

Shri Govind Guru University, Godhra

Bridge Course For Semester-3

Chemistry

Unit-1 : Inorganic Chemistry

What is Quantum mechanics ? Time independent Schrodinger equation and meaning of various terms in it. Significance of ψ and ψ^2 , Schrödinger equation for hydrogen atom. Rules for filling electrons in various orbitals, Electronic configurations of the atoms upto atomic number 30.

Ionic Bonding: General characteristics of ionic bonding. Covalent bonding: VB Approach: Shapes of some inorganic MO Approach: Rules for the LCAO method, bonding and antibonding MOs and their

Unit-2: Physical Chemistry

Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchhoff's equation. Statement of Third Law of thermodynamics and calculation of absolute entropies of substances

Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect

Unit-3 : Organic Chemistry-1

Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis. Conformations with respect to ethane, butane and cyclohexane. Interconversion of Newmann, Sawhorse and Fischer representations. Concept of chirality (upto two carbon atoms). Configuration:

Alkenes: (Upto 5 Carbons) Preparation: Elimination reactions: Dehydration of alkenes and dehydrohalogenation of alkyl halides (Saytzeff's rule); cis alkenes (Partial catalytic hydrogenation) and trans alkenes (Birch reduction).

Alkynes: (Upto 5 Carbons) Preparation: Acetylene from CaC_2 and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinal-dihalides.

Unit-3 : Organic Chemistry-2

Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation) Alkyl Halides (Upto 5 Carbons) Types of Nucleophilic Substitution ($\text{S}_{\text{N}}1$, $\text{S}_{\text{N}}2$) reactions

Aromatic nucleophilic substitution (replacement by $-\text{OH}$ group) and effect of nitro substituent. Benzyne Mechanism: KNH_2/NH_3 (or $\text{NaNH}_2/\text{NH}_3$).

Phenols: Electrophilic substitution: Nitration, halogenation. Reimer- Tiemann Reaction, Gattermann-Koch Reaction, Schotten – Baumann Reaction.

Aldehydes and ketones : Reactions – Reaction with HCN , ROH , NaHSO_3 , $\text{NH}_2\text{-G}$ derivatives. Iodoform test. Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation. Clemensen reduction and Wolff Kishner reduction.

Reference Books:

1. Lee, J.D. Concise Inorganic Chemistry ELBS, 1991. □
2. Cotton, F.A., Wilkinson, G. & Gaus, P.L. Basic Inorganic Chemistry, 3rd ed., Wiley.
3. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
4. Huheey, J.E., Keiter, E.A., Keiter, R.L. & Medhi, O.K. Inorganic Chemistry: Principles of Structure and Reactivity, Pearson Education India, 2006. □
5. Graham Solomon, T.W., Fryhle, C.B. & Snyder, S.A. Organic Chemistry, John Wiley & Sons (2014). □
6. Graham Solomon, T.W., Fryhle, C.B. & Snyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
7. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
8. Sykes, P. A Guidebook to Mechanism in Organic Chemistry, Orient Longman, New Delhi (1988).
9. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S. □ Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.

Shri Govind Guru University, Godhra

Bridge Course For Botany

Unit 1.

- Algae :-
 - Introduction & general characteristics 1 Lecture
 - Life cycle of spirogyra 2 Lecture
 - Economics importance of algae 1 Lecture
- Fungi :-
 - Life cycle of mucar 2 Lecture
 - Economics importance of fungi 1 Lecture

Unit 2. Bryophytes

- Introduction & general characteristics 1 Lecture
- Life cycle of funaria 3 Lecture
- Ecological and Economics importance of bryophytes 2 Lecture

Unit 3. Plant Ecology

- Introduction 1 Lecture
- Scope and branches of ecology 2 Lecture
- Eco system : Structure, function and energy flow in Ecosystem 5 Lecture

Unit 4. Plant Morphology and Plant Taxonomy

- Basics of plant morphology 1 Lecture
- Leaf : parts of leaf, types of leaves 2 Lecture
- Flowers : Definition, bracts, cylix and corolla 3 Lecture
- Function and types
- Study of malvace and solanaceae family 2 Lecture

SHRI GOVIND GURU UNIVERSITY
Bridge Course Syllabus of Mathematics

B.Sc.SEM-III

Unit I :

Successive Derivatives, Leibniz's Theorem, Taylor's and Maclaurin's Theorems (both without proof), Taylor's and Maclaurin's series of function's e^x , $\sin x$, $\cos x$, $\log(1+x)$, $(1+x)^m$. Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem and their geometric interpretations, Increasing and decreasing functions, Indeterminate forms, L'Hospital's rule-I and L'Hospital's rule-II with proof and all other forms.

