

Department of Chemistry
Sree Narayana College, Kollam

Certificate Course in
“INSTRUMENTAL METHODS OF
ANALYSIS”

2018-2019

SREE NARAYANA COLLEGE, KOLLAM
POST GRADUATE AND RESEARCH
DEPARTMENT OF CHEMISTRY

invites applications for

Certificate Course

on

“Instrumental Analysis”

Qualification : Plus two science stream

Duration : 6 months

Admission is open now

For more details contact

Dr. Rijith S. (Course Coordinator)

Mob: +91 94955 38668



DEPT. OF CHEMISTRY, SN COLLEGE, KOLLAM

List of Students selected for the certificate course on Instrumental Analysis

| Sl. No. | Candidate Code | Name of Candidate | Address of candidate | Selected/no t selected |
|---------|----------------|---------------------------------|--|-------------------------------|
| 1 | CP18IA1 | Hima Prasad | Melevila puthen veedu, Muttappalam, Muttappalam,695145 | Selected <i>Hima</i> |
| 2 | CP18IA2 | A K Sneha Babu | Kailasam,Kundara, Kundara,691501 | Selected <i>Sneha Babu</i> |
| 3 | CP18IA3 | AKSHAYA.S.ASOK | Kailasam,Kuzhimathicadu, Kuzhimathicadu,691509 | Selected <i>Akshaya</i> |
| 4 | CP18IA4 | S VISHNU SANTHOSH ANANDU. M. | Perumpally thekkathil 117, Kollam, Thekkevila, 691016 | Selected <i>Santhosh</i> |
| 5 | CP18IA5 | PREYAS. I. S | Navami, Odanavattom, Odanavattom, 691512 | Selected <i>Preyas</i> |
| 6 | CP18IA6 | VYSHNAVI M S | Krishnalayam, Pampuram, Kalluvathukkal, 691578 | Selected <i>Preyas</i> |
| 7 | CP18IA7 | VISHNU. V | Vishnu vilaz, Prakkulam, Prakkulam, 691602 | Selected <i>Vishnavi</i> |
| 8 | CP18IA8 | LAKSHMI R | Vishnu bhavanam, Mynagappally, Mynagappally p o | Selected <i>Vishnu</i> |
| 9 | CP18IA9 | AKHIL V S | Peringilethu PV, South Edakkulangara PO, Karunagapally, 690523 | Selected <i>Akhil</i> |
| 10 | CP18IA10 | ARUN. A | Sreevinayak, Perumpuzha, Perumpuzha 691504 | Selected <i>Arun</i> |
| 11 | CP18IA11 | SRADHA SUDHAKARAN | Suvarna mandiram, Peroor, T K M C p o 691005 | Selected <i>Sradha</i> |
| | | | Chandramathi sadanam, Kannanpuzha, Perumpuzham | Selected <i>Sradha</i> |

| | | | | |
|----|----------|-----------------------------|---|-----------------------------|
| 12 | CP18IA12 | | | |
| 13 | CP18IA13 | GOWRI GOPAN | Guru mandiram, Vengode, Kudavoor p o 695313 | Selected <u>Gowri</u> |
| 14 | CP18IA14 | AJAY J | Rajendra bhavan, Thangassery p o, Thangassery 691007 | Selected <u>Ajay</u> |
| 15 | CP18IA15 | ANANTHA KRISHNAN . U . S | Ambadi, Palayamkunnu p o, Palayamkunnu p o 695146 | Selected <u>AKS</u> |
| 16 | CP18IA16 | ASIYA A S | Olive, Mevaram, Thattamala p o, thattamala p o 691020 | Selected <u>AS</u> |
| 17 | CP18IA17 | SHAHINA.S | Sheeba manzil, Pallickal, K K Konam p o, 695604 | Selected <u>Shahina</u> |
| 18 | CP18IA18 | PARVATHY SHA A G | Kolleril house, Murunthal, Perinad, 691601 | Selected <u>Parvathy</u> |
| 19 | CP18IA19 | Shijin S | Mundakkalvilakam, Vanchiyoor, Vanchiyoor, 695102. | Selected <u>Shijin</u> |
| 20 | CP18IA20 | Aromal S | Devi kripa, Kandachira, Perinad, 691601 | Selected <u>Aromal</u> |

Arshad Harajil
Principal
Sree Narayana College
Kollam



DEPARTMENT LEVEL CERTIFICATE COURSE
(Offered By Department of Chemistry, Sree Narayana College, Kollam)

Instrumental Analysis

Total hours: 30

Aim of the Course

The course offers an introductory science of instrumentation techniques used in various science disciplines. Moreover, provides hands own experiences and guidance for analysis of samples and train personnel in operation and maintenance of Instruments.

