

**Department of Chemistry**  
**Sree Narayana College, Kollam**

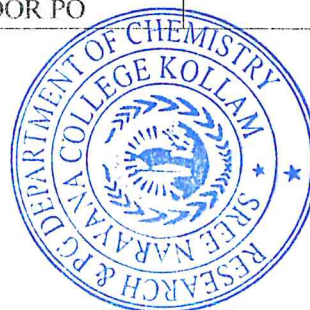
**Certificate Course in**  
**“INSTRUMENTAL METHODS OF**  
**ANALYSIS”**

**2017-2018**

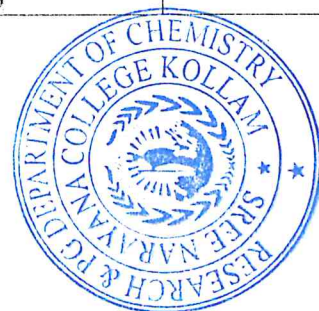
**DEPARTMENT OF CHEMISTRY**  
**SREE NARAYANA COLLEGE, KOLLAM**

*List of selected Students for the*  
**CERTIFICATE COURSE INSTRUMENTAL ANALYSIS**

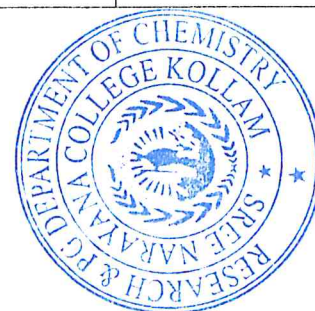
Sl. NO	Candidate code	NAME OF STUDENT	ADDRESS	Selected/not selected
1	CI/17-18/1	ABHIJITH P R	CHAITHANYA BHOOTHAKULAM BHOOTHAKULAM 691302 Mob: 9567972477	Selected
2	CI/17-18/2	ABHINAND BOSE C	CHANDRAKANTHAM PUNTHALATHAZHAM KILIKOLLOOR P O 691004 Mob: 9446343206	Selected
3	CI/17-18/3	ADITHYA P S	PANAMPLAVIL THAZHATHIL KANJAVELY KANJAVELY 691602 Mob: 8078997880	Selected
4	CI/17-18/3	AKSHAY RJ	jayavihar kachani karakulam 695564 Mob: 7907542640	Selected
5	CI/17-18/4	GOKUL RAJ	Poikavilaveedu kovoor palayamkunnu PO Varkala, Tri Varkala Varkala 695146 Mob: 9207911418	Selected
6	CI/17-18/5	GOURI JAYAN	PLAVILA PUTHEN VEEDU ADICHANALLOOR ADICHANALLOOR PO	Selected



			691573 Mob: 9605566448 <i>Ramie</i>	
7	CI/17-18/6	MILAN RAJ B	AIKKARA THEKKATHIL MARUTHADY MARUTHADY P O 691003 <i>Mur</i>	Selected
8	CI/17-18/7	HARIPRIYA G	MSANTHOSH BHAVAN PALLICKAL PAKALKURI P O 695604 Mob: 7510534829ob: 9746552974 <i>Haripriya</i>	Selected
9	CI/17-18/8	KRISHNAPRIYA S	SANTHOSH BHAVAN PALLICKAL PAKALKURI P O 695604 Mob: 7510534829 <i>Krishnapriya</i>	Selected
10	CI/17-18/9	LEKSHMI A	S S BHAVAN MAVINMOODU KALLAMBALAM P O 695605 Mob: 9656111542 <i>Lekshmi</i>	Selected
11	CI/17-18/10	MEKHA S PRAKASH	ASHTAMI BHOOTHAKULAM P O POOTHAKULAM P O 691302 Mob: 9895683595 <i>Mekha</i>	Selected
12	CI/17-18/11	PARVATHY VA	KALLUVILA KIZHAKKATHIL KUREEPUZHA KUREEPUZHA P O PERINAD 691601 Mob: 9744403275 <i>Parvathy</i>	Selected
13		REJITH R	DEVIKRIPA MANJAVIL PADINJATTATHIL THIRUMULLAVARAM P O THIRUMULLAVARAM P O 691012 Mob: 8138967379 <i>Rejith</i>	N
14	CI/17-18/12	ROHITH H	NANDHANAM THODIYOOR THODIYOOR NORTH 690523 Mob: 9745170259 <i>Rohith</i>	Selected
15	CI/17-18/13	SIVAPRIYA. A	THUNDUVILA VEEDU POOTHAKULAM POOTHAKULAM 691302 Mob: 8129487988 <i>Sivapriya</i>	Selected



