Department of Biotechnology
Jamia Millia Islamia

B.Sc. (Biotechnology) Semester II

Multidisciplinary (MLD)

Chemistry-I (Code: 24-BBT-T-204)

Credit: 3

UNIT- I: Alcohols
Classification and nomenclature

Dihydric alcohols- Nomenclature, methods of preparation, chemical reactions of vicinal glycols, eg: Oxidative cleavage using $(Pb(OAc)_4)$ & HIO_4 and pinacol-pinacolone rearrangement.
Trihydric alcohols- Nomenclature and methods of preparation, chemical reactions of glycol

UNIT -II: Phenols
Nomenclature, structure and bonding of phenols, Physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenol. Electrophilic aromatic substitution, acylation and carboxylation, mechanism of Fries rearrangement, claisen rearrangement, Reimer Tiemann reaction.

UNIT- III: Ethers and Epoxides

Nomenclature of ethers and methods of their preparation, Physical properties.Chemical reactions- Cleavage and autoxidation, Ziesel's method.

Synthesis of epoxides, Acid and base catalysed ring opening, reaction of Grignards and organolithium reagents with epoxides.

UNIT-IV: Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes from acid chlorides, synthesis of ketones from nitriles and from carboxylic acids. Physical properties, Mechanism of nucleophilic addition to Carbonyl compounds. Condensation with ammonia and its derivatives. Witting reaction, Mannich reaction.

Suggested Readings

1. Organic Chemistry by P.Y. Bruice
2. Organic Chemistry, I L Finar, Pearson Education, New Delhi .
3. Organic Chemistry, Morrison & Boyd, Pearson Education, New Delhi

Bioinformatics and Biostatistics (Code: 24-BBT-S 205)

Skill Enhancement Course (SEC)

Credit: 3

UNIT -I

History of Bioinformatics. The notion of Homology. Sequence Information Sources, EMBL, GENBANK, Entrez, Unigene, Understanding the structure of each source and using it on the web. **Searching Databases:** SRS, Entrez, Sequence Similarity Searches-BLAST, FASTA, Data Submission. Genome Annotation: Pattern and repeat finding, Gene identification tools.

UNIT- II

Protein Information Sources: PDB, SWISSPROT, TREMBL, Understanding the structure of each source and using it on the web. Introduction of Data Generating Techniques and Bioinformatics problem posed by them- Restriction Digestion, Chromatograms, Microarrays, Mass Spectrometry. Sequence and Phylogeny analysis, Detecting Open Reading Frames, Outline of sequence Assembly, Mutation/Substitution Matrices, Pairwise Alignments, Introduction to BLAST, Interpreting results, Multiple Sequence Alignment, Phylogenetic Analysis.

Biostatistics

UNIT- III

Types of Data, Collection of data; Primary & Secondary data, Classification and Graphical representation of Statistical data. Measures of central tendency and Dispersion. Measures of Skewness and Kurtosis.

Probability classical & axiomatic definition of probability, Theorems on total and compound probability), Elementary ideas of Binomial, Poisson and Normal distributions.

UNIT- IV

Methods of sampling, confidence level, critical region, testing of hypothesis and standard error, large sample test and small sample test. Problems on test of significance, t-test, chi-square testfor goodness of fit and analysis of variance (ANOVA).
Correlation and Regression. Emphasis on examples from Biological Sciences

Suggested Readings

1. Ghosh Z. and Bibekanand M. (2008) Bioinformatics: Principles and Applications. Oxford University Press.
2. Pevsner J. (2009) Bioinformatics and Functional Genomics. II Edition. Wiley-Blackwell.
3. Campbell A. M., Heyer L. J. (2006) Discovering Genomics, Proteomics andBioinformatics. II Edition. Benjamin Cummings.
4. Le CT (2003) Introductory biostatistics. 1st edition, John Wiley, USA
5. Glaser AN (2001) High YieldTM Biostatistics. Lippincott Williams and Wilkins, USA
6. Edmondson A and Druce D (1996) Advanced Biology Statistics, Oxford University Press.
7. Danial W (2004) Biostatistics : A foundation for Analysis in Health Sciences, John Wiley andSons Inc.

Entrepreneurship Development (Code:24-BBT-V-206)

Value Added Course (VAC)

Credit 2

UNIT-I
Introduction and Establishing an Enterprise

Meaning, Needs and Importance of Entrepreneurship, Promotion of entrepreneurship, Factors influencing entrepreneurship, Features of a successful Entrepreneurship. Forms of Business Organization, Project Identification, Selection of the product, Project
formulation, Assessment of project feasibility.

UNIT-II
Financing the Enterprise and Marketing Management

Importance of finance / loans and repayments, Characteristics of Business finance, Fixed capital management: Sources of fixed capital, working capital its sources and how to move for loans,Inventory direct and indirect raw materials and its management.
Meaning and Importance, Marketing-mix, product management – Product line, Product mix,stages of product like cycle, marketing Research and Importance of survey, Physical Distribution
and Stock Management.

UNIT-III
Entrepreneurship and International Business (10 Periods)

Meaning of International business, Selection of a product, Selection of a market for international
business, Export financing, Institutional support for exports.
Project Report on a selected product should be prepared and submitted.

Suggested Readings

1. Holt DH. Entrepreneurship: New Venture Creation.
2. Kaplan JM Patterns of Entrepreneurship.
3. Gupta CB, Khanka SS. Entrepreneurship and Small Business Management, Sultan Chand &
Sons.