COURSE WISE BREAKUP

Fourth Year Eighth Semester

SPECILIZATION APPLIED CHEMISTRY

THEORY

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-424	PAPER-IV: APPLIED CHEMISTRY	03	100
CHEM-425	PAPER-V: APPLIED CHEMISTRY	03	100
CHEM-426	PAPER-VI: APPLIED CHEMISTRY	03	100

PRACTICALS

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-422	APPLIED CHEMISTRY (RESEARCH PROJECT)	06	200

- **Total Credits of the Semester = 15 (theory 09 & practicles 06 credits)**
- **Maximum Marks = 500 (theory 300 & practicles 200 marks)**

4th Year; 8th Semester

PAPER-IV

Title of the Course: **APPLIED CHEMISTRY** Code: **CHEM-424**

Credit Hours: **03** Marks: **100**

Course Contents:

Paper and Pulp Technology

Raw materials for pulp and paper industries; Classification of paper products; Chemistry involved in the processing of kraft pulp, sulphite pulp and semi-chemical pulp; Manufacture of paper and regeneration of spent liquor.

Industrial Polymerization and Polymers

General classification and characterization of polymers; Mechanism and chemistry of polymerization; Thermoplastic and thermosetting polymerization; A brief outline for the production and applications of polymers i.e. polyethylene, polystyrene, polyurethanes, polyesters and urea phenol formaldehyde resins; Production of drug delievery polymers.

Cosmetics and Perfumes

Chemistry and production of hair products and shampoos; Chemistry involved in hair curling and styling products; Hair tonics and depilatory products; Production of cold cream, vanishing cream, bleach cream and shaving creams; Tooth paste and face powders; Production of nail polish, lipsticks and mascaras.

Production of Explosives, Propellants and their Applications

Raw materials; Manufacture of industrial explosives and propellants; Types of explosives and their safety measures; Chemistry involved in production of military explosives.

4th Year; 8th Semester

PAPER-V

Title of the Course: **APPLIED CHEMISTRY** Code: **CHEM-425**

Credit Hours: **03** Marks: **100**

Course Contents:

Petroleum Refinery and Petrochemicals

Origin of petroleum; Constituents and classification of petroleum; Cracking and distillation of various fractions in distillation towers; Control of distillation tower in refinery; Manufacture of

monomers such as acetylene, ethylene, propylene; Separation and purification of benzene, toluene and xylene.

Pharmaceutical Industry

Classification of pharmaceutical products and pharmaceutical processing; Manufacture of paracetamol/disprol and aspirin; Chemistry involved in the production and manufacture of various antibiotics such as streptomycin, erythromycin, penicillin etc.

Fermentation and Biotechnology

Micro-organisms, conditions for their growth and biochemical activity. Production of ethanol, acetic acid, citric acid, penicillin and amylase; Microbial growth rate and its modelling.

Nuclear Industry and Peaceful Applications

Extraction of uranium from rocks; Importance of nuclear technology; Nuclear energy and its peaceful applications; Production of nuclear energy and control of nuclear reactors; Chemistry of fission and fusion reactions; Reprocessing of nuclear spent fuel; Industrial application of nuclear radiatios.

4th Year; 8th Semester

PAPER-VI

Title of the Course: **APPLIED CHEMISTRY** Code: **CHEM-426**

Credit Hours: **03** Marks: **100**

Course Contents:

Iron, Steel and Alloyes Industries

Iron ores, constituents and their classification; Manufacture of iron and steel; Types of iron and steel; Metal Extractions and production of Alloyes.

Corrosion and its Prevention

Chemistry and causes of corrosion phenomena; Types and theories of corrosion; Corrosion prevention and inhibitors; Surfaces coating and Electroplating.

Colour Chemistry

Organic dyes, sources and classification of dyes; Chemistry and production of various organic dyes, Methods of dyeing, Finishing and dyeing of textiles.

Coal Cleaning and Utilizations

Origion and types of coal; Coal cleaning and its utilization; Coal combustion, carbonization and gasification; Production of various fuel gases from coal such as water gas, producer gas etc.

4th Year; 8th Semester

Title of the Practicals: **APPLIED CHEMISTRY (RESEATRCH PROJECT)**

Code: **CHEM-422** Credit Hours: **06** Marks: **200**

RECOMMENDED BOOKS:

1. George T. Auston., Shreve's Chemical Process Industries, 5th Edition., McGraw Hill Book Company Inc. New York, (1984).
2. Riegel, E. R., Industrial Chemistry, 5th Ed., Reinhold Publishing Corporation NewYork, (1997).
3. J. C Kuriacase & J Rajaran, Chemistry in Engineering and Technology, 2nd Ed., (1984).
4. Chuis A. Clauses III Guy Matison, Principles of Industrial Chemistry, (1978).
5. P. C. Jain., A Textbook of Applied Chemistry, (1993).
6. G. N. Pandey, A Text Book of Chemical Technology, 2nd Edition, Vikas Publishing house, (2000).
7. R. Lambourne., Paint & Surface Coatings Theory & Practice, (1987).
8. Mattsson, E. Basic Corrosion Technology for Scientists and Engineers, 1st Ed., Ellis Horwood, Ltd. UK (1989).
9. Leighou, R. B., Chemistry of Engineering Materials, Fourth Edition 1953, Mc Graw-Hill Book Company Inc. New York, (1953).
10. Octave Levenspiel, Chemical Reaction Engineering, 2nd Ed., (1979).
11. Groggins, P.H., Unit Process in Organic Synthesis, 5th Ed, McGraw Hill Book Company Inc. York (1958).
12. Furnas, C. C., Industrial Chemistry,Vol-II 6th Ed., D. Van Nostrand Company, Inc. Princetion New Jersey, New York (1957).
13. Vogel, I. A.,Text Book Quantitative Inorganic Analysis, 7rd Ed., Longman, Green and Co. Ltd. UK (1961) and (1978).

14. Jeffrey, G. H., J, Bassett, J. Mandham and R. C. Denney, Vogel's Textbook of Qualitative Chemical Analysis, 5th Ed., ELBS Longman Scientific and Technical Group, England (1989), Reprinted (1994).
15. Vogel, I. A.,Text Book Quantitative Inorganic Analysis, 3rd Ed., Longman,Green and Co. Ltd. UK (1961) and (1978).
16. A. K. Spivas Tava, Chemical Analysis, 3rd Ed., (1997).