

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - II

**BS23MD2BO1
MDC Course (BOTANY)**

Diversity of Cryptogams

INFORCE FROM JUNE 2023

SHRI GOVIND GURU UNIVERSITY
Syllabus on the bases of New Education Policy (NEP)
B.Sc. Semester – II
BS23MD2BO1
MDC BOTANY
[Diversity of Cryptogams]

UNIT: 1. ALGAE and FUNGI

Algae:

- Introduction, General characteristics
- Economic importance of Algae
- Life history of *Nostoc* with reference to:
 - Systematic position with reasons up to family
 - Habit and Habitat, Vegetative structure and Reproduction
- Life history of *Spirogyra* with reference to:
 - Systematic position with reasons up to family
 - Habit and Habitat, Vegetative structure and Reproduction

Fungi:

- Introduction, General Characteristics
- Economic importance of Fungi
- Life history of *Puccinia* with reference to,
 - Systematic position with reasons up to family
 - Habit and Habitat, Vegetative structure and Reproduction.

UNIT: 2. BRYOPHYTES and PTERIDOPHYTES

Bryophytes:

- Introduction, General Characteristics
- Systematic Position; Adaptation to land habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the
 - *Funaria*
- Ecological aspects of Bryophytes
- Economic importance of Bryophytes

Pteridophytes:

- Introduction, General Characteristics
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of
 - *Nephrolepis*
- Ecological aspects of Pteridophytes
- Economic importance of Pteridophytes

Suggested Readings

1. Smith, G.M. 1972. *Cryptogamic Botany* Vol. 1 & 2. Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. College Botany Vol. I & II Das, Datta, Gangulee and Kar, New Centralbook Agency.
3. Algae, Fungi, Bryophytes, Pteridophyte by Vasishta., S. Chand Pub., New Delhi.
4. Parihar, N.S. (1991). An introduction to Embryophyta: Vol. I. Bryophyta. Central Book Depot. Allahabad.
5. Vashistha, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S. Chand. Delhi, India.
6. Bendre Ashok and Kumar Ashok. A Textbook of Practical Botany vol. I & II. Rastogi Publication Meerut.

SHRI GOVIND GURU UNIVERSITY
Syllabus on the bases of New Education Policy (NEP)

B.Sc. Semester - II

MDC Course - BOTANY

Practical

[Based on Paper: Diversity of Cryptogams]

1. Study of Microscope (Simple and Compound)
2. *Nostoc*:
 - Specimen: Thallus
 - Mounting: Colony
 - P.S: Colony
3. *Spirogyra*:
 - Specimen: Thallus
 - Mounting: Thallus and Conjugation types
 - P.S: Thallus and Conjugation types
4. *Puccinia*:
 - Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves;
 - Mounting – Uredospore and Telutospore
 - P.S: Uredospore, Telutospore, Pycnidiospores and Aecidiospores,
5. *Funaria*:
 - Specimen: Morphology of thallus; Thallus with Sporophytes
 - Mounting: Antheridia, Archegonia, Peristome.
 - P.S: Antheridial and Archegonial branch, L.S. Capsule, Protonema
6. *Nephrolepis*:
 - Specimen: Sporophytic Plant
 - Mounting: Ramenta, Hydathode, Sporangia
 - P.S.: Prothallus with Antheridia and Archegonia; T.S. leaflet passing through sorus
7. Project / Submission

BS23MD2CH1
BSC Semester- 2 (MDC)
Chemistry in Food

Objectives:

- To understand the historical development of food chemistry and its significance in food processing.
- To comprehend the importance of water in food systems, including the structures of water and ice, and the concepts of bound and free water.
- To classify carbohydrates, elucidate their structures, and analyze their physical and chemical properties.
- To evaluate the alterations in carbohydrates during food processing, particularly dietary fiber changes.
- To define proteins, amino acids, and peptides, categorize proteins, and describe their structures and properties.
- To examine lipid structures, classify fatty acids and glycerides, and assess their physical and chemical properties.

Learning outcomes:

On completion of the course, the student will be able to:

- Demonstrate an understanding of the historical context and importance of food chemistry in processing.
- Apply knowledge of water structures and concepts of bound and free water in food systems.
- Identify and classify various carbohydrates, linking their structures to their roles in food.
- Analyze changes in carbohydrates throughout food processing and their impact on dietary composition.
- Explain the structures and properties of proteins and amino acids.
- Describe the structures and properties of lipids, identifying their susceptibility to oxidation.
- Evaluate alterations in proteins and lipids during food processing, considering changes in their functional properties.

Unit 1 Water and Carbohydrates

Introduction: Development of food chemistry and its role in food processing.

Water: Importance of water in foods. Structure of water & ice. Concept of bound & free water and their implications.

Carbohydrates: Nomenclature and classification, structure, physical and chemical properties of carbohydrates – monosaccharide, disaccharides and polysaccharides (cellulose, starch, fructans, galactans, hemi-cellulose, pectic substances) and their functions; dietary fiber, changes in carbohydrates during processing.

Unit 2 Proteins and Lipids

Proteins: Nomenclature, classification, structure, chemistry and properties of amino acids, peptides, proteins. Essential and non- essential amino acids. Changes during processing.

Lipids: Structure, classification, physical and chemical properties of fatty acids and glycerides, Auto-oxidation, photo oxidation and flavor reversion, Changes in fats & oils during processing.

References:

- (1) Food Chemistry by Meyer
- (2) Food Chemistry by Belitz
- (3) Food Chemistry by Lee
- (4) Principles of Biochemistry by Lehniger

BSC Sem-2 Practical Chemistry

Objectives:

- To impart practical knowledge of qualitative analysis of organic compounds having monofunctional group.
- To identify various functional groups and unknown organic compounds.

Learning outcomes:

On completion of the course, the student will be able to:

- Determine the functional group present in the given organic compound.
- Identify the organic compound based on its qualitative properties.

Organic Spotting :- (08 Solids and 05 Liquids).

List of organic compounds having different only mono functional groups:

Solids:

Acids: (1) Benzoic acid (2) Oxalic acid (3) Cinnamic Acid

Phenols: (1) β -Naphthol (2) α -Naphthol (3) Resorcinol

Neutral: (1) Urea (2) Thiourea (3) Benzamide (4) Naphthalene (5)
Acetanilide

Liquids: (1) Aniline (2) Nitrobenzene (3) Benzaldehyde (4) Ethanol
(5) Ethyl acetate (6) Chloroform (7) Chloro benzene (8) Acetone

REFERENCE BOOKS

1. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language Book Society) Longman. 5th Ed.
2. 'Analytical Chemistry' by Dhruba Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
3. 'Analytical Chemistry' by Gary D. Christian, 4th Ed., John Wiley & Sons.
4. 'Comprehensive Practical Organic Chemistry – Qualitative Analysis' by V. K. Ahluwalia, Sunita Dhingra University Press (India) Private Limited, Hyderabad, First Indian Reprint 2010.
5. 'Organic Analytical Chemistry theory and Practice' by Mohan Jag, Narosa Publication, New Delhi. (2003).
6. 'Elementary Practical Organic Chemistry Part-2, Qualitative Organic Analysis' by Arthur I. Vogel- CBS Publishers & Distributors, New Delhi. (2nd Ed., reprint 2004)
7. 'Advanced practical Organic Chemistry' by J. Leonard, B. Lygo, G. Procter, Publication- Stanley Thornes (Publishers) Ltd. (First India



B.Sc Semester Two [Multidisciplinary] Microbiology BS23MD2MB1: Basics of Microbial Biochemistry (Credit 2)

Objectives:

To bring to the knowledge of how the microbes can be cultivated , preserved and controlled by knowing the nutritional requirements and factors that affect their growth

Outcome:

Will know how the microbes can be cultivated , preserved and controlled after knowing the nutritional requirements and factors that affect their growth

Unit 1

15 lectures

- A. Bioelements
- B. Diversity of Nutritional requirements for Microbes
- C. Transport of nutrition
- D. Principles of Cultural Media, its formulation and use
- E. Reproduction in bacteria
- F. Batch cultivation
- G. Continuous cultivation
- H. Enumeration of microbial growth and population
- I. Culture collection centres

Unit 2 A

15 lectures

- A. Factors affecting the efficiency of Controlling Microbial Population
- B. Introduction to Antibiotics
- C. Physical Methods Of Microbial Control:
 - 1. High and low Temperature
 - 2. Ionic and non-ionic Radiation
 - 3. Ultrasonication, Bacteriological filters
 - 4. Effects of salts, sugars, detergent, desiccation on microbial growth

Unit 2 B

- 1. Ideal Chemical Agent to Control Microbes
- 2. Chemical Disinfectants
- 3. Chemical sterilizing agents
- 4. Fumigation to control microbial population
- 5. Phenol coefficient

LAB. COURSE (Credit 2)

- 1. Cell Wall Staining
- 2. Capsule Staining
- 3. Endospore Staining
- 4. Granule Staining
- 5. Wet Mount: Hanging Drop Technique to study motility of bacteria
- 6. Isolation of pure culture of bacteria By Spread Plate Method



7. Isolation of pure culture of bacteria On Nutrient Agar Plate By Four Flame Method
8. Isolation Of Bacteria By Pour Plate Method
9. Study of Effect Of Chemical On Microbial Growth-Bacteria By Cup Borer Method
10. Study of Effect Of Temperature On Bacterial Growth
11. Study of Oligodynamic Effect
12. Study of Effect Of pH On Bacterial Growth
13. Study of microbial pigmentation

List Of Microbiology Books Authored By:

- 1) Principles Of Microbiology , Atlas R.M.
- 2) Microbiology Marjorie Kelly Cowan
- 3) Microbiology Gerard J. Tortora
- 4) Microbe Hunters: The Classic Book On The Major Discoveries Of The Microscopic World Paul De Kruif
- 5) Foundations In Microbiology Kathleen Park Talaro
- 6) General Microbiology Roger Y. Stanier Macmillan, 1987
- 7) Michael J. Pelczar Jr. Chan Ecs And Krieg Nr (2004) Microbiology , 5th Edition. Tata Mcgraw Hill.
- 8) Instructor's Manual To Accompany Elements Of Microbiology By Michael J. Pelczar

SGGU First year Multi B.Sc Microbiology Syllabus

SHRI GOVIND GURU UNIVERSITY
Syllabus for B. Sc. Semester II (Mathematics)
BS23MD2MT1 Multidisciplinary: Geometry (Theory)

Hours: 2 /week

Credits: 2

Prerequisite: Plane Geometry (Geometry in \mathbb{R}^2).

Course Objectives: The geometry course typically aims to provide students with a well-rounded understanding of geometry, from fundamental concepts to practical applications that ensure they acquire a comprehensive understanding of geometric principles. The main objective of this course is to develop their problem-solving and analytical thinking skills within a geometric context that deals with the properties, measurements, and relationships of points, lines, angles, surfaces, and solids.

Course Learning Outcomes: The learning outcomes of this course outline the skills and knowledge that students are expected to gain by the end of the course. The below-mentioned learning outcomes collectively reflect the acquisition of a comprehensive set of skills and knowledge in geometry, emphasizing both theoretical understanding and practical application. Upon completing the course, students should be able to:

1. Develop a strong foundational understanding of basic geometric concepts, including points, lines, planes, angles, surfaces, and solids.
2. Demonstrate competence in circular geometry, understanding the properties of the sphere, cone, and cylinder.
3. Apply geometric concepts to real-world situations, solving practical problems in architecture, art, engineering, and other fields.
4. Develop analytical thinking skills, the ability to critically analyze geometric relationships, the ability to enhance logical reasoning and deduction skills.
5. Effectively communicate geometric ideas and solutions, both in written and oral form.
6. Demonstrate mastery in problem-solving by applying geometric principles to solve a variety of challenging problems.

Syllabus:

Unit I: Definition of a sphere, Cartesian equation of a sphere, General equation of a sphere, Equation of a sphere with diametrically opposite end points, Equation of a sphere through a given circle, Intersection of a sphere with Line, Intersection of a sphere with plane, Intersection of a sphere with sphere (No theory but only problems), Equation of a tangent and normal plane to a sphere, Orthogonal spheres.

Unit II: Definition of cone, Homogeneous equation of cone, right circular cone, Equation of envelope of cone, Problems on cone, Definition of cylinder, Homogeneous equation of cylinder, right circular cylinder, Equation of envelope of cylinder, Problems on cylinder.