Unit II :

Eigen values, Eigen vectors and the characteristic equation of a matrix, Cayley-Hamilton (CH) theorem and its use in finding inverse of a matrix, Application of matrices in solving a system of simultaneous linear equation, Cramer's rule, Theorems on consistency of a system of simultaneous linear equation, Diagonalization of a symmetric matrix. Linear dependence and independence of row and column matrices and rank of a matrix, Row Reduced Echelon (RRE) form of a matrix inversion using it.

Unit III :

Exact differential equations (without proof), Integrating factors, Linear differential equation, Bernoulli's differential equation, Differential Equations reducible to linear equation. Method of solving differential equations of first order and higher degree: solvable for y , solvable for x , solvable for p (where $p = \frac{dy}{dx}$), Clairaut's differential equation (both general and singular). Linear differential equation of higher order and degree one with constant coefficients, Complementary Function and Particular Integrals, Inverse operator, Operational methods for its solutions, Euler form of linear differential equations with variable coefficients

Unit IV :

Definition of a sphere in R^3 , Cartesian equation of a sphere, General equation of a sphere, Equation of a sphere with diametrically opposite end points, Intersection of a sphere with Line/plane/sphere (No theory but only problems), Equation of a tangent plane to a sphere, the tangency of a plane and normality of a line to a sphere, Orthogonal spheres. Polar coordinate system: Polar coordinates in R^2 & R^3 and its relationships with Cartesian coordinates, polar equation of line/circle/conic and properties of conics. Different types of cones and cylinders, Equations of enveloping cone/cylinder. right circular cone/cylinder (Without proof). Problems on cone and cylinder.

Reference :

1. C.W. Curtis Linear Algebra, Springer, 1987
2. Introduction to Linear Algebra - V.Krishnamurthy, Affiliated East-west Press Pvt Ltd.
3. An Introduction to Linear Algebra - I.K.Rana, Ane Books Pvt.Ltd.
4. Shanti Narayan and P.K.Mittal, A text book of Matrices, S.Chand & co., 2005

5. Shanti Narayan, Differential Calculus, S.Chand & co., 1996
6. Zafar Ahsan, Differential Equations and their Application, Prentice Hall of India, 2004.
7. Shanti Narayan, Integral Calculus, S.Chand & Co.Ltd., 1999
8. Analytic Calculus, Fuller and Parker
9. Calculus and Analytic Geometry - G.B.Thomas and R.L. Finney. Pearson Education. Indian Reprint
10. Louis Leithold, The Calculus with Analytic Geometry, Harper-Collins Publisher, 1981
11. Vasavada H.M. Analytical geometry of two and three dimensions, 1992
12. College Algebra, 2nd Edition, By Spiegel M.R., Moyer r.E., Tata Mcgraw hill Publishing Co.

Shri Govind Guru University,Godhra

Bridge Course For First Year B.Sc Microbiology

Semester One

Course Mb 101: Introduction To Microbiology And Microbial Diversity

1. Diverse types of microbes

- a. Members of the microbial world : General characters, cell structure, distribution/habitats, significance
- b. Introduction of bacteria and archaeae
- c. Introduction of fungi, algae and protozoa
- d. Acellular microbes
- e. The scope and relevance of microbiology

2. The history and scope of microbiology

- a. Spontaneous generation
- b. Developments in the area of medical microbiology, pure culture techniques, antibiotics, aseptic surgery immunology and prophylaxis, industrial microbiology, microbial ecology genetics and biotechnology, bioinformatics and nanobiotechnology

3. The study of microbial structure: microscopy and specimen preparation

- a. The light microscope
- b. Electron microscopy
- c. Confocal microscopy
- d. Scanning probe microscopy
- e. The differential interference contrast microscope
- f. Preparation and staining of specimens for light microscope and electron microscope

4. Biomolecules: carbohydrates , lipids , nucleic acid , amino acids and proteins

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Semester two (microbiology)

Course mb 103: (taxonomy and bacteriology)

