**UGC CBCS**

**UG COURSE CURRICULUM**

**AND**

**SYLLABI**

**(As per UGC’s Draft Model**

**Syllabi)**

**(PROPOSED SCHEME)**

**CHEMISTRY**

**UGC’s Draft Model Syllabi)**

**(PROPOSED SC**

**HEME)**

***NORTH LAKHIMPUR COLLEGE***

***(AUTONOMOUS)***

SYLLABUS

FOR

UNDER GRADUATE (UG)COURSE

IN

CHEMISTRY

(SKILL ENHANCEMENT COURSE)

UND ER

CHOICE BASED CREDIT SYSTEM

NORTH LAKHIMPUR COLLEGE

2019

**CBCS**

**UG - SY LLABI**

**CHEMISTRY**

**(SEC)**

CBCS: B. Sc. with CHEMISTRY

**Skill Enhancement Course (SEC)**

CHEMISTRY

**(3rd Semester)**

**Course Code: CHE-SE-T2-301**

*Basic Analytical Chemistry*

**(Contact Hours-30 Lectures; Credits: 02)**

**Full Marks = 50 [** End Semester Exam (40) Internal Assessment (10)**]**

**Unit I: 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.

**3 Lectures, Marks - 4**

**Unit II: 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.

**5 Lectures, Marks - 8**

**Unit III: 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.

**4 Lectures, Marks - 8**

**Unit IV: 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.

**5 Lectures, Marks - 10**

**Unit V: Chromatography**

Definition, general introduction on principles of chromatography, paper chromatography, TLC etc.

a. Paper chromatographic separation of mixture of metal ion (Fe3+and Al3+).

b. To compare paint samples by TLC method.

**5 Lectures, Marks - 10**

**Suggested Applications**

a. To study the use of phenolphthalein in trap cases.

**Suggested Instrumental demonstrations:**

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

**Reference Books**

1. Willard, H.H., Merritt, L.L., Dean, J. & Settoe, F.A. *Instrumental Methodsof Analysis*, 7th Ed. Wadsworth Publishing Company Ltd., Belmont, California, USA,1988.

2. Skoog, D.A., Holler, F.J. & Crouch, S. *Principles of Instrumental Analysis*, Cengage Learning India Edition, 2007.

3. Skoog, D.A.; West, D.M. & Holler, F.J. *Analytical Chemistry: An Introduction 6th Ed.,* Saunders College Publishing, Fort Worth, Philadelphia (1994).

4. Harris, D. C. *Quantitative Chemical Analysis*, 9th ed. Macmillan Education, 2016.

**2.** Dean, J. A. *Analytical Chemistry Handbook*, McGraw Hill, 2004.

**3.** Day, R. A. & Underwood, A. L. *Quantitative Analysis*, Prentice Hall of India, 1992.

**4.** Freifelder, D.M. *Physical Biochemistry 2nd Ed.,* W.H. Freeman & Co., N.Y. USA (1982).

**5.** Cooper, T.G. *The Tools of Biochemistry,* John Wiley & Sons, N.Y. USA. 16 (1977).

**6.** Vogel, A. I. *Vogel’s Qualitative Inorganic Analysis 7th Ed.,* Prentice Hall, 1996.

**7.** Mendham, J., *A. I. Vogel’s Quantitative Chemical Analysis 6th Ed.,* Pearson, 2009.

**8.** Robinson, J.W. *Undergraduate Instrumental Analysis 5th Ed.,* Marcel Dekker, Inc., NewYork (1995).

**9.** Christian, G.D. *Analytical Chemistry*, 6th Ed. John Wiley & Sons, New York, 2004.

CBCS: B. Sc. with CHEMISTRY

**Skill Enhancement Course (SEC)**

CHEMISTRY

**(4th Semester)**

**Course Code: CHE-SE-T2-401**

*Fuel Chemistry*

**(Contact Hours-30 Lectures; Credits: 02)**

**Full Marks = 50 [** End Semester Exam (40) Internal Assessment (10)**]**

**Unit I:**

Review of energy sources (renewable and non-renewable).

Classification of fuels and their calorific value.

**4 Lectures, Marks - 4**

**Unit II:**

*Coal*: Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of

coal. Coal gas, producer gas and water gas—composition and uses. Fractionation of coal tar, uses of coal tar bases chemicals.

**5 Lectures, Marks - 6**

**Unit III:**

*Petroleum and Petrochemical Industry*: Composition of crude petroleum; Different types of

petroleum products and their applications. Principle and process of fractional distillation, Cracking – Thermal and catalytic cracking; Qualitative treatment of non-petroleum fuels- LPG, CNG, LNG, bio-gas, fuels derived from biomass, fuel from waste; synthetic fuels – gaseous and liquids.

**9 Lectures, Marks - 12**

**Unit IV:**

*Petrochemicals*: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene.

**6 Lectures, Marks - 8**

**Unit V:**

*Lubricants*: Classification of lubricants, lubricating oils (conducting and non-conducting), Solid and semisolid lubricants, synthetic lubricants. Properties of lubricants – viscosity index, cloud point, pore point.

**6 Lectures, Marks - 10**

**Reference Books:**

**1.** E. Stocchi: Industrial Chemistry, Vol -I, Ellis Horwood Ltd. UK.

**2.** P. C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.

**3.** B. K. Sharma: Industrial Chemistry, Goel Publishing House, Meerut.