Reference Books:

1. Analytical solid geometry - Shanti Narayan, S.Chand & Company

2. Co-ordinate Geometry By : R.J.T. Bell
3. Solid Geometry(three dimension) - H. K. Das, S. C. Saxena and Raisinghania, S. Chand.
4. Coordinate Geometry of Two and Three Dimension, P. Balasubramanyam, et. al. , Tata Mc Graw Hill Publ. Co., 1994.

Teaching Plan: The teaching plan may be followed as:

Weeks 1 and 2: Definition of a sphere, Cartesian equation of a sphere, General equation of a sphere.

Weeks 3 and 4: Equation of a sphere with diametrically opposite end points, Equation of a sphere through a given circle.

Weeks 5, 6 and 7: Intersection of a sphere with Line, Intersection of a sphere with plane, Intersection of a sphere with sphere (No theory but only problems), Equation of a tangent and normal plane to a sphere, Orthogonal spheres.

Weeks 8 and 9: Definition of cone, Homogeneous equation of cone, right circular cone.

Weeks 10, 11 and 12: Equation of envelope of cone, Problems on cone, Definition of cylinder, Homogeneous equation of cylinder, right circular cylinder.

Weeks 13 and 14: Equation of envelope of cylinder, Problems on cylinder.

Week 15: Discussion about learning outcomes of the course.

Multidisciplinary: Geometry (Practical)

Hours: 4 /week

Credits: 2

Number of Practicals: 08

List of Practicals: 08

1. Problems on Cartesian equation and General equation of a sphere.
2. Equation of a sphere with diametrically opposite end points, Equation of a sphere through a given circle, Intersection of a sphere with Line.
3. Problems on Intersection of a sphere with plane, Intersection of a sphere with sphere.
4. Problems on Equation of a tangent and normal plane to a sphere, Orthogonal spheres.
5. The mutual relations among Cartesian, Cylindrical and Spherical coordinate system in \mathbb{R}^3 and transformation equation from one system to another system.
6. Problems on equation of a cone with conic as guiding curve and enveloping cone of a sphere.
7. Problems on cone.
8. Problems on Cylinder.

Reference Books:

1. Analytical solid geometry - Shanti Narayan, S.Chand & Company
2. Co-ordinate Geometry By : R.J.T. Bell
3. Solid Geometry(three dimension) - H. K. Das, S. C. Saxena and Raisinghania, S. Chand.
4. Coordinate Geometry of Two and Three Dimension, P. Balasubramanyam, et. al. , Tata Mc Graw Hill Publ. Co., 1994.

Shri Govind Guru University

GODHRA

Syllabus of

B. Sc. Semester - II

PHYSICS

(Theory&Practical)

BS23MD2PH1

(Based on NEP-2020)

Effective from December, 2023

BS23MD2PH1

MULTIDISCIPLINARY COURSE (Theory): Digital Electronics (Credit-2)

UNIT – 1: Logic Circuits and Circuit Analysis

1. Logic Circuits

- 1.1 Binary Number System
- 1.5 Boolean Algebra
- 1.6 NOR Gates
- 1.7 NAND Gates

2. Circuit Analysis

- 2.1 Boolean Laws and theorem
- 2.2 Sum of Products method
- 2.3 Truth Table to Karnaugh Map
- 2.4 Pairs, Quads and Octets
- 2.5 Karnaugh simplification
- 2.6 Don't care conditions
- 2.7 Product of sums method
- 2.8 Product of sums simplification

UNIT – 2: Number Systems and Codes

- 4.2 Binary to Decimal Conversion
- 4.3 Decimal to Binary Conversion
- 4.4 Octal Numbers
- 4.5 Hexadecimal Numbers
- 4.6 The ASCII code
- 4.7 The Excess-3 code
- 4.8 The Gray code

- **Text Book:** Digital Principles and Applications by Albert Paul Malvino, Donald P. Leach. (4th Edition, McGRAW-HILL)

B. Sc. - Semester – II

MULTIDISCIPLINARY COURSE (Practical): Digital Electronics (Credit-2)

1. Logic Gates (AND, OR, NOT)

To verify the truth tables and understanding of voltage for “0” and “1” level.

2. Universal Logic Gates (NAND, NOR)

To verify the truth tables and understanding of voltage for “0” and “1” level.

3. De Morgan’s Theorem

To verify the De Morgan’s theorem.

4. (i) Gray Code to Binary and Decimal conversion (ii) ASCII Code

To convert given Gray code into Binary Code and Decimal system.

To write ASCII code for given words and sentences and vice-versa.

5. Decimal to Octal and Hexadecimal conversion

To convert Decimal number into Octal and Hexadecimal number system and vice-versa.

6. Absorption coefficient of liquid using photocell

To find out the absorption coefficient of liquid using photocell.

7. Use of Multimeter for measurement

To measure resistance R, AC & DC Voltage, Current, Checking electrical fuse other electronic devices

SHRI GOVIND GURU UNIVERSITY, GODHARA

B.SC.ZOOLOGY SEM-II

MULTI DISCIPLINARY COURSE (THEORY)

BS23MD2ZO1

FUNDAMENTALS OF ZOOLOGY-II

(Credit 02)

UNIT: I Cytology- II

- Ultra structure of Plasma membrane (different models), Golgi body, Lysosome, Centriole/Basal bodies, Cilia/Flagella, and Cytoskeleton.

UNIT:2 Genetics-II

- Structure and types of Chromosome based on position of centromere
- Epistasis: Supplementary (recessive) genes – coat color in mice (9:3:4),
Complementary (double recessive) genes – flower color in *Odoratus lathyrus* (Pea plants) (9:7)
- Sex linked Inheritance: X-linked- color blindness and Eye color in *Drosophila*,
Y-linked Holandric genes (Baldness in men)

REFERENCES:

1. A Cell Biology and Molecular Biology, N. Arumugan, Saras Publications.
2. Cytology P.K.Gupta., S Chand & Co. Delhi.
3. Fundamentals of Genetics B.D.singh., Medtech Science Press.
4. Genetics, P.S. Verma & V.K. Agarwal, S.Chand& Co. Delhi

SHRI GOVIND GURU UNIVERSITY, GODHARA

B.SC.ZOOLOGY SEM-I

MULTI DISCIPLINARY COURSE (PRACTICAL)

FUNDAMENTALS OF ZOOLOGY

(Credit 02)

1. Study of Cytology

- 1) Plasma membrane
- 2) Golgi body
- 3) Lysosomes
- 4) Centriole/Basal bodies
- 5) Cilia/Flagella
- 6) Cytoskeleton

2. Study of Molecular Biology and Genetics

- 1) Structure of chromosome
- 2) Recessive Epistasis (9:3:4)
- 3) Double recessive Epistasis (9:7)

3. Study of Sex Linked inheritance

- 1) X-linked- color blindness
- 2) Y-linked- Holandric genes

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Syllabus on the bases of New Education Policy(NEP)

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For

B.Sc. Semester -II

Major Course-1-(BOTANY)

BS23MJ2BO1

Paper–I: Bryophytes, Pteridophytes, Cell Biology and Biomolecules

IN FORCE FROM JUNE 2023

SHRIGOVINDGURUUNIVERSITY

Syllabus on the bases of New Education Policy(NEP)

B.Sc. Semester – II BS23MJ2BO1

Major Course-1 -BOTANY

Paper–I: Bryophytes, Pteridophytes ,CellBiology and Biomolecules

UNIT:1. BRYOPHYTES

- Introduction & General Characteristics
- Classification according to Rothmaler and Proskauer
- Systematic Position; Adaptation to land habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the
 - *Riccia*
- Systematic Position; Adaptation to land habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the
 - *Funaria*
- Systematic Position; Adaptation to land habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the
 - *Marchantia*
- Ecological aspects of Bryophytes
- Economic importance of Bryophytes

UNIT:2.PTERIDOPHYTES

- Introduction & General Characteristics
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of the *Nephrolepis*
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of the *Selaginella*
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of the *Equisetum*
- Ecological aspects of Pteridophytes
- Economic importance of Pteridophytes
- Heterospory and seed habit

UNIT:3. CELLBIOLOGY

- Ultra-structure of plantcell
- Structure & functions of following cellorganelles;
 - Cell wall, Endoplasmic reticulum,
 - Ribosome, Chloroplast, Mitochondria,
 - Nucleus, Lysosome, Dictyosome.
- Celcycle and celldivision- Mitosis &Meiosis, itssignificance.
- Chromosome: Morphology and Structure
 - Structureof Polyteneand Lampbrush chromosome.

UNIT:4.BIOMOLECULES

- Carbohydrates:
 - Definition, classification and significance.
 - Structure and functions of Monosaccharides(trioses, pentoses and hexoses).Structure and functions of Disaccharides (maltose and sucrose).
 - Structure and functions of Polysaccharides(cellulose).
- Lipids:
 - Definition, classification and significance
 - Structure and functions of Fattyacids: Saturated and unsaturated
 - Essential fattyacids
 - Simple and Conjugated Lipids: Structure and functions of Triglycerides and waxes. Conjugated lipids with examples.
- Structure of Nucleic acids-DNA(Watson & Crick)&Types of structures of RNA (mRNA, rRNA, tRNA), DNA replication.

Suggested Readings

1. Smith, G.M. 1972. *Cryptogamic Botany* Vol. 1 & 2. Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. College Botany Vol. I & II Das, Datta, Gangulee and Kar, New Central Book Agency.
3. Algae, Fungi, Bryophytes, Pteridophytes by Vasishta., S. Chand Pub., New Delhi.
4. Parihar, N.S. (1991). An introduction to Embryophyta: Vol. I. Bryophyta. Central Book Depot. Allahabad.
5. Vashista, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S. Chand. Delhi, India.
6. Bendre Ashok and Kumar Ashok. A Textbook of Practical Botany vol. I & II. Rastogi Publication Meerut.
7. Nelson, D.L. and Michael, M. Cox, 2008, Lehninger Principles of Biochemistry, 5th Edition, WH Freeman and Company, New York, NY.
8. Campbell, M.K. (2012). Biochemistry, 7th ed., Published by Cengage Learning.
9. Tymoczko, J.L., Berg, J.M. and Stryer, L. (2012). Biochemistry: A short course, 2nd ed., W.H. Freeman.
10. Karp, G. (2010). Cell Biology, John Wiley & Sons, U.S.A. 6th edition.

SHRIGOVINDGURU UNIVERSITY

Syllabus on the bases of New Education Policy(NEP)

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For

B.Sc. Semester -II

BS23MJ2BO2

Major Course-2 (BOTANY)

**Paper – II: Practical (Bryophytes, Pteridophytes, Cell Biology and
Biomolecules)**

IN FORCE FROM JUNE 2023

SHRIGOVINDGURUUNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

B.Sc. Semester - II BS23MJ2BO1

Major Course-BOTANY

Paper –II(Practical)

(Based on Paper–I: Bryophytes, Pteridophytes, Cell Biology and Biomolecules)

1. *Riccia*: Specimen: Thallus with sporophyte; P.S.: Thallus V.T.S., Thallus with Antheridia and Archegonia
2. *Funaria*: Morphology of thallus; Mounting of Antheridia and Archegonia, Peristome; P.S: Antheridial and Archegonial branch, L.S. Capsule, Protonema
3. *Marchantia*: Specimen of Thallus, Reproductive organs.
Permanent slides or charts of V.S. of thallus, Reproductive organs.
4. *Nephrolepis*: Morphology; Mounting: Ramenta, Hydathode, Sporangia; P.S.: Prothallus with Antheridia and Archegonia; V.S. leaflet passing through sorus
5. *Selaginella*–Morphology; Mounting: whole mount of strobilus; P.S.: L.S. Strobilus
6. *Equisetum*: Morphology; Mounting: L.S. of strobilus, Permanent Slides: T.S. of rhizome; L.S. of strobilus
7. To study cell division stages-Mitosis-in Onion root tip by squash method.
8. Study of different stages of Meiosis (Chart/Permanent Slides).
9. Study of Cell organelles through Model/Charts–Cell wall, Endoplasmic reticulum, Ribosome, Nucleus, Lysosome, Dictyosome.
10. Histochemical localization of Starch, Lignin, Fat and Glucose from plant material.
11. Histochemical localization of RNA in plant tissue.
12. Study of DNA (Watson & Crick), DNA replication through model/charts.
13. Study of RNA and Types RNA (mRNA, rRNA, tRNA) through model/charts.
14. Study of Giant chromosome through Charts: Polytene and Lamp brush chromosome.
15. Project/Submission

B. Sc. Semester –II
Theory (Major-1)
BS23MJ2CH1

Objectives:

- To develop basic and advance concepts regarding thermodynamics.
- To derive and understand the expressions for determining rate of reactions and kinetics for various types of chemical reactions.
- To study the concept of ionization in aqueous solution, pH, buffers and various applications of ionization.
- To acquaint the students with functional groups such as –alcohols, phenols, aldehydes and ketones including their reactions and preparations.
- To introduce polynuclear hydrocarbons, their reactions and synthesis.
- To study various effects which are characteristic to organic compounds owing to their structures.

