RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

SCHEME
Semester – I

No	Subject Code	Subject Type	Subject Title	Marks Allotted						
				Assignment Marks		Theory Marks		Practical Marks		Total Marks
				Max	Min	Max	Min	Max	Min	
1	FC-101/1 (Foundation Course)	Core	English Language	10	4	40	14	-	-	50
2	FC-101/2 (Foundation Course)	Core	Development of Entrepreneurship	10	4	40	14	-	-	50
3	BSZ 111 (Zoology)	Core	Invertebrates & Chordate	20	8	80	27	50	17	150
4	BSB 111 (Botany)	Core	Diversity of Microbes & Cryptogams	20	8	80	27	50	17	150
5	BCH 111 (Chemistry)	Core	Based on Inorganic, Organic And Physical Chemistry	20	8	80	27	50	17	150
6	BPY 111 (Physics)	Core	MECHANICS	20	8	80	27	50	17	150
7	BBT 111 (Bioechnology)	Elective	CELL AND MOLECULAR BIOLOGY & MOLECULAR GENETICS	20	8	80	27	50	17	150
8	BCS-111 (Comp. Scie.)	Elective	Computer Fundamentals & Application	20	8	80	27	50	17	150
9	BEC 111 (Electronics)	Elective	FUNDAMENTALSOF ELECTRONICS	20	8	80	27	50	17	150
10	BMM 111 (Maths)	Core	Algebra and Trigonometry	20	8	80	27	-	-	100
11	BMB 111 (Micro. Bio)	Elective	Fundamental of Microbiology	20	8	80	27	50	17	150
12	BFS 111 (Food Sci.)	Elective	INTRODUCTION TO FOOD TECHNOLOGY	20	8	80	27	50	17	150

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B.Sc. Courses

Every candidate appearing in B.Sc. Semester 1 examination shall be examined in

(a) Foundation Course F.C (Compulsory) for all students.

(b) Any one of the following combinations:

1 Physics, Maths, Computer Science.
2 Physics, Maths, Electronics.
3 Physics, Chemistry, Maths.
4 Chemistry, Botany, Zoology.
5 Chemistry, Botany or Zoology, Biotechnology.
6 Chemistry, Botany or Zoology, Microbiology.
7 Chemistry, Botany or Zoology, Food Science.

Provided that the courses of studies for Physics offering combinations from (i) to (iii) and for Chemistry offering combinations from (iii) to (vii) shall be those prescribed for biology group.

Electives Subjects	**Core Subjects**	**Combinations Available**
BBT 111 Biotechnology	BSZ 111/BSB 111 (Zoology/Botany), BCH 111 Chemistry	BSZ 111/ BSB 111, BCH 111, BBT 111.
BMB 111 Microbiology	BSZ 111/BSB 111 (Zoology/Botany), BCH 111 Chemistry	BSB 111/ BSZ 111, BCH 111, BMB 111.
BEC 111 Electronics	BMM 111 Mathematics, BPY 111 Physics	BMM 111, BPY 111, BEC 111.
BFS 111 Food Science	BSZ 111/BSB 111 (Zoology/Botany), BCH 111 Chemistry	BSZ 111/ BSB 111, BCH 111, BFS 111.
BCS 111 Computer Science	BMM 111 Mathematics, BPY 111 Physics	BMM 111, BPY 111, BCS 111.

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Core Subjects	Combinations
BMM 111 Mathematics	BCH 111 Chemistry/BCS 111 Computer Science/ BEC 111 Electronics, BPY 111 Physics.
BPY 111 Physics	BCH 111 Chemistry/BCS 111 Computer Science/ BEC 111 Electronics, BMM 111 Mathematics.
BCH 111 Chemistry	BMM 111Mathematics, BPY 111 Physics or, BBT 111 Biotechnology, BSZ 111/BSB 111 (Zoology/Botany) or, BMB 111 Microbiology, BSZ 111/BSB 111 (Zoology/Botany) or, BSB 111 Botany, BZB 111 Zoology or, BFS 111 Food Science, BSZ 111/BSB 111 (Zoology/Botany),
BSZ 111 Zoology	BCH 111 Chemistry,BBT 111 Biotechnology or, BCH 111 Chemistry,BMB 111 Microbiology or, BCH 111 Chemistry,BSB 111 Botany or, BCH 111 Chemistry,BFS 111 Food Science.
BSB 111 Botany	BCH 111 Chemistry,BBT 111 Biotechnology or, BCH 111 Chemistry,BMB 111 Microbiology or, BCH 111 Chemistry,BSB 111 Zoology or, BCH 111 Chemistry, BFS 111 Food Science.

