Choice Based Credit System (CBCS)
Fifth Semester- Bachelor Of Science (Biology)
Subject-CHEMISTRY
Code-BSCB-501A

UNIT-I

Organic Compounds of Nitrogen: preparation, properties and chemical reactions of nitro alkanes and nitroarenes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic neutral and alkaline media, picric acids.Halonitroarenes; structure and nomenclature, and their activity. Amines structure, and nomenclature, physical properties and Stereochemistry, separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines.

UNIT-II

Carbohydrates

Classification and nomenclature, monosaccharide, mechanism of osazone formation, chain lengthening and chain shortening of aldoses, epimerization, configuration of monosaccharide,erythro, threo diasterioisomers. Formation of glycosides, ethersand esters, determination of ring size of monosaccharide, cyclicstructure of D (+) glucose, mechanism of mutarotation.Structure of ribose and deoxyribose.

UNIT-III

Photochemistry: Electromagnetic radiation, range of different regions of the spectrum, different expression units for energy, wavelength and frequency Interaction of radiation with matter, difference between thermal and photochemical process. Laws of photochemistry – Grotthus-Draper law, Stark-Einstein law, Beer-Lambert law. Electronic transitions, JablonskiSdiagram depicting various quantum yield.

UNIT-IV

Bioinorganic Chemistry – I Essential and trace elements in biological processes, metalloporphyrins with special reference to hemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to Ca2+.**Bioinorganic Chemistry - II**

Role of metal ions in biological process, nitrogen fixation, oxygen-uptake proteins, cytochromes and ferredoxins.

UNIT –V

Hard and Soft Acids and Bases (HSAB)of acids and bases as hard and soft, Pearson'HSAB concept, symbiosis.**Inorganic Polymers:** Introduction and scope of inorganic polymers, special characteristics, classification and their applications. Structure and nature of bonding in Silicones andtriphosphonitrilic chloride.

Recommended Books:

1. Physical Chemistry-Puri, Sharma and Pathania, Vikas Publications, New Delhi
2. Physical Chemistry -G.M. Barrow, International Student Edition, McGraw Hill.
3. Inorganic Chemistry – J.D. Lee, John Wiley
4. Inorganic Chemistry – Cotton and Wilkinson, John Wiley

CHEMISTRY

PAPER: PRACTICAL

Inorganic Chemistry Analysis of inorganic mixture containing five radicals with at least one interfering radical or typical combination **Gravimetric analysis** Barium as barium sulphate.

Organic Chemistry
1. Acetylation
2. Benzoylation
3. Meta-Dinitrobenezene
4. Picric Acid

Choice Based Credit System (CBCS)
Fifth Semester- Bachelor of Science (Biology)
Subject -Reproductive Biology of Angiosperms
BOTANY
Code-BSCB-502A

UNIT I

Introduction : History ,contributions of G.B. Amici, W. Hofmeister, E. Strasburger, S.G. Nawaschin, P. Maheshwari, B.M. Johri, W.A. Jensen, J. Heslop-Harrison) and scope.

UNIT II

Reproductive development, Induction of flowering; flower as a modified determinate shoot. Flower development: genetic and molecular aspects

UNIT III

Anther and pollen biology, Anther wall: Structure and functions, microsporogenesis, callose deposition and its significance. Micro gametogenesis; Pollen wall structure, MGU (male germ unit) structure, NPC system; Palynology and scope (a brief account); Pollen wall proteins; Pollen viability, storage and germination; Abnormal features: Pseudomonads, polyads, massulae, pollinia.

UNIT IV

Ovule (structure; Types; Special structures–endothelium, obturator, aril, caruncle and hypostase; Female gametophyte– megasporogenesis (monosporic, bisporic and tetrasporic) and mega gametogenesis (details of Polygonum type); Organization and ultrastructure of mature embryo sac. Pollination and fertilization, Pollination types and significance; adaptations; structure of stigma and style; path of pollen tube in pistil; double fertilization

UNIT V

Self incompatibility, Basic concepts (interspecific, intraspecific, homomorphic, heteromorphic, GSI and SSI); Methods to overcome self- incompatibility: mixed pollination, bud pollination, stub pollination; Intra-ovarian and in vitro pollination; Modification of stigma surface, parasexual hybridization; Cybrids, in vitro fertilization. Polyembryony and apomixes, Introduction; Classification; Causes and applications

Suggested Readings:

1. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition
2. Shivanna, K.R. (2003). Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt. Ltd. Delhi. 38
3. Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands.

BOTANY
PRACTICAL

1 Anther: Wall and its ontogeny; Tapetum (amoeboid and glandular); MMC, spore tetrads, uninucleate, bicelled and dehisced anther stages through slides/micrographs, male germ unit (MGU) through photographs and schematic representation.

2. Pollen grains: Fresh and acetolyzed showing ornamentation and aperture, psuedomonads, polyads, pollinia (slides/photographs, fresh material), ultrastructure of pollen wall(micrograph);Pollen viability: Tetrazolium test.germination: Calculation of percentage germination in differentmedia using hanging drop method.

