

**V.B.S. Purvanchal University
Jaunpur
(UNS Institute of Engineering & Technology)
Department of Chemistry**



Syllabus

[Effective from the Session: 2016-017]

B.TECH. COURSES

[Common to all Branches of B.Tech. 1st Year]

NEW STUDY & EVALUATION SCHEME
B. Tech. First Year (Common to all B.Tech. Courses)
[Effective from the session 2016-017]
Year I, SEMESTER-I

S.No	Course Code	Subject	PERIODS			Evaluation Scheme			Sub. Total	Credit	
			L	T	P	SESSIONALEX.		ESE			
						CT	TA	Total			
THEORY											
1	EAS-102	Engg. Chemistry	3	1	0	30	20	50	100	50	04
2	EAS-105	Env. Ecology &	2	0	0	15	10	25	50	75	02
PRACTICAL											
1	EAS-152	Engg. Chem. Lab	0	0	2	10	10	20	30	50	01

**Remedial English language is compulsory for Audit-Course. Candidate has to secure minimum 30% pass marks.*

L- Lecture, T – Tutorial , P- Practical , CT- Cumulative Test , TA – Teachers Assessment , ESE - End Semester Exam.

UNIT I: CHEMICAL BONDING AND STATE OF MATTER

Molecular orbital theory and its applications to homo-nuclear diatomic molecules. Various states of matter including liquid crystalline state, classification and application of liquid crystal. Type of unit cell, space lattice (only cubes, Bragg's Law). Calculation and density of the unit cell, one and two dimensional solid such as graphite and its conduction properties. Fullerenes and their application.

Unit II: REACTION KINETICS, PHASE RULE AND ELECTROCHEMISTRY:

Order and molecularity of reactions, Zero order, and second order reactions. Integrated rate equation. Theories of reaction rates. Phase rule and its application to one component system (i.e. Water). Equilibrium potential, electrochemical cells, galvanic and concentration cells. Electrochemical theory of corrosion and protection of corrosion. Fuel cells.

Unit III: STRUCTURAL AND MECHANISTIC CONCEPTS OF ORGANICS

Inductive, Electromeric, Mesomeric and Hyperconjugative effects. Stability of reaction intermediates e.g. **CARBOCATIONS** and **FREE RADICALS**. Mechanism of Nucleophilic Substitutions. Mechanism of the following reactions:

- a. **ALDOL CONDENSATION REACTION**
- b. **CANNIZARO REACTION**
- c. **BECKMANN REARRANGEMENT REACTION**
- d. **HOFFMANN REARRANGEMENT REACTION**
- e. **DIELS-ALDER REACTION.**

E-Z nomenclature, RS Configuration, Optical Isomerism, Chirality and its applications. Conformation of n-Butane.

Unit IV: POLYMERS AND ORGANOMETALLICS

Polymerization and its classification. Thermoplastic and Thermosetting resins. Elastomers and Synthetic fibres. Ion Exchange resins. Organic conducting and Biodegradable Polymers. Classification and general methods of synthesis of Organics and their applications in polymerizations and catalysis.

Unit V: ANALYTICAL METHODS AND FUELS

Titrimetric analysis with reference to acid–base, redox, precipitations and complexometric titrations. Elementary ideas and simple application of UV, Visible, Infra-red and HNMR spectral techniques.

Water treatment methods for boiler feed water by calgon processes, Zeolites and ion –exchange resins.

Classification of fuels. Analysis of coal, determination of calorific values. Biomass and Biogas.

Text Books

1. Advanced Inorganic Chemistry, by Cotton, F.A; Willkinson G; Murrillo, C.A and Bochmann; Wiley, Eichester, 1999.
2. March's Advanced Organic Chemistry: Mechanism & Structure Smith, Michael B. / March, Jerry, John Wiley & sons, 6th Edition, 2007.
3. Elements of Physical Chemistry, Glasstone, Samuel B. ELBS, 2005.
4. Organic Chemistry, Finar, I.L: Edition – WesleyLongman, Limited, 2004.

Reference Books

1. Text Book of Polymer Science by F.W. Billmeyer, John Wiley & sons, 1994.
2. Liquid crystals and Plastic Crystals, Vol.-I, edited by G.W Gray and P.A. Winsor, Ellis Harwood Series in Physical Chemistry, New York.
3. Corrosion Engineering by M.G. Fontana Mc Graw Hills Publications.

EAS105/EAS205: ENVIRONMENT & ECOLOGY

L	T	P
2	0	0

UNIT I :

Definition, Scope & Importance, Need for Public Awareness- Environment definition, Ecosystem. Balanced Ecosystem, Human Activities- Food Shelter, Economic and Social Security.

Effect of Human activities on Environment-Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.

UNIT II :

Natural Resources- Water Resources- Availability and Quality aspects. Water borne diseases, Water induced diseases. Fluoride problem in drinking water. Minerals Resources, Forest Wealth, Materials Cycle- Carbon, Nitrogen and Sulphur Cycles.

Energy- Different type of Energy, Electro-magnetic radiation. Conventional and Non- Conventional sources. Hydroelectric, Fossil Fuel Based, Nuclear Solar, Biomass, and Biogas. Hydrogen as an alternative future source of energy.

UNIT III:

Environmental Pollution and their effects. Water Pollution, Land Pollution, Noise Pollution, Public Health aspects. Air Pollution, Solid Waste management.

CURRENT ENVIRONMENTAL ISSUE OF IMPORTANCE: Population Growth, Climate Change and Global Warming-Effects, Urbanization, Automobile Pollution.

ACID RAIN, OZONE layer depletion, Animal Husbandry.

UNIT IV:

Environmental Protection- Role of Government, Legal aspects, initiatives by Non-Governmental Organization (NGO). Environmental Education, Women Education.

TEXT BOOKS

1. Environmental Studies – Benny Joseph – Tata McGraw Hill 2005
2. Environmental Studies- Dr. D.L Manjunath, Pearson Education 2006
3. Environmental Studies- R. Rajagopalan – Oxford Publication 2005
4. Text Book of Environmental Science & Technology – M. Anji Reddy – BS Publication.

REFERENCE BOOKS

1. Principle of Environmental Science and Engineering – P. Venugopalan Rao, Prentice Hall, India
2. Environmental Science & Engineering – Meenakshi, Prentice Hall, India

Science Based Open Electives for B.Tech. Course

UNIT I & II POLYMERS:

Introduction, Chemistry of Polymer Synthesis, Polymer reaction Kinetics, Physical properties and Characterization of Polymers, effects of structure on properties of Polymers, Organic Polymers.

Introduction to High Performance Polymers, Composites and their Processing.

UNIT III & IV

Introduction, Step- Growth Polymerization, Free radicles, Chain- Growth Polymerization, Emulsion Polymerization, Ionic and Cationic Polymerization., Cain Statistics and Rubber Elasticity.

UNIT V & VI PREPARATION AND APPLICATIONS:

Preparation, properties and Technical applications of Thermo-Plastics (PVC, PVA), Thermostates (PF, UF) and Elastomers (SBR, GR-N), Silicones. Application of Polymers in Space, **Ocean**, Electronics, Medicals, Agricultures, Automobiles, Sports and Building Constructions.