Learning outcomes:

On completion of the course, the student will be able to:

- Understand and apply laws of thermodynamics to analyze and solve problems related to entropy during different changes and processes.
- Define various terms of chemical kinetics and solve problems involving rate equations and half-life determination for different order reactions and understand and predict kinetics of various reactions.
- Explain the concept of electrolytes, ionization of electrolytes, various types of conductance, with emphasis on weak acid and base and hydrolysis of salt, indicators used in different acid-base titration.
- Classify organic compounds into alcohols, phenol, aldehydes and ketones and explain their synthesis methods and perform specific tests for their identification. Analyze and predict reactions involving alcohols, phenols, aldehydes and ketones.
- Understand the concepts of polynuclear hydrocarbons, their synthesis and reactions
- Interpret the impact of various factors on molecular structures and reactivity. Analyze and predict the behavior of molecules based on structural effects.

Unit: I (A) Thermodynamics :

Zeroth law, first law, Limitations of first law and need for the second law, Second law of thermodynamics; proof of 2nd law (Carnot's Cycle); Entropy of Gas and calculation of entropy for different processes; Entropy change during phase change, entropy of mixing of ideal gases, entropy change in reversible and irreversible process, Kirchhoff's equation.

(B) Chemical Kinetics :

Basic terms: molecularity, order of reactions. Unit for rate constant, Derivation of: first order rate constant, Second order rate constant for (a=b) and (a ≠ b), Third order rate equation (a=b=c), Determination of Half Life Time for 1st, 2nd and 3rd order reactions, Kinetics of opposing and consecutive reaction.

Unit: II Ionic equilibrium

Definition of basic terms: Strong & Weak electrolytes, Electrical conductance, Specific conductance, Equivalent conductance, Molar conductance, Cell constant and its determination, Incomplete dissociation, Degree of dissociation, Oswald's dilution law and its limitations, Kohlraush law and its application, Self ionization of water and Ionic product of water K_w , pH Scale, Hydrolysis of different salts (strong acid and weak base, strong base and weak acid, weak acid and weak base) including relation between K_a , K_b , K_h , h , K_w and their pH equation, Buffer Solutions, Henderson – Hasselbalch equation, Indicator theory, Useful pH range of indicator for acid and base titration.

Unit: III (A) Alcohols, Phenols (Up to 6 Carbons):

Alcohol : Preparation of 1°, 2°, 3° alcohols using Grignard reagent, Ester hydrolysis, reduction of aldehydes, ketones, carboxylic acids and esters. Reaction with Na, HX (Lucas test), esterification, oxidation (PCC, alk. $KMnO_4$, Acidic dichromate, $Con.HNO_3$) (Up to 6 Carbons)

Phenols : Preparation of phenol by Dow, Cumene and diazotization process. Reaction of Phenol : Electrophilic substitution (Nitration, Halogenation) Reimer-Tiemann Reaction, Gattermann –Koch Reaction, Schotten-Baumann Reaction.

(B) Aldehydes, Ketones :

(Formaldehyde, Acetaldehyde, Benzaldehyde, Acetone, Acetophenone)

Preparation: From Alcohol, Acid Chloride, Nitriles (Grignard reagent)

Reaction : With HCN, ROH, $NaHSO_3$, NH_2-NH_2 , $NH_2-NH-Ph$, Iodoform test, Aldol Condensation, Cannizzaro reaction, Clemmensen reduction and Wolff-kishner reduction.

Unit: IV (A) Polynuclear Hydrocarbon:

Nomenclature, structure and synthesis of Naphthalene and substituted Naphthalene (Only Howarth synthesis), Reactions (oxidation reduction and electrophilic substitution reaction (ESR) of naphthalene. Howarth synthesis of Anthracene and Phenanthrene.

(B) Chemical Reactivity and Molecular Structure:

Acid-Base, Scale of acidity-basicity, Resonance effect, drawing of structure and the condition for resonance, Effect of change of hybridization on acidity and basicity, Inductive and electronic effects, steric effect and hydrogen bonding,

REFERENCE BOOKS

1. 'Elements of Physical Chemistry' by Peter Atkins & Julio De Paula, 5/E, Oxford University Press, Indian Edition.
2. 'Physical Chemistry' by P. W. Atkins, 7/E, 2002, Oxford University Press, Indian Edition.
3. 'Physical Chemistry' by W. J. Moore, MacGraw Hill Publication, 1996, 6/E. 17. 'Principle of Physical Chemistry' by Puri, Sharma & Pathania, 41/E, Vishal Publishers.
4. 'Advanced Physical Chemistry' by Gurdeep Raj, 19/E, Goel Publishing House Meerut.
5. 'Essentials of Physical Chemistry' by Bahl & Tuli. 22/E, S. Chand publication New Delhi.
6. 'Advanced Physical Chemistry' by Gurdeep Raj, 19/E, Goel Publishing House, Meerut.
7. 'Organic Chemistry' by G. Marc Loudon, 4/E, 2010, Oxford University Press, Indian Edition.
8. 'Organic Chemistry' by Robert Thornot Morrison, Robert Neilson Boyd, 6/E, 1992, Prentice Hall of India Pvt Ltd, New Delhi.
9. 'Text book of Organic Chemistry' by P. L. Soni and H. M. Chawla, 26/E, 1995, Sultan Chand & Sons Publication, New Delhi.
10. 'Text book of Organic Chemistry' by P. S. Kalsi, 1999, MacMillan of India Pvt. Ltd.
11. 'Organic Chemistry' by Bhupinder Mehta, Manju Mehta, Prentice Hall of India Pvt. Ltd, New Delhi.
12. 'Essentials of Physical Chemistry' by Bahl & Tuli. 22/E, S. Chand publication, New Delhi.

B. Sc. Semester –II
Practical (Major-2)
BS23MJ2CH2

Objectives:

- To discuss principles of redox and iodimetry-iodometry titrations in detail.
- To teach preparation of solutions of different Molarity/Normality.
- To impart practical training of titration.
- To impart practical knowledge of qualitative analysis of organic compounds having monofunctional group.
- To identify various functional groups and unknown organic compounds.

Learning outcomes:

On completion of the course, the student will be able to:

- Prepare solution of different Molarity/Normality.
- Explain various methods for titration.
- Estimate amounts of titrate given in unknown concentration by titration methods.
- Determine the functional group present in the given organic compound.
- Identify the organic compound based on its qualitative properties.

(A) Volumetric Analysis:-

Redox Titrations:-

Preparation of standard solution of KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$

- (1) $\text{KMnO}_4 \rightarrow \text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ (2) $\text{KMnO}_4 \rightarrow \text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
(3) $\text{K}_2\text{Cr}_2\text{O}_7 \rightarrow \text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ (4) $\text{K}_2\text{Cr}_2\text{O}_7 \rightarrow \text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$

Iodimetry - Iodometry:

Preparation of standard solution of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

- (1) $\text{I}_2 \rightarrow \text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$
(2) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \rightarrow \text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

(B) Organic Spotting :- (08 Solids and 05 Liquids).

List of organic compounds having different only mono functional groups:

Solids:

Acids: (1) Benzoic acid (2) Oxalic acid (3) Cinnamic Acid

Phenols: (1) β -Naphthol (2) α -Naphthol (3) Resorcinol

Neutral: (1) Urea (2) Thiourea (3) Benzamide (4) Naphthalene (5)
Acetanilide

Liquids: (1) Aniline (2) Nitrobenzene (3) Benzaldehyde (4) Ethanol
(5) Ethyl acetate (6) Chloroform (7) Chloro benzene (8) Acetone

REFERENCE BOOKS

1. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language Book Society) Longman. 5th Ed.
2. 'Analytical Chemistry' by Dhruba Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
3. 'Analytical Chemistry' by Gary D. Christian, 4th Ed., John Wiley & Sons.
4. 'Comprehensive Practical Organic Chemistry – Qualitative Analysis' by V. K. Ahluwalia, Sunita Dhingra University Press (India) Private Limited, Hyderabad, First Indian Reprint 2010.
5. 'Organic Analytical Chemistry theory and Practice' by Mohan Jag, Narosa Publication, New Delhi. (2003).
6. 'Elementary Practical Organic Chemistry Part-2, Qualitative Organic Analysis' by Arthur I. Vogel- CBS Publishers & Distributers, New Delhi. (2nd Ed., reprint 2004)
7. 'Advanced practical Organic Chemistry' by J. Leonard, B. Lygo, G. Procter, Publication-Stanley Thornes (Publishers) Ltd. (First Indian reprint, 2004).

Bachelor of Sciences : Microbiology

Course Learning Outcomes & Contents of the Courses

Semester Two BS23MJ2MB1

Major 1 : Procaryote cell structure, growth and control

Credit 4

Objectives of Course learning

Objectives: The students will know the cytology of procaryotes, understand the requirement of the microbes to grow, and nutritional types. They will be able to study some of the physiology of microorganisms

Course learning outcomes: At the completion of this course, the students are able to -

Outcome 1. Describe characteristics of bacterial cells, cell organelles, cell wall composition and various appendages like capsules, flagella or pili.

Outcome 2. Differentiate a large number of common bacteria by their salient characteristics; classify bacteria into groups.

Outcome 3. Describe the nutritional requirements of bacteria for growth; developed knowledge and understanding that besides common bacteria there are several other microbes which grow under extreme environments.

Outcome 4. Describing the growth characteristics of the microorganisms capable of growing under unusual environmental condition of temperature, oxygen, and solute and water activity.

Outcome 5. Describing the growth characteristics of the microorganisms which require different nutrient for growth and the associated mechanisms of energy generation for their survival like autotrophs, heterotrophs, chemolithoautotrophs etc.

Outcome 6. Perform basic laboratory experiments to study microorganisms; methods to preserve bacteria in the laboratory; calculate generation time of growing bacteria.

Unit – 1:

15 Lectures

Procaryotic Cell Structure And Function

1. An Overview Of Procaryotic Cell Structure , Shapes, Size Arrangement And Its Diversity
2. Procaryotic Cell Surface Layers
 - a) Plasma Membranes
 - b) Bacterial Cell Wall: Gram Positive ,Gram Negative Bacteria, Archaea
 - c) Capsules, Glycocalyx, S Layer Slime Layer
3. The Cytoplasmic Matrix, The Nucleoid, Plasmids, Cytoplasmic Inclusions Structures: Organic And Inorganic Inclusions
4. Components External To The Cell Surface Layers: Flagella: Ultrastructure, Arrangement, Types Of Motility, Mechanism Of Motility., Pili, Fimbrie, Prosthica, Stalk
5. Bacterial Spores: Endospore: Arrangement, Ultrastructure, Sporogenesis, Germination And Exospores



Unit – 2:

15 Lectures

Microbial Nutrition And Growth

1. Requirement Of Bioelements, Growth Factors
2. Nutritional Types Of Microbes
3. Modes Of Nutritional Uptake: Passive, Active, Group Translocation
4. Types Of Cultural Media
5. Modes Of Microbial Reproduction
6. Growth Curves- Normal, Diauxic, Continuous, Synchronous
7. The Mathematics Of Growth, Growth Rate , Generation Time
8. Effect Of Environment Factors On Microbial Growth : Solutes, Water Activity, Temperature, pH, Osmotic Pressure, Gases

Unit – 3:

15 Lectures

Control Of Microbes: Physical Methods

- a) Principles Of Controlling Microbial Population
- b) Conditions Influencing The Effectiveness Of Antimicrobial Agents
- c) Physical Methods Of Microbial Control:
 1. Heat And Temperature
 2. Radiation
 3. Ultrasonication
 4. Filtration
 5. Osmotic Pressure, Surface Tension, Water Activity

Unit – 4:

15 Lectures

Control Of Microbes: Chemical Methods

1. Criteria Of Ideal Chemical Agent to Control Microbes
2. Groups of antimicrobial chemical agents
 - a) Phenol
 - b) Alcohols
 - c) Halogens
 - d) Heavy Metals
 - e) Acids And Alkali
 - f) Quaternary Ammonium Compounds
 - g) Gaseous Agents
 - h) Aldehydes.
 - i) Dyes
3. Study of efficiency of antimicrobial agents: Agar Diffusion Methods , Determination Of Phenol Coefficient Of Disinfectant

Reference Books

1. Tortora, G.J., Funke, B.R. and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004).
2. Alcom, I.E. Fundamentals of Microbiology. VI Edition, Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).
3. Black J.G. Microbiology-Principles and Explorations. John Wiley & Sons Inc. New York, (2002).
4. Pelczar, MJ Chan ECS and Krieg NR, Microbiology McGraw-Hill.
5. Willey, Sherwood, Woolverton. Prescott, Harley, and Klein's Microbiology McGraw-Hill publication
6. Tortora, Funke, Case. Microbiology. Pearson Benjamin Cummings.