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Semester – I

Course	Subject	Subject Code
B.Sc. (FOUNDATION COURSE)	**English Language**	**FC-101/1**

COURSE OUTCOME

1: In this course students will read and understand about the rich classical texts from Indian literatures written in Hindi as well as Indian literatures written in Urdu, in translated versions

2: Upon the completion of course the students will be able trace the nature of influence that the classical texts have on modern English literatures

3: Know about various innovative ways of using English language in verbal and non-verbal communications.

4: Write clearly, effectively, and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.

5: Think about the relation between language and literature

COURSE CONTENTS:

Unit-I

1. Amalkanti : NirendranathChakrabarti
2. Sita : ToruDutt
3. Tryst with Destiny : JawaharlalNehru
4. Delhi in 1857 : MirzaGhalib
5. Preface to the Mahabharata : C.Rajagopalachari
6. Where the Mind is Without Fear : RabindranathTagore
7. A Song of Kabir : Translated byTagore
8. Satyagraha : M.K.Gandhi
9. Toasted English : R. K.Narayan
10. The Portrait of a Lady : KhushwantSingh
11. Discovering Babasaheb : AshokMahadevan

Unit-II

Comprehension

Unit-III

Composition and Paragraph Writing (Based on expansion of an idea).

Unit-IV

Basic Language Skills : Vocabulary – Synonyms, Antonyms, Word Formation, Prefixes and Suffixes, Words likely to be confused and Misused, Words similar in Meaning or Form, Distinction between Similar Expressions, SpeechSkills

Unit-V

Basic Language Skills: Grammar and usage – The Tense Forms, Propositions, Determiners and Countable/Uncountable Nouns, Verb, Articles,Adverbs.

Prescribed Books: English Language and Indian Culture, Published by M.P. Hindi Grant Academy.

Note :- Eight questions to be set from unit-1 and four to be attempted.

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B.Sc. Courses

Semester – I

Course	Subject	Subject Code
B.Sc. (FOUNDATION COURSE)	**Development of Entrepreneurship** उद्यमिताविकास	**FC-101/2**

COURSE OUTCOME

1: In this course students will learn and understand the meaning of entrepreneurship, types and functions of an entrepreneur, sequenced planning and guiding capacity explanation.

2: Upon the completion of the course the students will be able to discern distinct entrepreneurial traits

3: They will understand the systematic process to select and screen a business idea

4: Students will be able to design strategies for successful implementation of ideas

5: They will be able to prepare and analyse Project Report and interpret the same.

COURSE CONTENTS:

Unit - I

Entrepreneurship- Definition, Characteristics and importance, Types and functions of an entrepreneur, merits of a good entrepreneur motivational factors of entrepreneurship.
उद्यमिता–परिभाषा, विशेषताऐं एवं महत्व, एक उद्यमी के प्रकार एवं कार्य, एक अच्छे उद्यमी के गुण, उद्यमिता अभिप्रेरणा घटक।

Unit - II

(a) Motivation to achieve targets and establishment of ideas. Setting targets and facing challenges. Resolving problems and creativity. Sequenced planning and guiding capacity, Development of selfconfidence.

(b) Communication skills, Capacity to influence, leadership.

अ. लक्ष्य पाप्ति कौपरेणाएवंविचारांकौस्थापना। लक्ष्य निर्धारणएवंचुनौतीकासामना।
समस्यासमाधानएवंसृजनात्मकता। क्रमबद्ध योजना एवं क्षमता की दिशाबद्धता।
आत्मविश्वास का विकास।

ब. सम्प्रेषणकला। पभावित करनेकीक्षमता। नेतृत्व

Unit - III

(a) Project Report - Evaluation of selected process. Detailed project report – Preparation of main part of project report pointing out necessary andviability.