Course objectives

The course helps the students to understand the theory and working principles behind sophisticated instruments. Subsequently, aims to impart skill for analyzing real samples. Upon course completion, the student will get a strong understanding in handling the instruments and be able to analyze the samples.

GENERAL ASPECTS OF EVALUATION

Mode of Evaluation – Certificate Course on Instrumental Analysis

(i) Attendance for lecture and skill/laboratory sessions (to be noted separately where both lecture and skill/laboratory hours have been specified within a course);

(ii) Test for theory and Practical

The weightage is shown in Table 1.1

Table 1.1

| Sl. No | Component | Marks |
|--------|-------------------|-------|
| | | |
| 1 | Paper-1 | 55 |
| | | |
| 2 | Paper-2 Practical | 45 |
| | | |
| | Total | 100 |

DISTRIBUTION OF HOURS

| Hours/Week | | Course code | INSTRUCTIONAL HOURS |
|------------|-----------|-------------|---------------------|
| Theory (L) | Practical | | |
| 2 | 3 | CP18IA | 2X7=14 2X8=16 |

COURSE OUTCOME

| Co No | COURSE OUTCOME Upon completion of this course, students | Cognitive Level |
|-------|---|-----------------|
| 1 | Skill in experimenting, analyzing and interpreting data | U |
| 2 | Acquire knowledge of measurement techniques, calibration and installation | U, A |
| 3 | Develop skill in handling various instruments | A |

INSTRUMENTAL ANALYSIS (CPLIA)

16 Hours

Paper 1

Module 1

Analytical instruments–Brief outline. Atomic absorption spectrophotometer (AAS): principle, instrumentation, production of atoms and ions, burners, detectors, HCL, TGL, EDL, advantage and disadvantage of AAS.

4 hours

Module 2

UV-Vis spectrophotometer, Electronic transitions, Woodward Fieser rules, Effect of solvent polarity and conjugation, concept of chromophore, auxochrome, bathochromic, hyperchromic and hypochromic effects, λ_{max} calculations.

4 hours

Module 3

Introduction to electrochemical techniques, voltammetry, cyclic voltammetry, stripping voltammetry, linear sweep voltammetry, open circuit potential analysis, electrochemical impedance spectroscopy and chronoamperometry, principle and method of polarography.

4 hours

Module 4

Acquire the knowledge of the basic working principle and Instrumentation skill in using conductometer, potentiometer, refractometer, stalagmometer and Ostwald's viscometer, Colorimeter - principle and instrumentation, Beer's law, Lambert's Law and Beer-Lambert law

4 hours

PAPER-2

Practical: Instrumental analysis

(14 hours)

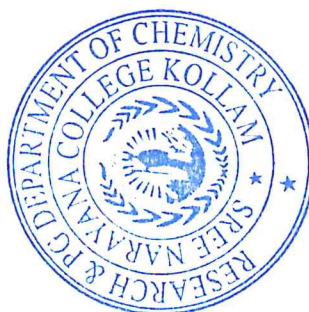
1. Determination of refractive indices of any three liquids by refractometer.
2. Determine the surface tension of binary mixtures and determination of concentration of an unknown mixture

3. Determination of low concentrations of metallic elements (Iron content) in the given copper based alloy sample using atomic absorption spectroscopy.
4. Use Beer's law to calculate ϵ for KMnO_4 , given the cell width (path length l) to be 1 cm.
5. To determine the formal potential and diffusion coefficient of $\text{Fe}(\text{CN})_6^{3-}$ using cyclic voltammetric techniques

Lab analysis report

References

1. Instrumental Methods of Inorganic Analysis(ELBS) : A.I. Vogel
2. N. K. Vishnoi, Advanced Practical Organic Chemistry, 3rd Edition, Vikas
3. F. G. Mann and B. C. Saunders, Practical Organic Chemistry, Pearson Education, 2009.
4. Skoog, Douglas A., Holler, F. James, & Crouch, Stanley R. (2007). Principles of Instrumental Analysis (6th ed.). Belmont, CA: Thomson Brooks/Cole. pp. 169– 173. ISBN 9780495012016.
5. Alderton , G., et al. (1954). "Spectrophotometric Determination of Humulone Complex and Lupulone in Hops." Anal.Chem. 26: 983-992.