7. Jacquelyn G. Black. Microbiology Principles and explorations. John Wiley & Sons, INC.
8. Madigan, Martinko, Bender, Buckley, Stahl. Brock Biology of Microorganisms. Pearson
9. Tom Besty, D.C Jim Koegh. Microbiology Demystified McGRAW-HILL.
10. Prescott, M.J., Harley, J.P. and Klein, D.A. Microbiology. 5th Edition WCB Mc Graw Hill, New York, (2002).
11. Online platforms:
 - 1) <https://www.mooc-list.com/tags/immunology>
 - 2) <https://www.mooc-list.com/tags/blood>
 - 3) <https://www.mooc-list.com/tags/vaccines>
 - 4) <https://www.pasteur.fr/en/e-learning-mooc>
 - 5) <https://onlinecourses.swayam2.ac.in>

semester two major microbiology NEP 01012024



Semester Two MAJOR 2 Practical

BS23MJ2MB2

Bachelor of Sciences : Microbiology

Course Learning Outcomes & Contents of the Courses

Credit 4

Objective 1: Learn to perform basic laboratory experiments to study the staining techniques to study the anatomy of microorganisms

Objective 2: Train to isolate and cultivated major groups of microorganisms by using various techniques

Objective 3: Become aware of methods to preserve bacteria in the laboratory; calculate generation time of growing bacteria.

Outcome 1: Perform basic laboratory experiments to study the staining techniques to study the anatomy of microorganisms

Outcome 2: Will be trained to isolate and cultivated major groups of microorganisms by using various techniques

Outcome 3: Will become aware of methods to preserve bacteria in the laboratory; calculate generation time of growing bacteria.

Major 2 : Special staining and culture techniques

1. Bacterial Cell Wall Staining
2. Bacterial Capsule Staining
3. Bacterial Endospore Staining
4. Bacterial Granule Staining
5. Wet Mount: Hanging Drop Technique to study motility of bacteria
6. Preparation Of Nutrient Agar, Nutrient Broth, Mac Conkey Agar, EMB Agar
7. Isolation of pure culture of fungi By Spread Plate Method
8. Isolation of pure culture of yeast On GYE Agar Plate from curd sample
9. Isolation of pure culture of bacteria On Nutrient Agar Plate by Four Flame Method
10. Isolation Of Bacteria by Pour Plate Method
11. Study of Effect of Chemical On Microbial Growth-Bacteria By Cup Borer Method
12. Study of Effect of Temperature On Bacterial Growth
13. Study of Oligodynamic Effect
14. Preservation of bacterial cultures on slant and broth.

Reference Books

1. Prescott, M.J.,Harley,J.P.andKlein,D.A.Microbiology. 5th Edition WCB Mc GrawHill, New York, (2002).
2. Tortora, G.J., Funke ,B.R. and Case, C.L. Microbiology : An Introduction. Pearson Education, Singapore, (2004).
3. Alcom, I.E. Fundamentals of Microbiology. VI Edition, Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).
4. Black J.G. Microbiology-Principles and Explorations. John Wiley & Sons Inc. New York, (2002).
5. Tom Besty, D.C Jim Koegh. Microbiology Demystified McGRAW-HILL.



6. Online platforms:

- 1) <https://www.mooc-list.com/tags/immunology>
- 2) <https://www.mooc-list.com/tags/blood>
- 3) <https://www.mooc-list.com/tags/vaccines>
- 4) <https://www.pasteur.fr/en/e-learning-mooc>
- 5) <https://onlinecourses.swayam2.ac.in>

semester two major microbiology NEP 01012024

SHRI GOVIND GURU UNIVERSITY
Syllabus for B. Sc. Semester II (Mathematics)
BS23MJ2MT1 Major-1: Analysis-I (Theory)
Major-1: Analysis-I (Theory)

Hours: 4 /week

Credits: 4

Prerequisite: Basic set theory, basic properties of real numbers, knowledge of trigonometry, knowledge of functions.

Course Objectives: The specific objectives of this course are to enrich the students with a deep and nuanced understanding of the fundamental principles and techniques in the study of real numbers, calculus, and complex numbers. More precisely, students are expected to develop a rigorous understanding of the properties of real numbers; explore the convergence and divergence of sequences and series; develop proficiency in constructing and understanding mathematical proofs; Provide a solid foundation for more advanced courses in mathematics, such as complex analysis; Enhance written and oral communication skills in presenting mathematical ideas and proofs.

Course Learning Outcomes: The learning outcomes capture the comprehensive knowledge and skills that students are expected to acquire after completing this course. Upon completing the course, students should be able to:

1. Demonstrate a thorough understanding of the properties of real numbers.
2. Analyze the convergence and divergence of sequences and series.
3. Demonstrate critical thinking and abstract reasoning skills in analyzing and solving mathematical problems.
4. Communicate mathematical ideas and proofs effectively, both in writing and orally.
5. Foster independence in learning and problem-solving, encouraging exploration of additional topics, build a foundation for more advanced mathematics courses, such as complex analysis or functional analysis.

Syllabus:

Unit I: Real Numbers

Algebraic properties of real numbers, Order structure of real numbers, Intervals, Bounded and unbounded Sets, Supremum and infimum, Non-Completeness of \mathbb{Q} , Archimedean property of real numbers.

(2.1 to 4.2 of Chapter-1 of [1])

Unit II: Real Sequences

Sequences, Bounded and unbounded Sequences, Limit point of a sequence, Convergent sequences, Convergence of monotonic real sequences, Cauchy sequences, Cauchy criterion for convergence of real sequences, Algebra of convergent sequences.

Unit III: Infinite Series of Real Numbers

Convergence and divergence of an infinite series, Necessary condition for convergence, Cauchy criterion for convergence of series, Tests for convergence of positive term series, Applications of the integral test, Comparison tests, D'Alembert's ratio test, Cauchy's root test, Alternating series, Leibniz alternating series test, Absolute and conditional convergence.

Unit IV: Introduction to Complex Number

Algebraic properties of complex numbers, Complex conjugate, Exponential form, Products and powers in complex Form, Arguments of products and quotients, Roots of complex numbers, Regions in complex plane.

(1.2 to 1.10 of [4])

Reference Books:

1. Mathematical Analysis (5th Edition) - S. C. Malik, Savita Arora, New age international publishers
2. Elements of Real Analysis - Charles G. Denlinger, Jones nad Bartlett publishers.
3. Introduction to Real Analysis - Robert G. Bartle and Donald R. Sherbert, Wiley Student Edition
4. Complex variables and applications (8th Edition) - R. V. Churchill, J. W. Brown, McGraw-Hill Higher Education.

Teaching Plan: The teaching plan may be followed as:

Weeks 1 and 2: Algebraic properties of real numbers, Order structure of real numbers, Intervals

Weeks 3 and 4: Bounded and unbounded Sets, Supremum and infimum, Non-Completeness of \mathbb{Q} , Archimedean property of real numbers.

Weeks 5, 6 and 7: Sequences, Bounded and unbounded Sequences, Limit point of a sequence, Convergent sequences, Convergence of monotonic real sequences.

Weeks 8 and 9: Cauchy sequences, Cauchy criterion for convergence of real sequences, Algebra of convergent sequences.

Weeks 10, 11 and 12: Convergence and divergence of an infinite series, Necessary condition for convergence, Cauchy criterion for convergence of series, Tests for convergence of positive term series.

Weeks 13 and 14: Applications of the integral test, Comparison tests, D'Alembert's ratio test, Cauchy's root test, Alternating series, Leibniz alternating series test, Absolute and conditional convergence.

Week 15: Discussion about learning outcomes of the course.

SHRI GOVIND GURU UNIVERSITY
Syllabus for B. Sc. Semester II (Mathematics)
BS23MJ2MT2 Major-2: Analysis-I (Practical)
Major-2: Analysis-I (Practical)

Hours: 8 /week

Credits: 4

Number of Practicals: 16

List of Practicals:

1. Problems on difference of properties of \mathbb{N} , \mathbb{Z} , \mathbb{Q} and \mathbb{R} .
2. Problems on intervals and boundedness of subsets of \mathbb{R} .
3. Problems on Supremum and Infimum.
4. Problems on absolute value of real numbers.
5. Examples on Limit point of a sequence.
6. Examples on Convergence of Sequences.
7. Examples on Cauchy Sequences and Cauchy Criterion for Convergence of Real Sequences.
8. Problems on monotonic sequences.
9. Examples on Comparison tests.
10. Examples on D'Alembert's ratio test.
11. Examples on Cauchy's root test.
12. Problems on Leibniz alternating series test.
13. Problems on Algebraic Properties of Complex Numbers, Complex Conjugate.
14. Problems on Exponential Form, Products and Powers in Complex Form.
15. Problems on Roots of Complex Numbers.
16. Problems on Arguments of Products and Quotients and Regions in complex plane.

Reference Books:

1. Mathematical Analysis (5th Edition) - S. C. Malik, Savita Arora, New age international publishers
2. Elements of Real Analysis - Charles G. Denlinger, Jones nad Bartlett publishers.
3. Introduction to Real Analysis - Robert G. Bartle and Donald R. Sherbert, Wiley Student Edition
4. Complex variables and applications (8th Edition) - R. V. Churchill, J. W. Brown, McGraw-Hill Higher Education.