16	CI/17-18/14	SONA SANTHOSH	Revathy Kollam Valathungal P O 691011 Mob: 8281079418	Selected
17		AKHIL BABU	KOLLANTAZHIKATHU PUTHEN VEEDU MARANADU MARANADU 691505 Mob: 8593809461	N
18	CI/17-18/15	ANJALI R	ANJALI BHAVANAM KUNNATHOOR WEST KALLADA P.O. 691500 Mob: 9744509555	Selected
19		ANANDA KRISHNAN S S	PANAVILA VEEDU NALLILA NALLILA 691515 Mob: 7025896980	N
20	CI/17-18/16	AMRUTHA PRADEEP	PULARI KALLUMPURATHU UMAYANALLOOR UMAYANALLOOR 691589 Mob: 9544509348	Selected
21		VISHNU K S	Lekshmi Vilasam, Manakkadu Vadakkevila Vadakkevila 691010 Mob: 9744386048	N
22		ABHIRAM SIVAPRASAD	Uthram Ayathil Ayathil 691021 Mob: 9495860881	N
23	CI/17-18/17	ANUPAMA S KUMAR	Thodiyil Puthen Veedu Puthuchira Umayanalloor P.O 691572 Mob: 9895554105	Selected
24	CI/17-18/18	ANJALI R	ANJALI BHAVANAM KUNNATHOOR WEST KALLADA P.O. 691500 Mob: 9744509555	Selected
25	CI/17-18/19	DEVIKA P	D D MANDIRAM VELLIMON VELLIMON 691511 Mob: 9446817413	Selected





26	CI/17-18/20	ARDRA R SAHADEVAN	ABHISHEKAM VETTUTHARA NEENDAKARA P O 691582 Mob: 9497960817	<i>Ardra</i>	Selected
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*Surbha H. Kurayil*  
Principal  
Sree Narayana College  
Kollam



**CERTIFICATE COURSE (UGC-NSQF)**  
(Offered By Department of Chemistry, Sree Narayana College, Kollam)

**Instrumental Analysis**

**2017-2018**

**Total hours: 30**

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**Aim of the Course**

The course offers an introductory science of instrumentation techniques used in various science disciplines. Moreover, provides hands on 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**

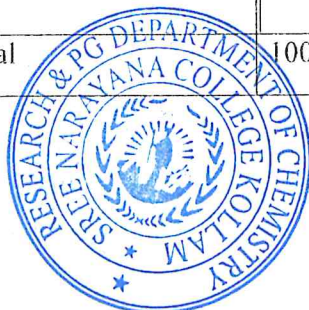
(i) Attendance for lecture and skill/laboratory sessions (to be noted separately where both lecture and skill/laboratory hours have been specified within a course);

(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	CPLIA	2X7=14 2X8=16

## COURSE OUTCOME

Co No	COURSE OUTCOME	Cognitive Level
	Upon completion of this course, students	
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,  $\lambda_{\max}$  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  $\epsilon$  for  $\text{KMnO}_4$ , 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.

