

# COURSE WISE BREAKUP

Fourth Year      Seventh Semester

SPECILIZATION

APPLIED CHEMISTRY

## THEORY

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-421	PAPER-I: APPLIED CHEMISTRY	03	100
CHEM-422	PAPER-II:APPLIED CHEMISTRY	03	100
CHEM-423	PAPER-III:APPLIED CHEMISTRY	03	100

## PRACTICALS

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-421	PAPER-I: APPLIED CHEMISTRY	02	50
CHEM-422	PAPER-II:APPLIED CHEMISTRY	02	50
CHEM-423	PAPER-III:APPLIED CHEMISTRY	02	50

- Total Credits of the Semester = 15 (theory 09 & practicles 06 credits)
- Maximum Marks = 450 (theory 300 & practicles 150 marks)

## **4<sup>th</sup> Year; 7<sup>th</sup> Semester**

### **PAPER-I**

Title of the Course: **APPLIED CHEMISTRY**

Code: **CHEM-421**

Credit Hours: **03**

Marks: **100**

#### **Course Contents:**

##### **Sugar Industry**

Scope of sugar industry; Manufacture of raw sugar from cane and beet; Refining of raw sugar; Methods of clarification of cane juice and chemistry involved in the clarification processes: Defecation Remelt Carbonation (DRC), Defecation Remelt Sulphitation (DRS), Defecation Remelt Phosphitation (DRP) and Double Carbonation Double Sulphitation (DCDS); Utilization of by-products of sugar industry.

##### **Starch Industry**

Scope of starch industry; Raw materials for starch production; Manufacture of starch from various raw materials such as corn, rice, wheat, potatoes; Industrial applications of starch; Chemistry involved in the conversion of starch; Synthesis of d-glucose and dextrin from starch.

##### **Leather Industry**

Leather, gelatine and adhesives; Preparation of hides; Methods of tanning, Vegetable and chrome tanning processing of leather; Production of glue and gelatine.

## **4<sup>th</sup> Year; 7<sup>th</sup> Semester**

### **PAPER-II**

Title of the Course: **APPLIED CHEMISTRY**

Code: **CHEM-422**

Credit Hours: **03**

Marks: **100**

#### **Course Contents:**

##### **Fertilizers**

Importance of chemical fertilizers; Classification of chemical fertilizers; Manufacture and chemistry involved in the production of various fertilizers i.e. Urea, Single Super phosphate (SSP), Triple super phosphate (TSP), Nitrophos (NP), Diammonium phosphate (DAP), Calcium ammonium nitrate (CAN), Ammonium nitrate (AN), Ammonium sulphate (AS), Zinc sulphate (ZS) and Complex fertilizers.

### **Agrochemical Industry**

Classification of pesticides; Formulation and toxicity of pesticides; Future trends of pest control; Control of weeds; Household agrochemicals; Plant growth regulators and background chemistry; Hazards associated with the use of agrochemicals and environmental aspects.

### **Industrial Pollution and Environmental Protection**

Sources of air, water and soil pollution; Industrial waste and its control for environmental protection; Modern trends for waste treatment; Industrial gases and pollution control methods; Role and production of free radicals and atmospheric chemistry.

## **4<sup>th</sup> Year; 7<sup>th</sup> Semester**

### **PAPER-III**

Title of the Course: **APPLIED CHEMISTRY**

Code: **CHEM-423**

Credit Hours: **03**

Marks: **100**

### **Course Contents:**

#### **Oils, Fats, Waxes and Vegetable Ghee Industry**

Oils, Fats and Waxes; Extraction of oils such as soybean and cotton seed oils; Purification and refining of oils; Chemistry involved in the production of vegetable ghee; Selective hydrogenation of oil and fats during the manufacture of vegetable ghee; Interesterification of crude fats.

#### **Soaps and Detergents**

Raw materials for the manufacture of soap and detergents; Chemistry involved in the production of soap and detergents; Action of builders, additives brighteners and surfactants; Cleansing action of soaps; Effect of acidic species and hard water on soap; Production of transparent soap.

#### **Surface Coating Industry**

Raw materials for paints and pigments; Classification and properties of surface-coating constituents; Classification and manufacture of pigments; Production of paints, varnishes, distempers, enamals and lacquers; Chemistry involved in the drying phenomena of paints; Drying oils for paint and classification of drying oils.

#### 4<sup>th</sup> Year; 7<sup>th</sup> Semester

##### PAPER-I

Title of the Practicals: APPLIED CHEMISTRY

Code: CHEM-421

Credit Hours: 02

Marks: 50

Water analysis; Analysis of oil and fats; Testing and analysis of vegetable ghee; Synthesis of soap and its analysis; Analysis of bleaching powder; Fertilizer analysis and testing of raw materials such as phosphate rock and ores; Various other practicals may be added in accordance with the available facilities.

#### 4<sup>th</sup> Year; 7<sup>th</sup> Semester

##### PAPER-II

Title of the Practicals: APPLIED CHEMISTRY

Code: CHEM-422

Credit Hours: 02

Marks: 50

Analysis of coal and petroleum fuels; Cement analysis and testing of raw materials; Milk analysis; Analysis of lime stone; Preparations of various cosmetics such as cold cream, shaving cream, nail polish, shoe polish etc. Various others of practicals may add in accordance with the available facilities.

#### 4<sup>th</sup> Year; 7<sup>th</sup> Semester

##### PAPER-III

Title of the Practicals: APPLIED CHEMISTRY

Code: CHEM-423

Credit Hours: 02

Marks: 50

#### RECOMMENDED BOOKS

1. Billmeyer, F. W. Jr., Text Book of Polymer Science, 3rd Ed., John Wiley and Sons Inc. Singapore, (1994).
2. L.H Sperling "Introduction to Physical Polymer Sciences", 2<sup>nd</sup> Ed., John Wiley & Sons
3. Joel R. Fried "Polymer Science & Technology", Prentice Hall, Inc. (1995).
4. G. Odoin "Principles of Polymerization", 2<sup>nd</sup> Ed. John Wiley & Sons .

5. Cowie J. M.G., Polymers Chemistry and Physics of Modern Material, 1st Ed. Intertext Book New York, (1973).
6. R. N. Shreve, The chemical process industries, McGraw-Hill Book Company.
7. Terold M. Schultz, Polymer Materials Science, (1974).
8. Riegel, E.R. (1956).” Industrial Chemistry” 5<sup>th</sup> ed. Reinhold Publishing Corporation, New York.
9. W Francis, Fuels and fuel technology, Pergamon press, New yourk.
10. Theodore Dumas Walter Bulani, Oxidation of Petrochemicals Chemistry and Technology, (1974).
11. Urbanski, T., Chemistry and Technology of Explosives Vol-1, Authorised Translation by I. Jeczalikowa ad S. Laverton, 2nd Ed., Pergamon Press London, (1983).
12. Urbanski T., Chemistry and Technology of Explosives Vol-II, Authorised Translation by W. Ornaf and S. London, 2nd Ed., Pergamon Press London, (1983).
13. Urbanski, T., Chemistry and Technology of Explosives Vol-III, 1<sup>st</sup> Ed., Pergamon Press London (1984).
14. Urbanstri, T., Chemistry and Technology of Explosives, (1985).
15. P. C. Deb, Soaps and Detergents, 1st Edition, C. B. S. Publisher and distributes, (1996).
16. P. C. Deb., Modern Trends in Formulating Soaps and Detergents, (1996).
17. R. M. Christie, Colour Chemistry, The Royal Society of Chemistry, (2001).