Shri Govind Guru University

GODHRA

Syllabus of

B. Sc. Semester - II

PHYSICS

(Theory)

BS23MJ2PH1

(Based on NEP-2020)

Effective from December, 2023

B.Sc. – Semester - II (PHYSICS)

BS23MJ2PH1

Major-1: PHYSICS

(Credit -4)

UNIT -1: Introduction to LASER

- 22.4 Interaction of light with matter Absorption
 - 22.4.1 Absorption
 - 22.4.2 Spontaneous emission
 - 22.4.3 Stimulated emission
- 22.7 Meeting the three requirements
 - 22.7.1 Population inversion
 - 22.7.2 Metastable states
 - 22.7.3 Confining radiation within the medium
- 22.8 Components of LASER
 - 22.8.1 Active medium
 - 22.8.2 Pumping
 - 22.8.3 Optical resonant cavity
- 22.9 Lasing Action
- 22.10 Principal pumping schemes
 - 22.10.1 Three-level pumping scheme
 - 22.10.2 Four-level pumping scheme
- 22.14 Types of LASERS
 - 22.14.1 Ruby Laser
 - 22.14.3 Helium-Neon Laser
 - 22.14.4 Carbon Dioxide Laser
- 22.15 Semiconductor Laser
 - 22.15.1 PN-Junction Laser
- 22.16 LASER beam characteristics
- 22.19 Applications

➤ **Text Book: A text book of Optics** by Dr. N. Subrahmanyam, Brijlal and Dr. M. N. Avadhanulu (S. Chand & Company Ltd. Publication)

❖ **Reference Books:**

1. Fiber optics and optoelectronics by R. P. Khare, Oxford university press
2. An introduction to LASERS – Theory and Applications by M. N. Avadhanulu, S. Chand & Company Ltd.
3. Optics – Third Edition by Ajay Ghatak

UNIT-2: Plasma Physics

- 1.1 Introduction
- 1.2 Composition and characteristics of plasma
- 1.3 Collision
- 1.4 Surface phenomena
- 1.5 Transport phenomena
- 1.6 Diffusion and Mobility- Ambipolar diffusion
- 1.7 Viscosity: Conductivity
- 1.8 Recombination
- 1.9 Ohm's Law
- 1.11 Comparison of various natural and manmade plasma
- 1.12 Plasma diagnostics

➤ **Text Book:** Elements of Plasma Physics By - S. N. Goswami
(Published by New Central Book Agency (p) Ltd. Culcutta, India)

UNIT-3: Nuclear Physics

1. Physical Tools for Doing Nuclear Physics

- 1.1 Introduction
- 1.2 Interaction between Particles and Matter- A Brief Survey
- 1.3 Detectors for Nuclear Particles
 - 1.3.1 Proportional Counter
 - 1.3.2 Scintillation Counter
 - 1.3.3 Spark Chamber

2. Radioactivity

- 2.1 Introduction
- 2.2 Properties of Radioactive Rays
- 2.3 The Law of Radioactive Decay
- 2.6 Radioactive Growth and Decay
- 2.9 Radioactive Series
- 2.11 Artificial Radioactivity
- 2.12 Determination of the age of the Earth
- 2.13 Carbon Dating- Archeological Time Scale

➤ **Text Book:** Nuclear Physics – An introduction By S.B. Patel (second edition, New Age International Limited)

❖ Reference Books:-

1. Nuclear Physics by Irving Kaplan, Narosa Publishing House
2. A Manual Of Radioactivity by Havest and F. A. Paneth, Oxford University Press
3. Experimental Nuclear Physics - Radioactive Decay by E. Segre, New York: Wiley
4. Atomic & Nuclear Physics by Chittaranjan Basu

B. Sc. - Semester – II

UNIT-4: AC Bridge and Digital Electronics

1. AC Bridge

- 5.5 Condition for bridge balance
- 5.6 Maxwell bridge
- 5.8 Schering bridge
- 5.9 Owen's bridge

2. Logic Circuits

- 1.1 Binary Number System
- 1.5 Boolean Algebra
- 1.6 NOR Gates
- 1.7 NAND Gates
- 2.1 Boolean Laws and Theorem

3. Number Systems and Codes

- 4.2 Binary to Decimal Conversion
- 4.3 Decimal to Binary Conversion
- 4.4 Octal Numbers
- 4.5 Hexadecimal Numbers
- 4.6 The ASCII code
- 4.7 The Excess-3 code
- 4.8 The Gray code

- **Text Book:** Modern Electronic Instrumentation and Measurement Techniques by Albert D. Helfrick, William D. Cooper
(Published by PHI Learning private Ltd., New Delhi)
- **Text Book:** Digital Principles and Applications by Albert Paul Malvino, Donald P. Leach. (4th Edition, McGRAW-HILL)

Shri Govind Guru University

GODHRA

Syllabus of
B. Sc. Semester - II
PHYSICS
(Practical)

BS23MJ2PH2

(Based on NEP-2020)

B. Sc. - Semester – II
BS23MJ2PH2

MAJOR-2: PHYSICS PRACTICAL (Credit-4)

- 1. Wavelength of LASER**
To determine the wavelength of given LASER light.
- 2. Radioactive Decay**
Simulation of Nuclear Radioactive Decay using calculator.
- 3. Logic Gates (AND, OR, NOT)**
To verify the truth tables and understanding of voltage for “0” and “1” level.
- 4. Universal Logic Gates (NAND, NOR)**
To verify the truth tables and understanding of voltage for “0” and “1” level.
- 5. Maxwell’s Bridge**
To find the value of inductance for unknown inductor using Maxwell’s bridge circuit.
- 6. Schering Bridge**
To find the value of capacitance for unknown capacitor using Schering bridge circuit.
- 7. Owen’s Bridge**
To find the value of inductance for unknown inductor using Owen’s bridge circuit.
- 8. De Morgan’s Theorem**
To verify the De Morgan’s theorem.
- 9. (i) Gray Code to Binary and Decimal conversion (ii) ASCII Code**
To convert given Gray code into Binary Code and Decimal system.
To write ASCII code for given words and sentences and vice-versa.
- 10. Decimal to Octal and Hexadecimal conversion**
To convert Decimal number into Octal and Hexadecimal number system and vice-versa.

Shri Govind Guru University, Godhra
B.Sc. Zoology Semester II

Theory Major Paper I

BS23MJ2ZO1

**Non-Chordates, Animal Diversity, Cytology and
Genetics**

(Credits 04)

Unit I: Non-chordates II and Animal Diversity

- A. Salient Features & classification up to class giving reasons starting, from Arthropoda to Hemichordata giving suitable examples (As per practical syllabus).
- B. *Plasmodium vivax*: Systematic position, Habits and Habitat
Life cycle: Asexual cycle, Sexual cycle and pathogenicity of Plasmodium.

Unit II: Animal diversity (Non chordate)

Type Study: Cockroach (*Periplaneta americana*) - systematic position, Habits and Habitat, External characters, Digestive system, Circulatory System, Excretory system, Reproductive system, Nervous system and sense organ (compound eyes).

Unit III: Cytology- II

Ultra structure of Plasma membrane (different models), Golgi body, Lysosome, Centriole/Basal bodies, Cilia/Flagella, and Cytoskeleton.

Unit IV: Genetics- II

- [A] Epistasis: Supplementary (recessive) genes – coat color in mice (9:3:4),
Complementary (double recessive) genes – Flower color in
Odoratus lathyrus (Pea plants) (9:7)
- [B] Sex linked Inheritance: X-linked- color blindness and Eye color in
Drosophila,
Y-linked Holandric genes (Baldness in men)
- [C] Molecular structure of DNA (Watson & Crick's Model)
Molecular structure and types of RNA
Electron Microscope (i) SEM (ii) TEM

REFERENCES:

1. A Manual of Zoology Vol. I & II, Ekambarnath Ayyar and Ananthakrishnan, Viswanthan Pvt. Ltd. Madras.
2. Biology of Animals, C. P. Hickman, L. S. Roberts, and A. Larson, McGrawHill Company, New York.
3. Biology of the Invertebrates, J. A. Pechenik, Tata-McGraw Hill Company, Ltd, New Delhi.
4. Integrated principals of Zoology, C. P. Hickman, L. S. Roberts, and A. Larson, McGraw Hill Company, New York.
5. Invertebrate Zoology Jordan, E. L. and Verma, P.S, S. Chand & Co. New Delhi.
6. Invertebrate Zoology Dhama, P.S. and Dhama, J.K., S Chand & Co. Delhi.
7. Invertebrate Zoology R.L. Kotpal Rastogi Publications, Meerut- New Delhi.
8. Biology of Animals, C. P. Hickman, L. S. Roberts, and A. Larson, McGrawHill Company, New York.
9. Cell Biology and Molecular Biology, N. Arumugan, Saras Publications.
10. Cytology P.K. Gupta., S Chand & Co. Delhi.
11. Fundamental of Light Microscopy & Electron Imaging. Murphy D.B., Wiley Liss.
12. Genetics, P.S. Verma & V.K. Agarwal, S.Chand & Co. Delhi.
13. Fundamentals of Genetics B.D. Singh., Medtech Science Press.

Shri Govind Guru University, Godhra

B.Sc. Zoology Semester II

Practical Major Paper II

BS23MJ2ZO2

(Practical A)

(Credits 04)

1. Classification of Non chordate animals up to class level giving reasons.

- 1) Arthropoda : Scorpion, Crab.
- 2) Mollusca : Chiton, Dentalium, Pila, Unio, Octopus.
- 3) Echinodermata : Star Fish, Brittle Star, Sea Cucumber, Feather Star.
- 4) Hemichordata: Balanoglossus.

2. Study of life cycle of *Plasmodium vivax* through chart and slides.

- 1) Asexual cycle
- 2) Sexual cycle
- 3) Signet ring stage.

3. Study of Cockroach.

- 1) External characters
- 2) Digestive system
- 3) Nervous system
- 4) Male reproductive system
- 5) Female reproductive system

Practical Major Paper II (Practical B)

1. Study of permanent mounting of Cockroach

- 1) T.S of Gizzard
- 2) Salivary glands
- 3) Cornea
- 4) Male gonapophyses
- 5) Female gonapophyses
- 6) Walking Leg

2. Study of Cytology

- 1) Plasma membrane
- 2) Golgi body
- 3) Lysosomes
- 4) Centriole/Basal bodies
- 5) Cilia/Flagella
- 6) Cytoskeleton

3. Study of Molecular Biology and Genetics

- 1) Structure of DNA (Watson and Crick's model)
- 2) Recessive Epistasis (9:3:4)
- 3) Double recessive Epistasis (9:7)

4. Study of Sex Linked inheritance

- 1) X-linked- Color blindness
- 2) Y-linked- Holandric genes

5. Study of Electron microscopes

- 1) SEM
- 2) TEM

SHRIGOVINDGURU UNIVERSITY

Syllabus on the bases of New Education Policy(NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester -II

**BS23MN2BO1
Minor Course(BOTANY)**

Bryophytes and Pteridophytes

INFORCEFROMJUNE2023

SHRIGOVINDGURUUNIVERSITY
Syllabus on the bases of New Education Policy(NEP)
B.Sc. Semester – II BS23MN2BO1
Minor Course-BOTANY
[Bryophytes and Pteridophytes]

UNIT:1. BRYOPHYTES

- Introduction
- General Characteristics
- Classification according to Rothmaler and Proskauer
- Systematic Position; Adaptation to and habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the
 - *Riccia*
- Systematic Position; Adaptation to and habit, Thallus (External & Internal) organization; Reproduction (excluding development) and life cycle of the
 - *Funaria*
- Ecological aspects of Bryophytes
- Economic importance of Bryophytes

UNIT:2.PTERIDOPHYTES

- Introduction
- General Characteristics
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of
 - *Nephrolepis*
- Systematic Position; Morphology, Anatomy and Reproduction (excluding development) and life cycle of
 - *Selaginella*
- Ecological aspects of Pteridophytes
- Economic importance of Pteridophytes
- Heterospory and seed habit

Suggested Readings

1. Smith, G.M. 1972. *Cryptogamic Botany* Vol. 1 & 2. Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. College Botany Vol. I & II Das, Datta, Gangulee and Kar, New Central book Agency.
3. Algae, Fungi, Bryophytes, Pteridophyte by Vasishta., S.Chand Pub., New Delhi.
4. Parihar, N.S. (1991). An introduction to Embryophyta: Vol. I. Bryophyta. Central Book Depot. Allahabad.
5. Vashista, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. S.Chand. Delhi, India.
6. Bendre Ashok and Kumar Ashok. A Textbook of Practical Botany vol. I & II. Rastogi Publication Meerut.

SHRIGOVINDGURUUNIVERSITY
Syllabus on the bases of New Education Policy (NEP)
B.Sc. Semester - II
Minor Course-BOTANY
Practical
[Based on Paper: Bryophytes and Pteridophytes]

1. *Riccia*:

Specimen: Thallus with sporophyte

P.S.: Thallus V.T.S., Thallus with Antheridia and Archegonia

2. *Funaria*:

Specimen: Morphology of thallus, Thallus with Sporophytes Mounting:

Antheridia, Archegonia, Peristome.

P.S.: Antheridial and Archegonial branch, L.S. Capsule, Protonema

3. *Nephrolepis*:

Specimen: Sporophytic Plant

Mounting: Ramenta, Hydathode, Sporangia

P.S.: Prothallus with Antheridia and Archegonia; V.S. leaflet passing through sorus

4. *Selaginella*:

Specimen: Morphology of Thallus

Mounting: whole mount of strobilus; P.S.:

L.S. Strobilus

5. Project/Submission

BS23MN2CH1
BSC Semester- 2 (Minor)
General Chemistry -2

Objectives:

- To analyze the strength of organic acids, emphasizing factors influencing pK values.
- To understand methods for preparing carboxylic acids and its derivatives.
- To compare nucleophilicity among acid derivatives and demonstrate interconversion between them.
- To define surface tension, its dimensions, and principles of measurement using stalagmometer.
- To explain the effects of surface tension and the working mechanisms of surface-active agents.
- To understand viscosity and the determination of viscosity coefficients.