1. Classification of microbes

- a) Binomial nomenclature
- b) Whittaker's five kingdom classification
- c) Carl Woese's three kingdom classification numerical taxonomy
- d) Molecular techniques for classification of microbes
- e) Differences between eubacteria and archaeobacteria

2. Prokaryotic cell structure and function

- a) An overview of prokaryotic cell structure, shapes, size arrangement and its diversity
- b) B. Prokaryotic cell surface layers: Plasma membranes, bacterial cell wall, capsules, endospore
- c) C. The nucleoid, plasmids, cytoplasmic inclusions structures,
- d) D. Flagella, pili, fimbriae, prostheca, stalk

3. Microbial nutrition and growth

- a. Requirement of bioelements, growth factors for growth
- b. Nutritional types of microbes
- c. Modes of nutritional uptake
- d. Culture media: types of media
- e. Methods of obtaining pure culture-
- f. Microbial reproduction
- g. Growth curves
- h. The mathematics of growth, specific growth rate, generation time
- i. Effect of environmental factors on microbial growth: temperature, pH, osmotic pressure, pH, gases

4. Control of microbes: physical methods & chemical Methods

- a. **Physical methods of microbial control:** temperatures, radiation, ultrasonication, filtration
- b. **Chemical methods of microbial control:** phenol, alcohols, halogens, heavy metals, acids and alkalies, quaternary ammonium compounds, gaseous agents, aldehydes.
- c. **Preservation of cultures**

Reference:

List of microbiology books authored by:

- Principles of microbiology, atlas r.m.
- [microbiology](#) marjorie kelly cowan
- [microbiology](#) gerard j. Tortora
- [microbe hunters: the classic book on the major discoveries of the microscopic world](#) paul de kruif
- [foundations in microbiology](#) kathleen park talaro

- General microbiology [roger y. Stanier](#) macmillan, 1987
- Michael j. Pelczar jr. Chan ecs and krieg nr (2004) microbiology , 5th edition. Tata mcgraw hill.
- Instructor's manual to accompany elements of microbiology by [michael j. Pelczar](#)
- Prescott's microbiology, eighth edition reviewed by [joanne j. Dobbins](#) joanne m. Willey , linda m. Sherwood , and christopher j. Woolverton . 2011. McGraw-hill higher education, new york, ny.
- H.a.modi's :elements of microbiology
- H.a.modi's : introduction to microbial world
- black jg (2008), microbiology : principles and explorations 7th edition, prentice hall.
- Medigan mt and martinko jm (2014), brock biology of microorganisms, 14th edition. Parker j. Prentice hall international inc
- Cappuccino j and sherman n (2010) microbiology: a laboratory manual, 9th edition. Pearson education limited

Shri Govind Guru University, Godhra

Bridge Course For Zoology

Unit 1. Non chordates

- protozoa to nematoda
- Type study - amoeba - classification, structure, locomotion, reproduction, nutrition

Diverse types of microbes

- Non Chordata
- Annelida to Hemichordata
- Type Study - Paramoecium - Classification, structure, nutrition, locomotion, reproduction

Unit 2. Mammalian Histology

- Stomach, intestines, pancreas, liver, kidney
- physiology of excretion
- Respiration physiology

Mammalian Histology

- Lungs, cartilage, bone, tongue, thyroid gland
- Respiration physiology

Unit 3. Cytology

- Eukaryotic animal cell, nucleus, cell membrane, L.R. Ribosome
- Mitochondria, Golgi body, lysosome, centriole
- Light microscope, simple, compound, fluorescent
- Mitochondria, Golgi body, lysosome, centriole

Unit 4. Genetics

- Mendelian genetics, incomplete dominance
- Codominance, multiple alleles (ABO)
- Epistasis - Supplementary genes (9:3:4)
Complementary genes (9:7)
- Sex linked inheritance (X linked colour blindness, albinism)
Eye colour in Drosophila
(Y holandric genes)
(Hemophilia in man)

Shree Govind Guru University

GODHRA

Syllabus of Bridge course

**for students migrating from other universities
to SGGU in B.Sc. Sem.-III & Sem.-IV
after completing B.Sc. Sem-I & Sem-II**

PHYSICS

UNIT – 1 : Vector Algebra

(1) Introduction, (1.4) Product of Two Vectors, (1.11) Triple Scalar Product, (1.13) Triple Vector Product, (2.1) Differentiation of Vectors, (2.2) Differentiation with respect to time, Velocity & Acceleration (2.3) Integration of Vectors, (2.4) Partial Differentiation, (2.5) Gradient, (2.6) Divergence of a Vector, (2.8) Curl of a Vector, (2.11) Multiple Operations involving ∇ , (2.14) Gauss' Theorem (2.17) Stokes' theorem.