MARK LIST OF STUDENTS

Certificate Course on Instrumental Analysis (2018-2019)

| SL. NO | NAME | MARKS OF THE EXAM | | TOTAL | GRADE |
|--------|--------------------------|-------------------|----------------|-------|-------|
| | | THEORY (45) | PRACTICAL (55) | | |
| 1 | HIMA PRASAD | 40 | 51 | 91 | A+ |
| 2 | A K SNEHA BABU | 43 | 54 | 97 | A+ |
| 3 | AKSHAYA.S.ASOK | 41 | 50 | 91 | A+ |
| 4 | S VISHNU SANTHOSH | 43 | 53 | 96 | A+ |
| 5 | ANANDU. M. | 40 | 52 | 92 | A+ |
| 6 | PREYAS. I. S | 43 | 50 | 93 | A+ |
| 7 | VYSHNAVI M S | 44 | 54 | 99 | A+ |
| 8 | VISHNU. V | 41 | 52 | 93 | A+ |
| 9 | LAKSHMI R | 42 | 55 | 97 | A+ |
| 10 | AKHIL V S | 38 | 50 | 88 | A |
| 11 | ARUN. A | 39 | 50 | 89 | A |
| 12 | SRADHA SUDHAKARAN | 42 | 50 | 92 | A+ |
| 13 | GOWRI GOPAN | 42 | 54 | 96 | A+ |
| 14 | AJAY J | 36 | 49 | 85 | A |
| 15 | ANANTHA KRISHNAN . U . S | 40 | 49 | 89 | A |
| 16 | ASIYA A S | 45 | 55 | 100 | A+ |
| 17 | SHAHINA.S | 44 | 50 | 94 | A+ |
| 18 | PARVATHY SHA A G | 43 | 54 | 97 | A+ |
| 19 | SHIJIN S | 38 | 50 | 88 | A |
| 20 | AROMAL S | 40 | 55 | 95 | A+ |



SREE NARAYANA COLLEGE, KOLLAM

CERTIFICATE COURSE 18-19

DEPARTMENT : Chemistry

NAME OF CERTIFICATE COURSE : Certificate Course in Instrumental Analysis

No. of students enrolled : 20

No. of students passed : 20

| Sl. No. | Candidate Code | Name of Candidate | Department | Completed/ Not |
|---------|----------------|---------------------------------|------------|-------------------|
| 1 | CP18IA1 | Hima Prasad | Chemistry | Completed |
| 2 | CP18IA2 | A K Sneha Babu | Chemistry | Completed |
| 3 | CP18IA3 | AKSHAYA.S.ASOK | Chemistry | Completed |
| 4 | CP18IA4 | S VISHNU SANTHOSH ANANDU. M. | Chemistry | Completed |
| 5 | CP18IA5 | PREYAS. I. S | Chemistry | Completed |
| 6 | CP18IA6 | VYSHNAVI M S | Chemistry | Completed |
| 7 | CP18IA7 | VISHNU. V | Chemistry | Completed |
| | CP18IA8 | | | |

| | | | | |
|----|----------|--------------------------|-----------|-----------|
| 8 | | | Chemistry | Completed |
| | CP18IA9 | | | |
| 9 | | LAKSHMI R | | |
| | CP18IA10 | | Chemistry | Completed |
| 10 | | AKHIL V S | | |
| | CP18IA11 | | Chemistry | Completed |
| 11 | | ARUN. A | | |
| | CP18IA12 | | Chemistry | Completed |
| 12 | | SRADHA SUDHAKARAN | | |
| | CP18IA13 | | Chemistry | Completed |
| 13 | | GOWRI GOPAN | | |
| | CP18IA14 | | Chemistry | Completed |
| 14 | | AJAY J | | |
| | CP18IA15 | | Chemistry | Completed |
| 15 | | ANANTHA KRISHNAN . U . S | | |
| | CP18IA16 | | Chemistry | Completed |
| 16 | | ASIYA A S | | |
| | CP18IA17 | | Chemistry | Completed |
| 17 | | SHAHINA.S | | |
| | CP18IA18 | | Chemistry | Completed |
| 18 | | PARVATHY SHA A G | | |
| | CP18IA19 | | Chemistry | Completed |
| 19 | | Shijin S | | |
| | CP18IA20 | | Chemistry | Completed |
| 20 | | Aromal S | | |



Report

The certificate course in *Instrumental Analysis*, was offered by the Research and Post Graduate Department of Chemistry, Sree Narayana College, Kollam, with an aim of introductory science of instrumentation techniques used in various science disciplines. Moreover, provides hands own experiences and guidance for analysis of samples and train personnel in operation and maintenance of instruments. Six subject experts from Dept. of Chemistry were opted for handling the classes. In additionally experts from other disciplines such as Physics have the charge of providing hands own expertise in sophisticated instruments like UV spectroscopy.