Learning outcomes:

On completion of the course, the student will be able to:

- Demonstrate the ability to assess and compare the strength of organic acids based on pK values.
- Apply knowledge to prepare carboxylic acids using hydrolysis and Grignard reactions.
- Execute the synthesis of various acid derivatives from carboxylic acids.
- Illustrate interconversions among acid derivatives and evaluate their nucleophilicity.
- Explain and measure surface tension using stalagmometer and comprehend its effects.
- Understand the functions and mechanisms of surface-active agents.
- Determine viscosity coefficients using Ostwald viscometer and comprehend their significance.
- Discuss the qualitative impact of temperature on surface tension and viscosity coefficients in liquids.

Unit 1

Carboxylic Acids and Their Derivatives: Carboxylic acids (aliphatic and aromatic): strength of organic acids: comparative study with emphasis on factors affecting pK values; Preparation: acidic and alkaline hydrolysis of esters and from Grignard reagents. Preparation of acid chlorides, anhydrides, esters and amides from carboxylic acids; Reactions: Comparative study of nucleophilicity of acid derivatives; interconversion among acid derivatives.

Unit 2

Liquids: Definition of Surface tension, its dimension and principle of its determination using stalagmometer; some effects of surface tension, surface active agents and their working methodology, Viscosity of a liquid and principle of determination of coefficient of viscosity using Ostwald viscometer; Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).

References:

- (1) Parmar, V. S. A Text Book of Organic Chemistry, S. Chand & Sons.
- (2) Madan, R. L. Organic Chemistry, S. Chand & Sons.
- (3) Wade, L. G., Singh, M. S., Organic Chemistry.
- (4) Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
- (5) Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).

Chemistry Practical (Minor)
BSC sem-2
Volumetric Analysis:-

Objectives:

- To discuss principles of redox and iodimetry-iodometry titrations in detail.
- To teach preparation of solutions of different Molarity/Normality.
- To impart practical training of titration.

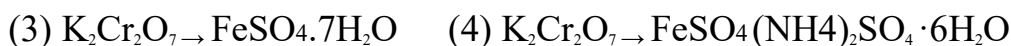
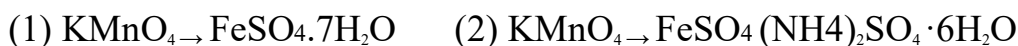
Learning outcomes:

On completion of the course, the student will be able to:

- Prepare solution of different Molarity/Normality.
- Explain various methods for titration.
- Estimate amounts of titrate given in unknown concentration by titration methods.

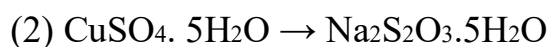
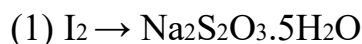
(A) Redox Titrations:-

Preparation of standard solution of KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$



(B) Iodimetry - Iodometry:

Preparation of standard solution of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$



REFERENCE BOOKS

1. 'Vogel's Textbook of Quantitative Chemical analysis' Revised by G. H. Jeffery, J. Bassett, J. Mendham & R. C. Denney, ELBS (English Language Book Society) Longman. 5th Ed.
2. 'Analytical Chemistry' by Dhruva Charan Dash, PHI Learning Private Ltd, New Delhi, 2011.
3. 'Analytical Chemistry' by Gary D. Christian, 4th Ed., John Wiley & Sons.
4. 'Comprehensive Practical Organic Chemistry – Qualitative Analysis' by V. K. Ahluwalia, Sunita Dhingra University Press (India) Private Limited, Hyderabad, First Indian Reprint 2010.

5. *'Organic Analytical Chemistry theory and Practice'* by Mohan Jag, Narosa Publication, New Delhi. (2003).
6. *'Elementary Practical Organic Chemistry Part-2, Qualitative Organic Analysis'* by Arthur I. Vogel- CBS Publishers & Distributers, New Delhi. (2nd Ed., reprint 2004)
7. *'Advanced practical Organic Chemistry'* by J. Leonard, B. Lygo, G. Procter, Publication-Stanley Thornes (Publishers) Ltd. (First India



B.Sc Semester Two [Minor] Microbiology (Credit 2)

Unit 1

10 lectures

- A. Growth, Requirement Of Bioelements, Growth Factors
- B. Nutritional Types Of Microbes
- C. Modes Of Nutritional Uptake: Passive, Active, Group Translocation
- D. Types Of Cultural Media
- E. Modes Of Microbial Reproduction
- F. Normal Growth Curves, generation time
- G. Batch and continuous cultivation
- H. Measurement of growth
- I. Preservation of cultures

Unit 2 A

10 lectures

Physical Methods Of Microbial Control:

- A. Principles Of Controlling Microbial Population
- B. Conditions Influencing The Effectiveness Of Antimicrobial Agents
- C. Physical Methods Of Microbial Control:
 1. Heat And Temperature
 2. Radiation
 3. Ultrasonication
 4. Filtration
 5. Osmotic Pressure, Surface Tension, Water Activity

Unit 2 B

Chemical Methods Of Microbial Control

1. Criteria Of Ideal Chemical Agent to Control Microbes
2. Groups of antimicrobial chemical agents
 - a) Phenol
 - b) Alcohols
 - c) Halogens
 - d) Heavy Metals
 - e) Gaseous Agents
 - f) Aldehydes.

LAB. COURSE (Credit 2)

1. Cell Wall Staining
2. Capsule Staining
3. Endospore Staining
4. Granule Staining
5. Wet Mount: Hanging Drop Technique to study motility of bacteria
6. Isolation of pure culture of bacteria By Spread Plate Method
7. Isolation of pure culture of bacteria On Nutrient Agar Plate By Four Flame Method
8. Isolation Of Bacteria By Pour Plate Method
9. Study of Effect Of Chemical On Microbial Growth-Bacteria By Cup Borer Method
10. Study of Effect Of Temperature On Bacterial Growth

11. Study of Oligodynamic Effect
12. Study of Effect Of pH On Bacterial Growth
13. Study of growth of bacteria by turbidometric method

List Of Microbiology Books Authored By:

- 1) Principles Of Microbiology , Atlas R.M.
 - 2) Microbiology Marjorie Kelly Cowan
 - 3) Microbiology Gerard J. Tortora
 - 4) Microbe Hunters: The Classic Book On The Major Discoveries Of The Microscopic World Paul De Kruif
 - 5) Foundations In Microbiology Kathleen Park Talaro
 - 6) General Microbiology Roger Y. Stanier Macmillan, 1987
 - 7) Michael J. Pelczar Jr. Chan Ecs And Krieg Nr (2004) Microbiology , 5th Edition. Tata Mcgraw Hill.
 - 8) Instructor's Manual To Accompany Elements Of Microbiology By Michael J. Pelczar
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SGGU Semester Two Minor Microbiology syllabus July 2023

SHRI GOVIND GURU UNIVERSITY
Choice Based Credit System (CBCS)
Syllabus for B. Sc. Semester II (Mathematics)
BS23MN2MT1 Minor : Calculus-II(Theory)

Hours: 2 /week

Credits: 2

Prerequisite: Basic calculus (derivatives and integration of functions on one variable)

Course Objectives: The objectives of introducing this course to enrich the students with the necessary skills and knowledge to apply calculus in solving real-world problems, to prepare them for more advanced mathematics, to enhance their critical thinking and analytical reasoning abilities, to learn the definition of a derivative and understand the interpretation of derivatives as rates of change, and to enhance written and oral communication skills in presenting mathematical ideas and solutions.

Course Learning Outcomes: The learning outcomes of a calculus course reflect the skills and knowledge that students are expected to acquire by the end of the course. These outcomes demonstrate the practical application of calculus principles and the development of analytical and problem-solving skills. Upon completing the course, students should be able to:

1. Apply the concept of derivatives to solve problems involving rates of change and optimization, and interpret and analyze the significance of derivatives in various contexts.
2. Apply calculus concepts to model and solve real-world problems in various disciplines.
3. Develop analytical thinking skills and the ability to critically analyze problems and solutions.
4. Develop a solid foundation for more advanced courses in mathematics that build upon calculus concepts.
5. Discuss and consider ethical implications related to the application of calculus in various contexts.

Syllabus:

Unit I: Mean Value Theorems

Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem, Geometric interpretations and applications of these theorems, Increasing and decreasing functions.

Unit II: Indeterminate Forms and series expansion of functions

L'Hospital's rule, Definition of Indeterminate forms, Indeterminate forms ($0/0$, ∞/∞ , $0 \cdot \infty$, $\infty - \infty$, 0^∞) (9.1 to 9.5 and 10.1 to 10.6 of [1]),

Taylor's and Maclaurin's Theorems and their applications (8.1, 8.2, 8.5, 6.1 and 6.2 of [1]).

Reference Books:

1. Differential Calculus - Shanti Narayan, P.K. Mittal, S. Chand and Co.
2. Calculus and Analytic Geometry - G. B. Thomas and R. L. Finney. Pearson Education. Indian Reprint.
3. Calculus - James Stewart, Sixth edition.

4. Calculus and Matrix algebra - Sanjay K. Patel, Bhikhalal P. Patel, Haribhai R. Kataria and Bhikha L. Ghodadra, University granth nirman board, Ahmedabad.

Teaching Plan: The teaching plan may be followed as:

Weeks 1 and 2: Rolle's Theorem, Lagrange's Mean Value Theorem.

Weeks 3, 4 and 5: Cauchy's Mean Value Theorem, Geometric interpretations and applications of these theorems.

Weeks 6 and 7: Increasing and decreasing functions.

Weeks 8 and 9: L'Hospital's rule, Definition of Indeterminate forms.

Weeks 10, 11 and 12: Indeterminate forms ($0/0$, ∞/∞ , $0 \cdot \infty$, $\infty - \infty$, 0^∞).

Weeks 13 and 14: Taylor's and Maclaurin's Theorems and their applications.

Week 15: Discussion about learning outcomes of the course.

Minor: Calculus-II (Practical)

Hours: 4 /week

Credits: 2

Number of Practicals: 08

1. Examples on Verify Rolle's Theorem and its application.
2. Examples on Verify Lagrange's Mean Value Theorem and its application.
3. Examples on Verify Cauchy's Mean Value Theorem and its application.
4. Examples on Increasing and decreasing functions.
5. Problems on Indeterminate forms - I ($0/0$, ∞/∞ , $0 \cdot \infty$ and $\infty - \infty$).
6. Problems on Indeterminate forms - II (0^∞ , 1^∞ and ∞^∞).
7. Problems on Taylor's Theorem.
8. Examples of Maclaurin series expansion of some trigonometric and logarithmic functions.

Reference Books:

1. Differential Calculus - Shanti Narayan, P.K. Mittal, S. Chand and Co.
2. Calculus and Analytic Geometry - G. B. Thomas and R. L. Finney. Pearson Education. Indian Reprint.
3. Calculus - James Stewart, Sixth edition.
4. Calculus and Matrix algebra - Sanjay K. Patel, Bhikhalal P. Patel, Haribhai R. Kataria and Bhikha L. Ghodadra, University granth nirman board, Ahmedabad.

Shri Govind Guru University

GODHRA

Syllabus of
B. Sc. Semester - II
PHYSICS
(Theory & Practical)

BS23MN2PH1

(Based on NEP-2020)

Effective from December, 2023

B. Sc. - Semester – II (PHYSICS)

BS23MN2PH1

MINOR (Theory): Basic Concepts of Physics

(Credit -2)

UNIT -1: Plasma Physics

- 1.1 Introduction
- 1.2 Composition and characteristics of plasma
- 1.3 Collision
- 1.4 Surface phenomena
- 1.5 Transport phenomena
- 1.6 Diffusion and Mobility- Ambipolar diffusion
- 1.7 Viscosity: Conductivity
- 1.8 Recombination
- 1.9 Ohm's Law
- 1.11 Comparison of various natural and manmade plasma
- 1.12 Plasma diagnostics

➤ **Text Book:** Elements of Plasma Physics By - S. N. Goswami
(Published by New Central Book Agency (p) Ltd. Calcutta, India)

UNIT – 2: Digital Electronics

1. Logic Circuits

- 1.1 Binary Number System
- 1.5 Boolean Algebra
- 1.6 NOR Gates
- 1.7 NAND Gates

2. Number Systems and Codes

- 4.2 Binary to Decimal Conversion
- 4.3 Decimal to Binary Conversion
- 4.4 Octal Numbers
- 4.5 Hexadecimal Numbers
- 4.6 The ASCII code
- 4.7 The Excess-3 code
- 4.8 The Gray code

➤ **Text Book:** Digital Principles and Applications by Albert Paul Malvino,
Donald P. Leach. (4th Edition, McGRAW-HILL)

B. Sc. - Semester – II

MINOR(Practical):Basic Concepts of Physics Practical (Credit-2)

1. Logic Gates (AND, OR, NOT)

To verify the truth tables and understanding of voltage for “0” and “1” level.