3 Ovule: Types-anatropous, orthotropous, amphitropous/campylotropous, circinotropous, unitegmic, bitegmic; Tenuinucellate and crassinucellate; Special structures: Endothelium, obturator, hypostase, caruncle and aril (permanent slides/specimens/photographs)

4. Female gametophyte through permanent slides/ photographs: Types, ultrastructure of mature egg apparatus

5. Intra-ovarian pollination; Test tube pollination through photographs

6. Endosperm: Dissections of developing seeds for endosperm with free-nuclear haustoria

Choice Based Credit System (CBCS)
Fifth Semester- Bachelor of Science (Biology)
Subject - ZOOLOGY
Code-BSCB 503A

UNIT I

Mendelian Genetics and its Extension Principles of inheritance, Incomplete dominance and co-dominance, Multiple alleles, lethal alleles, Epistasis, Pleiotropy, Sex-linked, sex influencedand sex-limited characters inheritance.

UNIT II

Linkage, Crossing Over and Chromosomal Mapping Linkage and crossing over, Cytological basis of crossing over, Molecular mechanisms of crossing over including models of recombination, Recombination frequency as a measure of linkage intensity, Two factor and three factor crosses, Interference and coincidence, Somatic cell hybridization.

UNIT III

Mutations Types of gene mutations (Classification), Types of chromosomal aberrations (Classification, figures and with one suitable example of each), Molecular basis of mutations in relation to UV light and chemical mutagens; Detection of mutations: CLB methods, attached X method.

UNIT IV

Translation Genetic code, Degeneracy of the genetic code and Wobble Hypothesis; Process of protein synthesis in prokaryotes: Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of polypeptide chain; Inhibitors of protein synthesis; Difference between prokaryotic and eukaryotic translation

UNIT V

Gene Regulation Transcription regulation in prokaryotes: Principles of transcriptional regulation with examples from lac operon and trip operon; Transcription regulation in eukaryotes: Activators, repressors, enhancers, silencer elements; Gene silencing, Genetic imprinting.

SUGGESTED READINGS:

- **Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter: Molecular Biology of the Cell, IV Edition.**
- **Cooper G. M. and Robert E. Hausman R. E. The Cell: A Molecular Approach, V Edition, ASM Press and Sinauer Associates.**
- **De Robertis, E.D.P. and De Robertis, E.M.F. (2006). Cell and Molecular Biology. VIII Edition. Lippincott Williams and Wilkins, Philadelphia.**

ZOOLOGY

PRACTICALS

1. To study the Mendelian laws and gene interactions.
2. Chi-square analyses using seeds/beads/Drosophila.
3. Linkage maps based on data from conjugation, transformation and transduction.
4. Linkage maps based on data from Drosophila crosses.
5. Study of human karyotype (normal and abnormal).
6. Study of Polytene chromosomes from Chironomous / Drosophila larvae
7. Study and interpretation of electron micrographs/ photograph showing

   (a) DNA replication

   (b) Transcription

   (c) Split genes

Choice Based Credit System (CBCS)
Fifth Semester- Bachelor Of Science (Biology)
Paper- BIO-FERTILIZER
CODE-BSCB 505A

UNIT I

General account about the microbes used as bio fertilizer – Rhizobium – isolation, Identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis.

UNIT II

Azospirillum: isolation and mass multiplication – carrier based inoculant, associative Effect of different microorganisms. *Azotobacter*: classification, characteristics – crop Response to *Azotobacter* inoculum, maintenance and mass multiplication.

UNIT III

Cyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.

Unit IV

Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.

UNIT V

Organic farming – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – biocompost making methods, types and method of vermicomposting – field Application.

Suggested Readings

1. Dubey, R.C., 2005 A Text book of Biotechnology S.Chand & Co, New Delhi.
2. Kumaresan, V. 2005, Biotechnology, Saras Publications, New Delhi.
3. John Jothi Prakash, E. 2004. Outlines of Plant Biotechnology. Emkay _Publication, New Delhi.
4. Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.
5. Subha Rao, N.S. 2000, Soil Microbiology, Oxford & IBH Publishers, New _Delhi.
6. Vayas,S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic _Farming Akta Prakashan, Nadiad

Choice Based Credit System (Cbcs)
Fifth Semester- Bachelor Of Science (Biology)

Paper- SERICULTURE
CODE- BSCB-505B

UNIT I

Introduction Sericulture: Definition, history and present status; Silk route Types of silkworms, Distribution and Races Exotic and indigenous races Mulberry and non-mulberry Sericulture

UNIT II

Biology of Silkworm, Life cycle of Bombyx mori Structure of silk gland and secretion of silk

UNIT III

Rearing of Silkworms Selection of mulberry variety and establishment of mulberry garden Rearing house and rearing appliances Disinfectants: Formalin, bleaching powder, RKO Silkworm rearing technology: Early age and Late age rearing Types of mountages Spinning, harvesting and storage of cocoons

UNIT IV

Pests and Disease Pests of silkworm: Uzi fly, dermestid beetles and vertebrates Pathogenesis of silkworm diseases: Protozoan, viral, fungal and bacterial Control and prevention of pests and diseases

UNIT V

Entrepreneurship in Sericulture Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture. Visit to various sericulture centres.

SUGGESTED READINGS

1. **Manual on Sericulture; Food and Agriculture Organisation, Rome 1976•**
2. **Handbook of Practical Sericulture: S.R. Ullal and M.N. Narasimhanna CSB, Bangalore**
3. **Silkworm Rearing and Disease of Silkworm, 1956, Ptd. By Director of Ptg., Stn.• & Pub. Govt. Press, Bangalore**
5. **Appropriate Sericultural Techniques; Ed. M. S. Jolly, Director, CSR• & TI, Mysore. Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd.,**