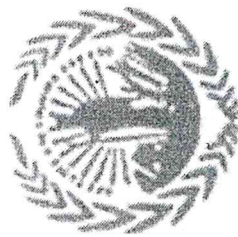
A total of 20 students with a qualification of plus two science stream and above has applied for the course and of these 20 were selected for the mentioned course of 6 month duration. The entire selected candidate has successfully completed the certificate course and majority of the students has achieved above 95 % mark in the final examination.

The course helped the students to have a better understand on the theory and working principles behind sophisticated instruments and has improved their skills for analyzing real samples. Also, the students got a strong knowledge in handling the instruments available for the analysis of samples.

The certificate course in *Instrumental analysis* has provided a strong professional training and awareness for careers in the instrumental field with a chemistry background. The mission has achieved through the practical knowledge about basic working principles of various colorimetric, potentiometric, physico-chemical & electrochemical instruments and doing analysis of real samples. The interdisciplinary curriculum designed were successfully clarify the career goals for those where considering to do instrumentation analysis in various science streams.

Turthatharajil
Principal
Sree Narayana College
Kollam





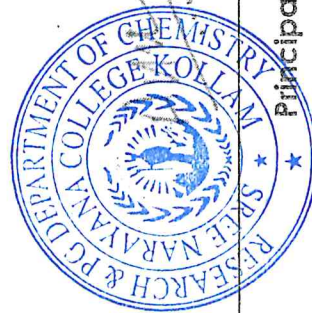
SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

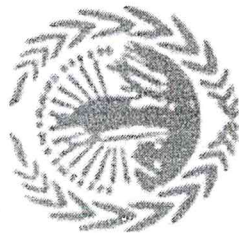
CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Mrs./Mrs. A K SNEHA BABU, Department of Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2018-2019.

Course Coordinator



Principal



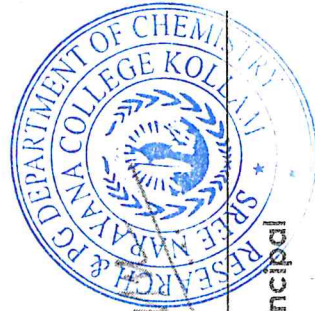
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DEPARTMENT OF CHEMISTRY

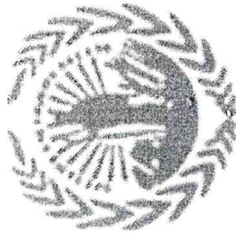
CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Ms./Mrs. HIMA PRASAD, Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2018-2019.

Course Coordinator



Principal



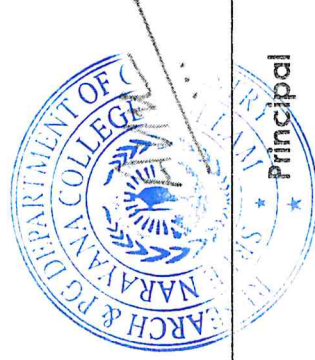
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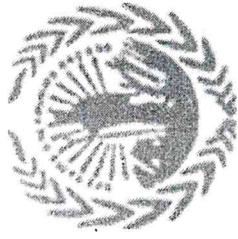
CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Ms./Mrs. AKSHAYA.S.ASOK, Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2018-2019.

Course Coordinator



Principal



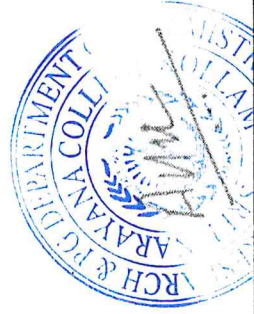
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DEPARTMENT OF CHEMISTRY

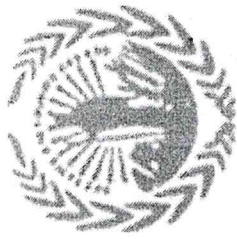
CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Ms./Mrs. S VISHNU SANTHOSH, Department of Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2018-2019.

Course Coordinator



Principal



SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Ms./Mrs. ANANDU. M., Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2018-2019.

Course Coordinator