2. Universal Logic Gates (NAND, NOR)

To verify the truth tables and understanding of voltage for “0” and “1” level.

3. De Morgan’s Theorem

To verify the De Morgan’s theorem.

4. (i) Gray Code to Binary and Decimal conversion (ii) ASCII Code

To convert given Gray code into Binary Code and Decimal system.

To write ASCII code for given words and sentences and vice-versa.

5. Decimal to Octal and Hexadecimal conversion

To convert Decimal number into Octal and Hexadecimal number system and vice-versa.

6. Absorption coefficient of liquid using photocell

To find out the absorption coefficient of liquid using photocell.

7. Demonstration experiment using Plasma Ball.

Lightning of Bulb or Light Tube using Plasma Ball. (Demonstration)

ShriGovindGuruUniversity,Godhara

B.Sc.ZoologySem-II

BS23MN2ZO1

MINOR PAPER (THEORY)

BASICASPECTSOFZOOLOGY-II

(Credit02)

UNIT:ICytologyII

- UltrastructureofPlasmamembrane,DifferentmodelsofPlasmaMembrane
- UltrastructureofGolgibody,Lysosome,Centriole/Basalbodies, Cilia/Flagella, and Cytoskeleton

UNIT:IIGenetics-II

- Epistasis: Supplementary (recessive) genes – coat color in mice (9:3:4), Complementary(doublerecessive)genes–flowercolorin*Odoratuslathyrus* (Pea plants) (9:7)
- SexlinkedInheritance:X-linked-colorblindnessandEyecolorin *Drosophila*, Y-linkedHolandricgenes(Baldnessinmen)
- MolecularstructureofDNA(Watson&Crick’sModel)
- MolecularstructureandtypesofRNA
- ElectronMicroscope(i)SEM(ii)TEM

REFERENCES:

1. ACellBiologyandMolecularBiology,N.Arumugan,SarasPublications.
2. CytologyP.K.Gupta.,SChand&Co. Delhi.
3. FundamentalofLightMicroscopy&ElectronImaging.MurphyD.B.,WileyLiss.
4. MicroscopyandMicrotechnique.R.Marimuthu,MJP Publishers.
5. FundamentalsofGeneticsB.D.singh.,MedtechSciencePress.
6. Genetics,P.S.Verma& V.K.Agarwal,S.Chand&Co. Delhi

ShriGovindGuruUniversity,Godhara

B.Sc.ZoologySem-II

MINOR PAPER (PRACTICAL)

BASICASPECTSOFZOOLOGY

(Credit02)

1. StudyofCytology

- 1) Plasmamembrane
- 2) Golgibody
- 3) Lysosomes
- 4) Centriole/Basalbodies
- 5) Cilia/Flagella
- 6) Cytoskeleton

2. StudyofMolecularBiologyandGenetics

- 1) StructureofDNA(WatsonandCrick'smodel)
- 2) RecessiveEpistasis(9:3:4)
- 3) DoublerecessiveEpistasis(9:7)

3. StudyofSexLinkedinheritance

- 1) X-linked-colorblindness
- 2) Y-linked-Holandricgenes

4. StudyofElectronmicroscopes

- 1) SEM
- 2) TEM

Shri Govind Guru University

GODHRA

Syllabus of
B. Sc. Semester - II
PHYSICS
BSC23SE201

(Based on NEP-2020)

Effective from December, 2023

B. Sc. - Semester – II
BSC23SE201

SKILL ENHANCEMENT COURSE

Instrumentation: Measurement and Analysis (Credit-2)

UNIT – 1: Vernier Calipers and Micrometer Screw

1. Vernier Calipers

Introduction

Theory, Figure and Description of the instrument

Detailed study of least count, Error, Types of Error

Determination of magnitude of Errors

Limitations of Vernier Calipers

Applications of Vernier Calipers

2. Micrometer Screw

Introduction

Theory, Figure and Description of the instrument

Definition of Pitch and its determination

Study of least count, Error, Types of Error

Determination of magnitude of Errors

Limitations of Micrometer screw

Applications of Micrometer screw

UNIT – 2: Traveling Microscope and Spectrometer

1. Traveling Microscope

Introduction

Construction and Main parts of Traveling Microscope

Vertical and Horizontal Scale

Least count of Traveling Microscope

Applications of Traveling Microscope

Precautions to be taken in measurement

The Gray code

2. Spectrometer

Introduction

Description of the instrument

Construction and explanation of three main parts of spectrometer

Light Sources: Mercury discharge lamp, Sodium discharge lamp

Study of least count

The adjustment, Leveling and recording of observation

Applications of spectrometer

➤ **Reference Book:**

1. Fundamentals of Vernier Calipers and Screw Guage by Rajesh Mishra
2. Basics in Metrology and Measurements by Dr R. Venkat Reddy

B. Sc. - Semester – II
SKILL ENHANCEMENT COURSE: Credit-2
BSC23SE202 : GREEN METHODS IN CHEMISTRY

Unit- I General Introduction of Green Chemistry

Theory and Hand-on Experiments Introduction: Definitions of Green Chemistry. Brief introduction of twelve principles of Green Chemistry, with examples, special emphasis on atom economy, reducing toxicity, green solvents, Green Chemistry and catalysis and alternative sources of energy, Green energy and sustainability

Unit II Green Chemistry world

Surfactants for carbon dioxide – Replacing smog producing and ozone depleting solvents with CO₂ for precision cleaning and dry cleaning of garments. Designing of environmentally safe marine antifoulant. Right fit pigment: Synthetic azo pigments to replace toxic organic and inorganic pigments. An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.

Reference Books:

- Anastas, P.T. & Warner, J.K. Green Chemistry- Theory and Practical, Oxford University Press (1998).
- Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).
- Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000). • Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).
- Sharma, R.K.; Sidhwani, I.T. & Chaudhari, M.K. Green Chemistry Experiments: A monograph I.K. International Publishing House Pvt Ltd. New Delhi, Bangalore.
- Lancaster, M. Green Chemistry: An introductory text RSC publishing, 2nd Edition.
- Sidhwani, I.T., Saini, G., Chowdhury, S., Garg, D., Malovika, Garg, N. Wealth from waste: A green method to produce biodiesel from waste cooking oil and generation of useful products from waste further generated “A Social Awareness Project”, Delhi University Journal of Undergraduate Research and Innovation, 1(1): 2015.

SHRI GOVIND GURU UNIVERSITY

Syllabus on the bases of New Education Policy (NEP)

As Proposed by University Grant Commission

For

B.Sc. Semester - II

**Skill Enhancement Course
(BOTANY)**

Fruits and Vegetable Processing

INFORCE FROM JUNE 2023

SHRI GOVIND GURU UNIVERSITY
Syllabus on the bases of New Education Policy (NEP)
B.Sc. Semester – II BSC23SE203
Skill Enhancement Course - BOTANY
Fruits and Vegetable Processing

Unit: 1

- Fruits - Definition, types of fruits (fleshy and dry) with examples.
- Vegetables - Definition, types of vegetables (leafy, stem, root, flower and fruit) with examples.
- Composition of fruits and vegetables.
- Maturation and ripening of fruits.

Unit: 2

- Principles of processing and preservation.
- Harvesting and pre-processing.
- Methods of processing: Drying, pickling, fermentation, freezing and dehydration, canning.
- Scope and importance of processing and preservation.

Suggested Readings

1. Ashraf, SM (2008). Handbook of Fruit and Vegetable products. Agrobios, India.
2. Cruess, WV (2004). Commercial Fruit and Vegetable Products. Agrobios, India.
3. Dubey, RC (1993). A Textbook of Biotechnology. S. Chand & Company Pvt. Ltd., New Delhi.
4. Frazier, WC and Westhoff, DC (2008). Food Microbiology. Tata Mc.Graw Hill Education Private Limited, New Delhi.
5. Lal G, Siddappa, GS & Tandon, GL (2019). Preservation of fruits & Vegetables. ICAR, New Delhi.
6. Manay, SN and Shadaksharaswamy, M (2008). Foods: Facts and Principles. New Age International, Bengaluru.

7. Narang, RK (2010). Fruit and Vegetable Preservation Techniques. APH Publishing Corporation, Delhi.
8. Potter, NN and Hotchkiss, HJ (1996). Food Science. CBS Publishers & Distributors, New Delhi.
9. Rahman, MS (2020). Handbook of food preservation (3rd Edition). CRC Press, United States.
10. Ranganna, S (1986). Handbook of analysis and quality control for fruits and vegetable products (2nd Edition). Tata Mc Graw-Hill Publishing Company Limited, New York.
11. Saldanha, E (2010). Successful Goan home wines. Rajhauns Vitaran, Goa.
12. Srilakshmi, B (2007). Food Science. New Age International (P) Limited, New Delhi.
13. Srivastava, RP and Kumar, S (2017). Fruit and Vegetable Preservation- Principles and Practices (3rd edition). CBS Publishers and Distributors Pvt Ltd., India.
14. Thompson, AK (2003). Fruit and Vegetables - Harvesting, Handling and Storage (2nd Edition). Blackwell Publishing Ltd., US.
15. Verma, LR and Joshi, VK (2000). Post-harvest technology of Fruits and vegetables- handling, processing, fermentation, and waste management. Vol I & II, Indus Publishing, New Delhi.

Shri Govind Guru University, Godhara

B.Sc. Zoology Sem-II

BSC23SE204

SKILL ENHANCEMENT COURSE

APICULTURE

(Credit 02)

UNIT: I

- Importance and scope of Apiculture
- Classification and diversity of honey bee
- Life history and social organization in honey bees
- Desirable characteristics of bees for apiculture
- Communication in honey bees

UNIT: II

- Structure of a typical bee hive
- Methods of Apiculture - Old and Modern method
- Appliances of apiary
- Characteristics and economic importance of Honey and Bees wax

REFERENCES:

1. Applied Zoology: N. Arumugam, T. Murugan, J. Johnson Rajeswar and R. Ram Prabu, Saras Publication
2. Economic Zoology: Sagarika Chaudhuri, New Central Book Agency.
3. Economic Zoology: G.S. Shukla and V.B. Upadhyay, Rastogi Publication.



SKILLENHANCEMENTCOURSE

Introduction to Food Hygiene and food testing

CREDIT2

Objective:

1. To know about food hygiene and its significance
2. To learn methods of food preservation
3. To learn some of the basic techniques that can be used for food analysis

Outcome:

1. Willknow about food hygiene and its significance
2. Willlearn methods of food preservation
3. Will learn some of the basic techniques that can be used for food analysis

SKILLENHANCEMENTCOURSE

Introduction to Food Hygiene and food testing

CREDIT2

1GeneralIntroduction

(5 Hours)

1. Food hygiene,
2. Food poisoning
3. Food spoilage
4. Socio-economic costs of poor food hygiene,
5. The role of HACCP and hazard analysis in ensuring food safety.
6. Foods most commonly involved in out breaks of food poisoning.

