

## VAC-Basic Analytical Chemistry

### KERAL VERMA SUBHARTI COLLEGE OF SCIENCE DEPARTMENT OF CHEMISTRY

#### VALUE ADDED COURSE AND ITS OBJECTIVES Session 2016-17



**Course Name:** Basic Analytical Chemistry

**Course Code:** VAC-C-002

**Course Coordinator:** Dr S. Bala

**Designation:** Assistant Professor

**Contact no.:** 8057579950

**Duration:** 18-08-2016 to 30-11-2016



#### The objective of the program

Distinguish between accuracy and precision, repeatability and reproducibility of data. Discuss the types and sources of errors in analytical chemistry. Apply statistical tests such as Q-test, F-test etc to sets of data. Describe principles and application of various chromatographic separation and thermal analytical methods. Write half-cell, overall cell reaction equations, calculate e.m.f. and explain the principles of electro-analytical techniques. Explain the principles of UV/Visible, IR, AAS and fluorimetry techniques



## KERAL VERMA FACULTY OF SCIENCE

SWAMI VIVEKANAND SUBHARTI UNIVERSITY

Subhartipuram, NH-58 Delhi-Haridwar-Meerut Bypass Road, Meerut -250005

Ref. NO. KV FOS / 2016 / 02

Date: 09-08-2016

### NOTICE

It's to inform all students of UG and PG that the Department of Chemistry, KV FOS introduced Value Added Course form 18-08-2016. The topics are as follows

- Basic Analytical Chemistry
- Business Skills for Chemists
- Pesticide Chemistry

Interested students give their name to HOD Chemistry, KV FOS.

*S. Bhatnagar*  
Dr S. Bhatnagar

HOD Chemistry Department

  
Registrar  
Swami Vivekanand  
Subharti University  
MEERUT

## Basic Analytical Chemistry

### VAC-C-002

**Objectives:** To familiarize the students with the concept and methods of analytical techniques for soil, water and food.

#### UNIT 1

**Introduction:** Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.

**Analysis of soil:** Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators.

a. Determination of pH of soil samples. b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.

#### UNIT 2

**Analysis of water:** Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.

a. Determination of pH, acidity and alkalinity of a water sample. b. Determination of dissolved oxygen (DO) of a water sample.

**Analysis of food products:** Nutritional value of foods, idea about food processing and food preservations and adulteration.

a. Identification of adulterants in some common food items like coffee powder, asafoetida, chilli powder, turmeric powder, coriander powder and pulses, etc. b. Analysis of preservatives and colouring matter.

#### UNIT 3

**Chromatography:** Definition, general introduction on principles of chromatography, paper chromatography, TLC etc. a. Paper chromatographic separation of mixture of metal ion ( $\text{Fe}^{3+}$  and  $\text{Al}^{3+}$ ). b. To compare paint samples by TLC method. Ion-exchange: Column, ion-exchange chromatography etc. Determination of ion exchange capacity of anion / cation exchange resin (using batch procedure if use of column is not feasible).

#### UNIT 4

**Analysis of cosmetics:** Major and minor constituents and their function

a. Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulphate. b. Determination of constituents of talcum powder: Magnesium oxide, Calcium oxide, Zinc oxide and Calcium carbonate by complexometric titration.

**Suggested Applications (Any one):**

a. To study the use of phenolphthalein in trap cases. b. To analyze arson accelerants. c. To carry out analysis of gasoline.

**Suggested Instrumental demonstrations:**

a. Estimation of macro nutrients: Potassium, Calcium, Magnesium in soil samples by flame photometry.

b. Spectrophotometric determination of Iron in Vitamin / Dietary Tablets.

c. Spectrophotometric Identification and Determination of Caffeine and Benzoic Acid in Soft Drink

**Course Outcomes**

CO1	Able to analyze soil.
CO2	Know the water analysis and quality of food products.
CO3	Able to apply various chromatographic techniques.
CO4	Know the chemistry of cosmetics.
CO5	Able to handle the possible analytical instruments.

