analytical method development and validation as per regulatory guidelines. Visits to the nearby industry besides the interactions with industry people. Evaluation of the trained personnel through internal assessment.

Learning Outcomes

1. Students will have a firm foundation in the fundamentals and application of recent scientific theories.
2. Students are able to use modern instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.
3. Students will be skilled in critical thinking, analytical reasoning and problems solving.
4. Students will be able to identify and solve chemical problems
5. Students will be able to explore new areas of research.
6. Students will able to use modern library searching and retrieval methods to obtain information about an issue relating to chemical techniques.
7. Students will have to knows the regulations for safe handling and use of chemicals
8. Students will be able to communicate the results of their work to society.
9. Students will have to understand the ethical, historic, philosophical, and environmental dimensions of problems and issues facing chemists.

10. Students will be able to explain in proper manner, why chemistry is an integral activity for addressing social, economic, and environmental problems.
11. Students will have to find gainful employment in industry or government, be accepted at graduate or professional schools, or find employment in school systems as instructors or administrators.
12. Students will appreciate the central role of chemistry in society and use knowledge as a basis for ethical behaviour in issues facing chemists including an understanding of safe handling of chemicals, environmental issues.

Evaluation System:

All the students will be continuously evaluated by,

a. Attendance	10 M
b. Assignments	10 M
c. Theory examination (Two papers)	80 M
d. Practical examination (Two papers)	50 M
e. Project	50 M
<hr/>	
200 M	

Nature of Theory question papers:-

- Q.1. Multiple choice question and compulsory, containing 08 questions. (08 marks)
- From Q.2-Q.6. (To be divided into sub-questions A, B, C &/or D) **any four** questions to be solved. (32 marks)

Project:

Simple project work is to be given and dissertation to be submitted at the end of the course. This is to be valued for 40 marks and 10 marks for viva voce examination.

Grades: - **A grade**= above 75, **B grade** = above 60, **C grade** = above 50

Certification: - A certificate will be issued on successful completion of the course.

Paper- I [Total periods: 15L]
Fundamentals in Analytical Chemistry and
Separation Techniques

Unit-1: Sampling of solids, liquids and gases (3L)

Definition, types of samples, sampling plan, quality of sample, sub-sampling, sample registration and storage, acceptance sampling, etc.

Unit-2: Theory and applications of following techniques of analysis (4L)

- a) pH-metry
- b) Colorimetry
- c) Spectrophotometry
- d) Amperometry

Unit-3: Chromatographic methods (4L)

- a) Ion exchange chromatography
- b) Paper chromatography
- c) Thin layer chromatography
- d) Column chromatography

Unit-4: Supercritical fluid extraction (4L)

Concept of critical state of matter and super critical state, super critical fluids, apparatus, and applications

Paper- II [Total periods: 15L]

Instrumental Methods in Analytical Chemistry

Unit-1: Spectroscopic Methods of analysis (4L)

- a) UV spectroscopic analysis
- b) IR spectroscopic analysis
- c) NMR spectroscopic analysis
- d) MS spectroscopic analysis

Unit-2: Polarography, Cyclic voltammetry (4L)

Theory, Apparatus; derivative, polarography, modified polarographic techniques, and their application in qualitative and quantitative analysis.

Unit-3: Coulometry (4L)

Principles technique, coulometry at constant current and controlled potential, coulometry applications.

Unit-4: Applications of computers in Chemistry (4L)

General introduction to micro-computer, different components and their functions, programme writing in BASIC language, application of ready-made software packages, microprocessor controlled analytical instruments, advantages and practical applications.

REFERENCES:

1. Introduction to Instrumental Analysis; R. D. Braun,
2. Instrumental Methods of Analysis; Willard, Merritt, Dean and Settle
3. Standard Methods of Chemical Analysis Vol.3, Part A & B F. J. Welcher:
4. Instrumental Methods of Analysis, 4th & 5th editions; G. W. Ewing.
5. Instrumental Methods of Analysis; Chatwal and Anand.

6. Electroanalytical Chemistry, Ed. H. W. Nurnberg.
7. A Textbook of Electrochemistry, Kortum and Bockris,
8. Principles of Electrochemistry; D. A. MacLennan,
9. Analytical Chemistry – G. D. Christian
10. Introduction to Chromatography, Bobbit.
11. Instrumental Methods of Analysis. Chatawal and Anand
12. Instrumental Methods of Inorganic Analysis (ELBS): A.I. Vogel
13. Chemical Instrumentation: A Systematic Approach, H.A. Strobel
14. The Principles of ion-selective electrodes membrane transport, W.E. Morf.
15. Physical Chemistry, P. W. Atkins.
16. Principles of Instrumental Analysis, D. Skoog & D. West
17. Treatise on Analytical Chemistry, Vol. I to VII- I. M. Kolthof

Practical

A) Organic Chemistry

1. Estimation of Dyes
2. Drugs
3. Agrochemicals
4. Polyphenols
5. Chlorophyll

B) Inorganic Chemistry

1. Fertilizer analysis
2. Soil
3. Environmental samples BOD, COD, DO etc.

C) Physical Chemistry:

1. pH Metry
2. Turbidometry
3. Fe- Hemoglobin
4. Analysis of biological samples

(Other experiments based on various instrumental analytical methods can be framed)

REFERENCES:

- 1) Text book of Quantitative Inorganic Analysis by A. I. Vogel.
- 2) A Text book of Practical Organic Chemistry by A. I. Vogel
- 3) Practical Organic Chemistry by Mann and Saunders.