(b) Selecting the form of Organization – Meaning and characteristics of sole Proprietorship, Partnership and cooperative committees, elements affecting selection of a form of an organisation.

(c) Economic management – Role of banks and financial institutions banking, financial plans, working capital-evaluation and management, keeping ofaccounts.

अ. परियोजनापतिवेदन
चुनौतीपूर्णक्रियाकामूल्यांकन
विस्तृत परियोजना प्रतिवेदन– आवश्यकता एवं प्रासंगिकता परियोजना प्रपत्र के प्रमुख भाग परियोजना प्रतिवेदन तैयार करना।

ब. संगठन के प्रकार का चयन–एकाकी व्यवसाय, साझेदारी एवं सहकारी समिति का अर्थ एवं विशेषताएं संगठन के चयनकोप्रभावित करनेवालेघटक।

स. आर्थिक प्रबंधनवित्तिय संस्थानएवंबैंकोंकीभूमिका,बैंकिंग,वित्तिय योजना,कार्यकारीपूंजी–मूल्यांकनतथाप्रबंधन,लागत व मूल्य निर्धारणतथालाभकामूल्यांकन,आर्थिक लेखा–जोखारखना।

Unit - IV

(a) Production management. Methods of purchase. Management of movable assets/goods. Quality management. Employee management.Packaging.

(b) Marketing management. Sales and the art of selling. Understanding the market and market policy. Consumer management. Timemanagement.

अ. उत्पादनकाप्रबंधन,खरीददेनेकेतरीके,चल सम्पत्ति / माल काप्रबंधन,गुणवत्ताप्रबंधन,कर्मचारीप्रबंधन,पैकिंग ब. विपणनप्रबंधन,बिक्रीएवंबेचनेकीकला,बाजार कोसमझएवंविपणननीति,उपभोक्ताप्रबंधन,समय प्रबंधन

Unit - V

(a) Role of regulatory institutions – district industry centre, pollution control board, food and drug administration, special study of electricity development and municipalcorporation.

(b) Role of development organizations, khadi & village Commission/ Board, MP Finance Corporation, scheduled banks, MP Women's Economics DevelopmentCorporation.

(c) Self-employment-oriented schemes, Prime Minister's Employment schemes, Golden Jubilee Urban environment scheme, Rani Durgavati Self-Employment scheme, Pt. Deendayal Self-employmentscheme.

(d) Various grant schemes – Cost-of-Capital grant, interest grant, exemption from entry tax, project report, reimbursement grant,etc.

(e) Special incentives for women entrepreneurs, prospects &possibilities.

(f) Schemes of M.P. Tribal Finance Development Corporation, schemes of M.P. Antyavasai Corporation, schemes of M.P. Backward Class and Minorities Finance DevelopmentCorporation.

1- नियामक संस्थाओं की भूमिका–जिला उद्योग केन्द्र, प्रदूषण निवारण मंडल, खाद्य एवं औषधि प्रशासन, विद्युत विभाग तथा नगर निगम का विशेष अध्ययनA

2. विकासात्मक संस्थाओं की भूमिका, खादी एवं ग्रामीण आयोग/बोर्ड, मध्य प्रदेश वित्त निगम, अनुसूचित बैंक, मध्य प्रदेश का महिला आर्थिक विकास निगम।

3. स्वरांजगार मूलक यांजनाएं–पधानमंत्रीरांजगार यांजना,स्वर्णजयंतीशहरीरांजगार यांजना,रानीदुर्गावती स्वरांजगार यांजना,दिनदयाल स्वरांजगार यांजना।

4. विभिन्न अनुदान योजनाएँ– लागत पूँजी अनुदान, ब्याज अनुदान, प्रवेश कर से छूट, परियोजना प्रतिवेदन, प्रतिपूर्ति अनुदानआदि।

5. महिला उद्यमियों हेतु विशेष प्रेरणाएं, संभावनाएँ एवं समस्याएँ।

6- मध्य प्रदेश आदिवासीवित्त विकास निगमकीयांजनाएं,म.प्र.अत्यावसायीनिगमकीयांजना,म.प्र.पिछड़ावर्ग एवंअल्पसंख्यक वित्त विकास निगमकीयांजनाएं।