*Tushar Haraji*  
Principal  
Sree Narayana College  
Kollam

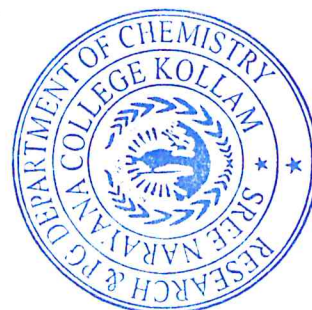


**DEPARTMENT OF CHEMISTRY**  
**SREE NARAYANA COLLEGE, KOLLAM**

*MARK List of Students for the*

CERTIFICATE COURSE INSTRUMENTAL ANALYSIS

Sl. NO	Candidate code	NAME OF STUDENT	Marks		TOTAL MARKS (100)	Grade
			Exam 1 (50)	Exam 2 (50)		
1	CI/i7-18/1	ABHIJITH P R	40	42	82	A
2	CI/17-18/2	ABHINAND BOSE C	43	41	84	A
3	CI/17-18/3	ADITHYA P S	45	46	91	A+
4	CI/17-18/3	AKSHAY RJ	47	48	95	A+
5	CI/17-18/4	GOKUL RAJ	42	40	82	A
6	CI/i7-18/5	GOURI JAYAN	48	49	97	A+
7	CI/17-18/6	MILAN RAJ B	44	39	83	A



8	CI/17- 18/7	HARIPRIYA G	48	50	98	A+
9	CI/17- 18/8	KRISHNAPRIYA S	50	49	99	A+
10	CI/17- 18/9	LEKSHMI A	48	47	95	A+
11	CI/17- 18/10	MEKHA S PRAKASH	46	49	95	A+
12	CI/17- 18/11	PARVATHY VA	45	50	95	A+
13	CI/17- 18/12	ROHITH H	38	43	81	A
14	CI/17- 18/13	SIVAPRIYA. A	45	47	92	A+
15	CI/17- 18/14	SONA SANTHOSH	39	41	80	A
16	CI/17- 18/15	ANJALI R	40	40	80	A
17	CI/17- 18/16	AMRUTHA PRADEEP	42	50	92	A+
18	CI/17- 18/17	ANUPAMA S KUMAR	46	48	94	A+
19	CI/17- 18/18	ANJALI R	45	47	92	A+
20	CI/17- 18/19	DEVIKA P	41	39	80	A
21	CI/17- 18/20	ARDRA R SAHADEVAN	42	43	85	A



**DEPARTMENT OF CHEMISTRY**  
**SREE NARAYANA COLLEGE, KOLLAM**

*List of Students for the*

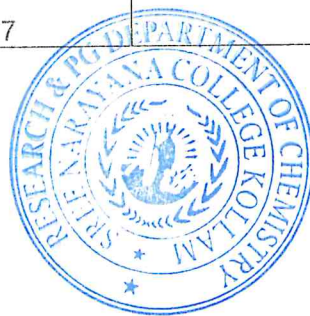
**CERTIFICATE COURSE INSTRUMENTAL ANALYSIS**

Sl. NO	Candidate code	NAME OF STUDENT	ADDRESS	RESULT	Grade
1	CI/17-18/1	ABHILITH P R	CHAITHANYA BHOOTHAKULAM BHOOTHAKULAM 691302 Mob: 9567972477	Qualified	A
2	CI/17-18/2	ABHINAND BOSE C	CHANDRAKANTHAM PUNTHALATHAZHAM KILIKOLLOOR P O 691004 Mob: 9446343206	Qualified	A
3	CI/17-18/3	ADITHYA P S	PANAMPLAVIL THAZHATHIL KANJAVELY KANJAVELY 691602 Mob: 8078997880	Qualified	A+
4	CI/17-18/3	AKSHAY RJ	jayavihar kachani karakulam 695564 Mob: 7907542640	Qualified	A+
5	CI/17-18/4	GOKUL RAJ	Poikavilaveedu kovoov palayamkunnu PO Varkala, Tri Varkala Varkala 695146 Mob: 9207911418	Qualified	A
6	CI/17-18/5	GOURI JAYAN	PLAVILA PUTHEN VEEDU ADICHANALLOOR	Qualified	A+