**Reference Books:**

1. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. Instrumental Methods of Analysis. 7th Ed. Wadsworth Publishing Co. Ltd., Belmont, California, USA, 1988.
2. Skoog, D.A. Holler F.J. & Nieman, T.A. Principles of Instrumental Analysis, Cengage Learning India Ed.
3. Skoog, D.A.; West, D.M. & Holler, F.J. Fundamentals of Analytical Chemistry 6th Ed., Saunders College Publishing, Fort Worth (1992).
4. Harris, D. C. Quantitative Chemical Analysis, W. H. Freeman.
5. Dean, J. A. Analytical Chemistry Notebook, McGraw Hill.
6. Day, R. A. & Underwood, A. L. Quantitative Analysis, Prentice Hall of India.
7. Freifelder, D. Physical Biochemistry 2nd Ed., W.H. Freeman and Co., N.Y. USA (1982).
8. Cooper, T.G. The Tools of Biochemistry, John Wiley and Sons, N.Y. USA. 16 (1977).
9. Vogel, A. I. Vogel's Qualitative Inorganic Analysis 7th Ed., Prentice Hall.
10. Vogel, A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Prentice Hall.
11. Robinson, J.W. Undergraduate Instrumental Analysis 5th Ed., Marcel Dekker, Inc., New York (1995).





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## **Department of Chemistry**

### **Report on Value Added Course**

A value added course on “**Basic Analytical Chemistry**” was conducted in Chemistry department for **First** year students, Two hour per week. The course starts on **18-08-2016**. The session was handled by **Dr Shashi Bala**, Chemistry on the need for **Basic Analytical Chemistry**. On that session students learnt about the basic analytical techniques used in the chemistry such as chromatography. Students felt that this value added session on **Basic Analytical Chemistry** was very much useful for them and they got the basic idea for developing their knowledge about how to use various Analytical instruments in the chemistry. It is planned to extend this value added training in the next semester with having more refined and advanced tool for their development.


HOD

(Department of Chemistry)

### Attendance List of Students

Name of Value Added Course: **Basic Analytical Chemistry** Course Code: **VAC-C-002**

S. No.	Enrollment No	Name of Students
1	1606010002158	SOMYA GARG
2	1606010002162	TEENA TYAGI
3	1606010002163	TWINKLE TYAGI
4	1606010002175	YASHVEER KUMAR
5	1606010003181	SHANKAR VERMA
6	1606020002275	AKANSHA
7	1606020002280	ANU CHAUDHARY
8	1606020002283	ARYA VIDIT KUMAR TYAGI
9	1606020002285	ASHUTOSH SAINI
10	1606020002286	BULBUL RATHI
11	1406010002404	VIPIN KUMAR HUDDA
12	1406010002405	SHADAB ALI
13	1406010002406	SHIVAM TOAMR
14	1406010002407	VAIBHAV SINGH RAJPUT
15	1406010002573	KM DEEPA
16	1406010002333	SHIVAM YADAV
17	1406010002334	SHAILENDRA CHOUDHARY
18	1406010002335	VIKRANT SINDHU
19	1406010002336	SHUBHAM JAIN
20	1406010002337	SAMRUL HAQ
21	1606020002306	MANISH
22	1606020002307	MANZIL
23	1606020002313	NIKITA SHARMA
24	1606020002320	RAHUL PAL
25	1606020002322	ROHIT SINGHAL
26	1606020002332	SHOVINDRA PAL
27	1606020002334	SURENDER PAL SINGH
28	1606020002337	TAPESH KUMAR
29	1606020002339	TUSHAR GANDHI
30	1606020002341	VAKAR SHABBU
31	1606020002342	VEDANT TEOTIYA
32	1606010002095	HEEBA NAAZ
33	1606010002096	HIMANSHU CHAUDHARY
34	1606010002098	ISHA GULIYA
35	1606010002101	KAJAL SAINI
36	1606010002107	KM. CHAHAT DEVI
37	1606010002120	MOHAMMAD IMRAN
38	1606010002124	MOHD TABISH
39	1606010002132	NITIKA PATEL
40	1606010002133	PARAS MALIK
41	1606010002136	PRATEEKSHA SHARMA

  
Registrar  
Swarni Dhekanand  
Subharti University  
MEERUT

*S. Bhatnagar*



Dr. Sashi Bala taking session of VAC



Sample VAC Certificate



**Swami Vivekanand Subharti University**  
**Meerut**  
**Keral Verma Faculty of Science**  
**Department of Chemistry**

**Certificate of Value Added Course**

This is to certify that Mr./Ms. ....son/daughter  
of.....of Course ..... has  
successfully completed his/her value added course entitled  
"Basic Analytical Chemistry" during 18-08-2016 to 30-11-2016.

*S. Bhatnagar*

HOD

*Shawli Bala*

Course Co-ordinator