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Syllabus
Semester – I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Biotechnology)	**CELL AND MOLECULAR BIOLOGY & MOLECULAR GENETICS**	**BBT-111**

Course outcome:

1. Exhibit a knowledge base in genetics, cell and molecular biology, and anatomy and physiology
2. An introduction to the physical and chemical organization of living organisms; cell structure, function, and metabolism;
3. Classical and molecular genetics; gene regulation; genetic engineering;
4. Molecular aspects of development; and reproduction.
5. Identify DNA structure and replication, transcription, translation and gene expression.

UNIT-I

Cell as a basic unit - classification of cell types - cell theory - organization of plant and animals cells - comparison of microbial, plant and animal cells.
Ultra structure of cells - sub-cellular organization - structure and function of cell membranes, cytosol / Endoplasmic recticulum, nucleus, cytoskeleton, ribosomes, mitochodria and chloroplast, vacuoles, peroxisomes, lysosome, cell wall.

UNIT-II

Cell division (Eukaryotic and Prokaryotic) - mitosis, meiosis and cell cycle.
Cell - Chemical nature and macromolecular protein structure and function; membrane architecture, membrane associated process, ATP synthesis and photosynthesis, Sub-cellular organelles - mitochondria, chloroplast.

UNIT-III

Chromosomal Architecture - modern concept of Gene; Prokaryotes and Eukaryotes, Genetics of bacteria - Gene transfer in bacteria - Transformation, transduction and conjugation - mechanism and their use in genetic mapping, DNA transfections: Replication, repair, recombination, restriction andmodification.

UNIT-IV

Gene as a unit of mutation and recombination - DNA as a genetic material- different types; RNA as a genetic material - different types-genetic code; Mutation - molecular nature - physical and chemical mutagens and its applications.Plant Tissue Culture, Principle of Plant Tissue culture, Applications of Plant Tissue culture, Advantages of Plant Tissue Culture,what makes tissue culture so great.

UNIT-V

DNA replication - prokaryotic and eukaryotic DNA replication - Mechanisms of DNA replication - Enzymes and accessory proteins involved in DNA replication - Bacterial genetic system - transformation, conjugation and transduction.

Reference

1. Cell Biology, De Roberties & De Roberties, Blaze publishers & Distributors Pvt. Ltd., New Delhi,2001.
2. Molecular cell Biology (III rd Edition), Harvey Lodish, David Baltimore et al.,W.H. Freeman,2000.
3. Molecular Biotechnology - Principles and Applications of recombinant DNA, Glick,B.R and J.J Pasternak, 2002. Panima PublishingCo-operations.
4. Microbial Genetics (II Edition) - Maloy S.R., Cronan, J.E.Jr and Frieifelder, D. Jones. Bartlett publishers
5. Concept of Genetics (IV Edition) Willam S. Klug & Micheal R.Cummings. Molecular Biology, H.D.K.Kumar, Vikas Publishing House PrivateLTD.
6. 2. Introduction to Sub molecular Biology, Alberts Szent- Gyorgyi, 1960. Academicpress.
7. The Molecular Biology of the Gene, J.D.Watson et al., 1987. BenjaminCummings.
8. Genes V II. Benjemin Lewin, 1994. Oxford University Press.Oxford.
9. Molecular cell Biology (III rd Edition), Harvey Lodish, David Baltimore et al., W.H. Freeman,2000.

PRACTICLE-I
Cell and Molecular biology & Molecular Genetics

1. Cell Types - Microbial, Animal and Plant Morphometricmeasurements.
2. Fractionation of cellular components.
3. Cell membrane, Separation and analysis of membranecomponents.
4. Mitosis andMeiosis
5. Microscopy and calibrations
6. Single Cell Colony Isolation - Checking for GeneticMarkers
7. Induced Mutagenesis (UV and NTG)
8. Isolation of antibiotic resistant and auxotrophicmutants.
9. Cell counting methods:
10. Haemocytometer : WBS,RBC
11. Differential counting usingLeishmans
12. Calibration using occularmicrometer
13. Finding out average cellsize
14. Isolation of DNA from suitable materials (*E.coli.* Plantmaterials)
15. Microscopes and itsparts
16. Mounting buccal epithelium and observing living cells using vitalstaining.
17. Mitosis in Onion root tipsquash
18. Meiosis in grasshopper testissquash
19. Chironomous - Salivary gland Chromosome squashpreparation
20. Staining of macro molecules- Carbohydrates andLipids..
21. Observation o slides (Cardiac muscle, Sperm cell, Musclecell)