			ADICHANALLOOR PO 691573 Mob: 9605566448		
7	CI/17-18/6	MILAN RAJ B	AIKKARA THEKKATHIL MARUTHADY MARUTHADY P O 691003	Qualified	A
8	CI/17-18/7	HARIPRIYA G	MSANTHOSH BHAVAN PALLICKAL PAKALKURI P O 695604 Mob: 7510534829ob: 9746552974	Qualified	A+
9	CI/17-18/8	KRISHNAPRIYA S	SANTHOSH BHAVAN PALLICKAL PAKALKURI P O 695604 Mob: 7510534829	Qualified	A+
10	CI/17-18/9	LEKSHMI A	S S BHAVAN MAVINMOODU KALLAMBALAM P O 695605 Mob: 9656111542	Qualified	A+
11	CI/17-18/10	MEKHA S PRAKASH	ASHTAMI BHOOTHAKULAM P O POOTHAKULAM P O 691302 Mob: 9895683595	Qualified	A+
12	CI/17-18/11	PARVATHY VA	KALLUVILA KIZHAKKATHIL KUREEPUZHA KUREEPUZHA P O PERINAD 691601 Mob: 9744403275	Qualified	A+
13	CI/17-18/12	ROHITH H	NANDHANAM THODIYOOR THODIYOOR NORTH 690523 Mob: 9745170259	Qualified	A
14	CI/17-18/13	SIVAPRIYA. A	THUNDUVILA VEEDU POOTHAKULAM POOTHAKULAM 691302 Mob: 8129487988	Qualified	A+
15	CI/17-18/14	SONA SANTHOSH	Revathy Kollam Valathungal P O 691011	Qualified	A



			Mob: 8281079418		
16	CI/17-18/15	ANJALI R	ANJALI BHAVANAM KUNNATHOOR WEST KALLADA P.O. 691500 Mob: 9744509555	Qualified	A
17	CI/17-18/16	AMRUTHA PRADEEP	PULARI KALLUMPURATHU UMAYANALLOOR UMAYANALLOOR 691589 Mob: 9544509348	Qualified	A+
18	CI/17-18/17	ANUPAMA S KUMAR	Thodiyil Puthen Veedu Puthuchira Umayanalloor P.O 691572 Mob: 9895554105	Qualified	A+
19	CI/17-18/18	ANJALI R	ANJALI BHAVANAM KUNNATHOOR WEST KALLADA P.O. 691500 Mob: 9744509555	Qualified	A+
20	CI/17-18/19	DEVIKA P	D D MANDIRAM VELLIMON VELLIMON 691511 Mob: 9446817413	Qualified	A
21	CI/17-18/20	ARDRA R SAHADEVAN	ABHISHEKAM VETTUTHARA NEENDAKARA P O 691582 Mob: 9497960817	Qualified	A



SREE NARAYANA COLLEGE, KOLLAM

DEPARTMENT OF CHEMISTRY

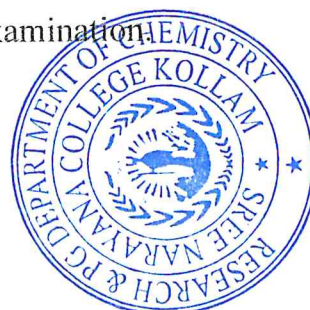
Report of the Certificate course

Instrumental Methods of Analysis

2017-2018

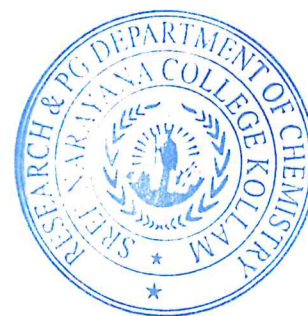
The certificate course in *Instrumental Analysis*, was offered by the Research and Post Graduate Department of Chemistry, Sree Narayana College, Kollam, with an aim of introductory science of instrumentation techniques used in various science disciplines. Moreover, provides hands own experiences and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

A total of 26 students with a qualification of plus two science stream and above has applied for the course and of these 21 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 80 % (A and A+) 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.