2. Food contamination and its prevention

(10 hours)

1. Define the terms: contamination, cross contamination, high risk food.
2. Main sources, vehicles and routes of bacterial contamination of food.
3. METHODSOFPRESERVATION
 - Temperature(including cooking, canning, pasteurization)
 - Dehydration, control of water availability
 - Chemicals(particularly salt and sugar)
 - Controlled atmosphere packaging and vacuum packing



➤ Smoking

Unit3.Routine testingmethods

(15 hours)

1. Preparation of nutrient agar plates, slants and nutrient broth
2. Cultivation and isolation of bacteria
3. Cultivation of an aero bicbacteria
4. Cultivation and isolation of fungi
5. Staining of bacteria:
 - Differential staining: gram staining and acid fast staining
 - Endosporestaining
6. Mounting of fungi
7. Biochemicaltests :IMViCtest
8. Demonstration of rapid identification kit
9. Standard Plate Count of milk
10. Most probable number of coliforms
11. Detection of faecalcoli forms
12. MBRT/Resazurintest
13. Phosphatasetest
- 14.** Cultivation,IsolationandIdentificationof*Staphylococcus aureus*,*Bacillus cereus*, *Esherichia coli*, *Enterobacter aerogenus*, *Pseudomonas*.

SHRI GOVIND GURU UNIVERSITY
Syllabus for B. Sc. Semester II (Mathematics)

BSC23SE206 Skill Enhancement Course: Introductory Calculus

Hours: 2 /week

Credits: 2

Prerequisite: Basic set theory, trigonometry, algebra.

Course Objectives: The introductory calculus course is introduced to enrich the students with a foundational understanding of calculus concepts and their applications. The course objectives collectively aim to provide students with a strong foundation in calculus, understand the interpretation of derivatives as rates of change, apply derivatives to solve real-world problems, and prepare them for more advanced mathematical studies and applications in various disciplines. This course is also useful for science stream students who have not learned mathematics at the HSC level.

Course Learning Outcomes: The learning outcomes of this course are to reflect the comprehensive understanding of introductory calculus, specific skills, and knowledge that students are expected to acquire by the end of the course. The below-mentioned outcomes emphasize the practical application of calculus principles and the development of analytical and problem-solving skills. Upon completing the course, students should be able to:

1. Demonstrate a thorough understanding of limits and continuity.
2. Apply derivatives to solve real-world problems, and interpret and communicate the meaning of derivatives in various contexts.
3. Develop analytical thinking skills and the ability to critically analyze problems and solutions.
4. Present mathematical ideas and solutions clearly and use appropriate mathematical notation and language.
5. Discuss and consider ethical implications related to the application of calculus in various contexts.
6. Students with majors in chemistry, physics, or biological sciences will have more confidence to solve problems involving mathematics in their field of study.

Syllabus:

Unit I: Functions, Inverse of a function, Exponential and Logarithmic function, Trigonometric functions, Graphs of some known functions Limit & continuity of a function.

Unit II: Definition of the derivative, Basic rules of derivatives, Derivatives of known functions, Chain rule, Examples of use of differentiation (see Chapter 4 of [3]).

Reference Books:

1. Calculus - James Stewart, Sixth edition.
2. Class 11,12 Mathematics, Gujarat State Board of School Textbooks, Gandhinagar.
3. Calculus for Biology and Medicines (4th Edition), Neuhauser, Claudia, Pearson.
4. Differential Calculus - Shanti Narayan, P.K. Mittal, S. Chand and Co.

Teaching Plan: The teaching plan may be followed as:

Weeks 1 and 2: Functions, Inverse of a function.

Weeks 3 and 4: Exponential and Logarithmic function, Trigonometric functions.

Weeks 5, 6 and 7: Graphs of some known functions Limit & continuity of a function.

Weeks 8 and 9: Definition of the derivative, Basic rules of derivatives.

Weeks 10, 11 and 12: Derivatives of known functions, Chain rule.

Weeks 13 and 14: Examples of use of differentiation.

Week 15: Discussion about learning outcomes of the course.

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BSC Semester – 2 Value Added Course (NEP-2020)

BSC23VA201 Science and Society

Unit 1 : Introduction Science and Society

Philosophy of science, the scientific method, importance of observation, questions and experimental design, rational thinking, myths vs. facts

Science, Technology and Traditional Practices: Suggestive areas include: Water harvesting structures and Practices; Construction, architecture and design - use of natural environment-friendly designs and materials; Agriculture including domestication of plants and animals.

Unit 2 : Society Health with Technology

Science and Technology in Modern Times: Suggestive areas include: Public Health: Nutrition, Hygiene, Physical and mental health, Vaccines and Antibiotics, Antimicrobial resistance; Food Security: Green Revolution, White Revolution; IT Revolution, E-Governance; Clean Energy, Renewable Energy; Space Science and Exploration; Evolution, Ecology and Environment

Suggested readings

- Basu and Khan (2001). Marching Ahead with Science. National Book Trust
- Gopalakrishnan (2006). Inventors who Revolutionised our Lives. National Book Trust
- Yash Pal and Rahul Pal (2013) Random Curiosity. National Book Trust
- HakobBarseghyan, Nicholas Overgaard, and Gregory Rupik (****) Introduction to History and Philosophy of Science
- John Avery {2005}. Science and Society, 2nd Edition, H.C. Orsted Institute, Copenhagen.
- Dharampal (2000). Indian Science and Technology in the Eighteenth Century, OIP.

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BSC Semester – 2 Value Added Course (NEP-2020)
BSC23VA202 Environmental studies

Unit 1 The Environment , Ecosystem and Environmental Pollution

Environment and Environmental studies: Definition, concept, components and importance, Ecosystem and Ecology: Structure and Function of ecosystem, Brief concept of Autecology and Synecology, Food chain, food web and ecological pyramids, Biogeochemical cycles in an ecosystems: (Carbon, Nitrogen and Phosphorous cycle), Ecological succession: Definition, types, concept and process (Hydrosere, Xerosere and Lithosere).

Definition, causes, effects and control measures of: a. Air pollution b. Water pollution(thermal and marine pollution)c. Land pollution d. Radiation pollution and nuclear hazard. e. Noise pollution;

Unit 2 Disaster Management , Natural Resources and their Conservation

Solid waste management: Causes , effects and control measures; Global warming and climate change Ozone depletion; Acid rain: Causes , effects and control measures; Types and management of Natural disasters (Earthquakes; Droughts; Floods; Landslides).

Forest Resources: Uses and overexploitation of forests and consequences of deforestation; Water Resources: Use and consequences of over-utilization, concept of rain water harvesting and watershed management, water conflicts; Food Resources: Sources of food, food problems- Indian scenario, Impacts of modern agriculture on environment (Fertilizer - pesticide problem, water logging and salinity), Organic farming; Energy Resources: Renewable and Non-Renewable energy sources, Growing energy needs and alternate energy sources; Land Resources: Global land use patterns, Soil erosion, Desertification, Wasteland Reclamation.

Suggested Readings:

1. Ecology and Environment by P.D. Sharma
2. Fundamentals of Ecology by E.P.Odum
3. Ecology by Mohan P. Arora
4. Fundamentals of Ecology by M.C. Dash
5. Environmental Science by S.C.Santra
6. An Introduction to Environmental Engineering & Science by Gilbert N Master

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BSC Semester – 2 Value Added Course (NEP-2020)

BSC23VA203 Avurveda and Nutrition

Unit- 1 Introduction to Ayurvedic Nutrition

- Ayurveda and Indian food cultures
- Nutrition and lifestyle transition over the years
- Regional Food Traditions of India
- Understanding rich sources of nutrients

Unit- 2 Nutrition, Diets and Ayurveda

- Concept of Doshas & assessment
- Ayurvedic Principles of food habits and factors determining quality of food (Ahara vidhivisheshayatana)
- FSSAI regulations on Ayurvedic Aahar
- Principles of Diet: Aharavidhividhan, Sattvic, Rajasi, Tamasic foods
- Incompatible food (Viruddha Ahara), Pathya; Apathya; Viprita Aahar
- Lifestyle Management with Dincharya and Ritucharya

Essential Readings

- Rastogi S (2014) Ayurvedic Science of Food and Nutrition. ASIN: BOOHWMV094, Springer: ISBN-13:978-1461496274
- Rastogi S (2010) Building bridges between Ayurveda and modern science. Int J Ayurveda Res. 1(1):41-46.
- FSSAI regulations on Ayurveda Aahar Regulations 2022. Gazette of India CG-DL-E-07052022-235642. New Delhi, Friday, May 6, 2022/ Vaisakha 16, 1944.
- Frawley D (2012) Ayurvedic healing: A comprehensive guide. Lotus Press, India.
- <https://iksindia.org/>: Indian Knowledge Systems

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BSC Semester – 2 Value Added Course (NEP-2020)

BSC23VA204 National Service Scheme

Unit 1 : Introduction , Basic Concepts and Activities of NSS

• Introduction of National Service Scheme • History & Philosophy of NSS • Basic Concepts: Objectives, Symbol, Motto, NSS Badge, NSS Songs, NSS Day • NSS Advisory Committees at various levels • Basic Concepts and Components • Various NSS Programme's and Activities • Aims of NSS Programme/Activities • Regular Activities & Special camping Programme • Orientation of NSS volunteers

Unit 2 : Health, Hygiene & Sanitization Programme's And Documentation

• Definition, Need and Scope of Health Education • National Health Programme's • Food & Nutrition • Safe Drinking Water, • First Aid, Healthy Lifestyle • Swachh Bharat Abhiyan • Preparation of documentation reports of NSS Activities. • Preparation of one day and annual camp report • Volunteer Diary • Socio Economy Survey Form for Adopted Village, Adopted Slum Area • Socio Economy Survey Data Collection, Analysis and Reporting.

Suggested References:

NATIONAL SERVICE SCHEME MANUAL

On-line Resources: <https://nss.gov.in/>

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BSC Semester - 2 Value Added Course (NEP-2020)

BSC23VA205 National Cadet Corps

Unit – 1: NCC General & Personality Development

- Introduction of NCC and History
- Aims, Objectives and Organization of NCC
- Incentives for NCC Cadets
- Duties of NCC Cadets
- NCC Camps: Types and Conduct
- Unity in Diversity & role of NCC in nation building
- Threats to National Security
- Intra and interpersonal skills
- Self-Awareness & analysis
- Critical and Creative Thinking
- Decision Making and Problem Solving

Unit - 3 Social Service and Community Development

- Basics of Social Service and its need
- Types of social service activities
- Objectives of Rural Development Programmes and its importance
- NGO's and their contribution in social welfare
- Contribution of Youth and NCC in social welfare

Suggested readings

- DGNCC Cadet's Hand Book - Common Subjects -All Wings (in English)
- DGNCC Cadet's Hand Book - Common Subjects -All Wings (in Hindi)
- DGNCC Cadet's Hand Book- Specialised Subjects -Army, Navy and Air Wing

SHRI GOVIND GURU UNIVERESITY, GODHRA
B.Sc. Biotechnology Semester-2

Multidisplinary Paper

Genetics

UNIT-1: CONCEPT OF GENOME AND PATTERNS OF INHERITANCE IN HUMANS:

- Mendel's discoveries
- Mendel's first law of independence
- Mendel's Second law of segregation
- Euchromatin and Heterochromatin
- Nucleosome and concept of Lampbrush & Polytene chromosomes
- Pedigree analysis of autosomal recessive and Dominant disorders
- Pedigree analysis of X-linked dominant and recessive disorders
- Y-linked inheritance

UNIT 2 : POPULATION AND EVOLUTIONARY GENETICS

- Macro- and Micro - evolution in Mendelian population,
- Hardy-Weinberg equilibrium and conditions for its maintenance, Elemental forces of evolution - Mutation, Selection (Types of selection, selection coefficient, selection in natural populations), Genetic drift, Migration
- Species and speciation_Sympatric and Allopatric

REFERENCES:

1. Griffiths, A. F., Wessler, S. R., Lewontin, R. C. and Carroll, S. B. (2008) *Introduction to Genetic Analysis*, 9th Edition, W. H. Freeman and Company, New York.
2. Klug, W. S. and Cummings, M. R. (2007) *Concepts of Genetics*, 7th Edition, Pearson Education.

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SHRI GOVIND GURU UNIVERESITY, GODHRA
B.Sc. Biotechnology Semester-2

Multidisplinary Paper 4

Lab Practical

1. Preparation of mitotic chromosomes from onion root tip
2. Contribution of scientists in the field of genetics
3. Problems related to Mendelian genetics
4. Study of microbiocidal effect of UV rays
5. Effect of physical and chemical agents on growth of bacteria
 - pH
 - Temperature
 - Heavy metal ions (Oligodynamic Action)
 - U.V. Rays
 - Antibiotics