Text Book : Introduction to Classical Mechanics By R.G. Takwale & P.S. Puranik.
(Tata McGraw-Hill Publishing Co. Ltd.)

UNIT – 2 : Waves & LASER

1. Travelling waves

- Speed of propagation of waves in a stretched string
- longitudinal waves in a bar
- plane waves in fluid
- Transmission of energy by a travelling wave

Text Book- Mechanics,Wavemotion & Heat By - Francis Wetson Sears
Pub.- Addison Wesley pub. Art. 16.3 to 16.6

2. Sound waves

- Introduction
- Intensity and Intensity level
- Loudness and Pitch
- Radiation from a piston

Text Book- Mechanics,Wavemotion & Heat By - Francis Wetson Sears
Pub.- Addison Wesley pub. Art. 18.1, 18.2, 18.3,

3. Fundamentals of LASERS

22.1 – Introduction

22.4 – Interaction of light with matter

22.4.1 – Absorption

22.4.2 - Spontaneous emission

22.4.3 - Stimulated emission

22.14 - Types of LASERS

22.14.1 – Ruby LASER

22.14.3 – Helium –Neon LASER

Text Book : A Textbook Of Optics By Dr.N.Subrahmanyam, Brijlal, Dr.M.N.Avadhanulu,
S.Chand Publication (Chapter No. :- 22)

UNIT – 3 : Gravitation & Radioactivity

1. Gravitation

- 6.1 Newton's Law of Gravitation
- 6.2 Gravitational Field
- 6.3 Gravitational Potential
- 6.12 Escape Velocity
- 6.13 Kepler's Laws of Planetary Motion (all three)
- 6.15 Satellites
- 6.16 Time Period of satellite
- 6.17 State of weightlessness
- 6.18 Gravity

Text Book : Engineering physics By R.K. Gaur & S.L.Gupta. (Dhanpat Rai Publications.)

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, S. B. Patel, New Age International Limited.

UNIT – 4 : Electronics & Electrostatics

1. Diode Circuit

- 2.2 Half wave rectifier
- 2.8 Full wave rectifier
- 2.9 Bridge rectifier

Text Book :

Electronic devices and circuits-an introduction by Allen Mottershead, Chapter 2-3, Publish by PHI Learning private Ltd., New Delhi.

2. AC Bridge

- 5.5 Condition for bridge balance
- 5.6 Maxwell bridge
- 5.7 Hay bridge
- 5.8 Schering bridge
- 5.10 Wein bridge

Text Book:

Modern Electronic Instrumentation and Measurement Techniques by Albert D. Helfrick, William D. Cooper published by PHI Learning private Ltd., New Delhi, Chapter. 5

3. Electrostatics

- 1.1 Coulomb's Law
- 1.3 Electric Field
- 1.5 Electric Flux
- 1.6 Gauss' Law (Integral Form)
- 1.7 Gauss' law (Differential Form)
- 1.10 Electrostatic Potential
- 1.11 Relation between the field and the potential.
- 1.12 Two important relations
- 1.14 Electrostatic Energy.

Text Book : Electromagnetics by B.B. Laud.
(New Age International Publishers)

Reference Books:-

1. An introduction to LASERS – Theory and Applications by M.N.Avadhanulu, S.Chand & Company Ltd.
2. Optics – Third Edition by Ajay Ghatak
3. Fundamentals of Electricity and Magnetism by R.B.Singh & A.K.Shukla
(New Age International Publishers)
4. Mathematical Methods in Physical Sciences by M. L. Boas Chapter 6
(John Wiley & Sons)
5. Introduction to Classical Mechanics by R. G. Takwalw and P. S. Puranik
(Tata McGraw-Hill Pub. Com. Ltd.)
6. Nuclear Physics by Irving Kaplan, Narosa Publishing House
7. A Manual Of Radioactivity by Havest and F. A. Paneth, Oxford University Press
8. Experimental Nuclear Physics - Radioactive Decay by E. Segre, New York: Wiley
9. Atomic & Nuclear Physics by Chittaranjan Basu