*Tushar H. Kurayil*  
Principal  
Sree Narayana College  
Kollam







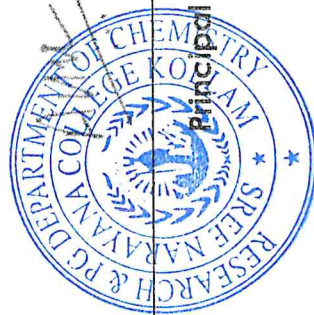
# SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

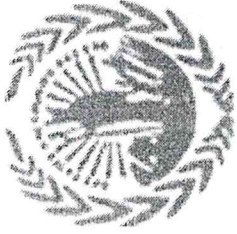
## CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Ms./Mrs. ABHIJITH P.R. Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2017-2018.

Course Coordinator







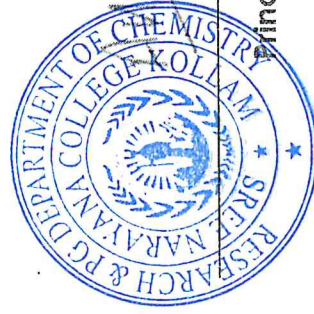
# SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

## CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

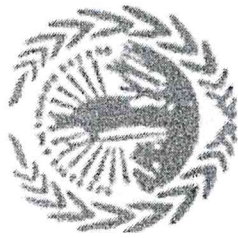
This is to certify that Mr./Ms./Mrs. ABHINAND BOSE, Department of Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2017-2018.

Course Coordinator



Principal





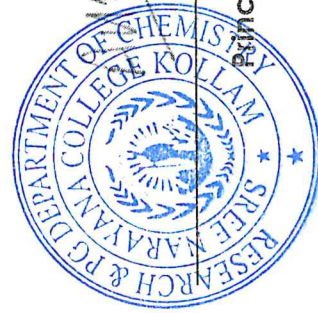
# SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

## CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

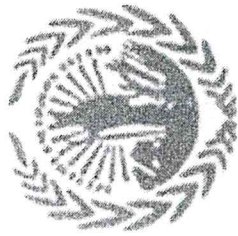
This is to certify that Mr./Ms./Mrs. ADITHYA P.S. Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2017-2018.

Course Coordinator



Principal





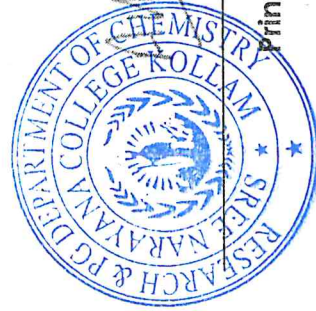
# SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

## CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

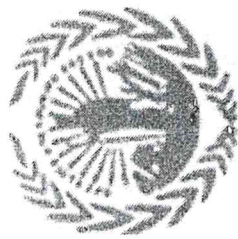
This is to certify that Mr./Mrs. AKSHAY RAJ, Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2017-2018.

Course Coordinator



Principal





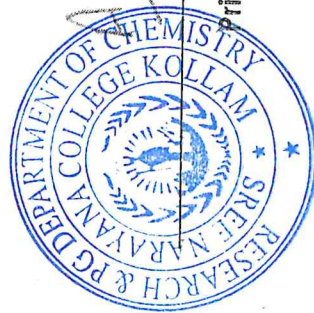
# SREE NARAYANA COLLEGE KOLLAM

DEPARTMENT OF CHEMISTRY

## CERTIFICATE COURSE IN INSTRUMENTAL ANALYSIS

This is to certify that Mr./Ms./Mrs. GOKUL RAJ., Department of .Chemistry has successfully completed Certificate Course in INSTRUMENTAL ANALYSIS during the Academic Year 2017-2018.

Course Coordinator



Principal