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Syllabus
Sem.– I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (CHEMISTRY)	**BASED ON INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY**	**BCH-111**

Course outcome:

1. To learn about the covalent bond and its applications.
2. Learn about the various critical phenomenons and its application.
3. Derivation of Vander Waal's Equation of State and gaseous states.
4. To learn about the Concept of isomerism and its brief idea.
5. To study about the Mechanism of Organic Reactions and its details.

Course Contents:

UNIT-I
Covalent Bond

Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions (BeF2, BF3, CH4, PF5, SF6,IF7 SO4, ClO4)Valence shell electron pair repulsion (VSEPR)theory to NH3, H3O+, SF4, CIF3, ICI2- and H2O. MO theory of hetero -nuclear (CO and NO) diatomic molecules, bond strength and bond energy.

UNIT-II
Gaseous States

Maxwell's distribution of velocities and energies (derivation excluded) Calculation of root mean square velocity, average velocity and most probable velocity. Collision diameter, co llision number, collision frequency and mean free path. Deviation of Real gases from ideal behavior.Derivation of Vander Waal's Equation of State.

UNIT-III
Critical Phenomenon:

Critical temperature, Critical pressure, Critical volume and their determination. PV isotherms of real gases,.**Liquid States** -Structure of liquids. Properties of liquids – surface tension, viscosity vapour pressure and optical rotations and their determination. **Solid State**
Classification of solids, Laws of crystallography – (i) Law of constancy of interfacial angles (ii) Law of rationality of indices(iii) Law of symmetry. Definition of unit cell & space lattice.X ray diffraction by crystals.Derivation of Bragg equation. Liquid crystals :,types of liquid crystals. Applications of liquidcrystals.

UNIT-IV
Stereochemistry of Organic Compounds-I

Concept of isomerism.Types of isomerism.elements of symmetry, molecular chirality,enantiomers, stereogenic centre, , chiral and achiral molecules with two stereogeniccentres, diastereomers, mesocompounds, resolution of enantiomers, inversion, retention and racemization.

Stereochemistry of Organic Compounds-II

Sequence rules, R & S systems of nomenclature. Geometric isomerism determination of configuration of geometric isomers. E & Z system of nomenclature, isomerism conformational analysis of ethane and n-butane, conformations of cyclohexane, Newman projection and Sawhorseformulae.

UNIT- V

Mechanism of Organic Reactions

Curved arrow notation, drawing electron movements with arrows, half-headed and double- headed arrows, homolytic and heterolytic bond breaking. Types of reagents – electrophiles and nucleophiles.Types of organic reactions.Energy considerations. Reactive intermediates carbocations, carbanions, free radicals, carbenes , arynes and nitrenes (formation, structure & stability).Assigning formal charges on intermediates and other ionic species.

Books:

1. Inorganic Chemistry, Huhee, Keiter and Keiter, Addition-Wesley,1993.
2. Applied Mathematics for Physical Chemistery, J.R. Barante, PreniceHall.
3. I. L. Levine, Quantum Chemistry , Prentice-Hall Inc., New Jersey. 4..

T. Engel and P. Reid, Physical Chemistry,Benjamin-Cummings.

5. F. A. Carey and R. J Sundberg, Advanced Organic Chemistry, Part A and B,Plenum
6. P. S. Kalsi., Organic Reactions and their Mechanisms, New AgeInternational

Paper (Practical's)

1. **Volumetric AnalysisRedox titrations**: Determination of Fe2+ , C2O4 2- (using KMnO4,K2Cr2O7)
2. **Iodometic titrations:** Determination of Cu2+ (using standardhyposolution).
3. **Complexometric titrations:** Determination of Mg2+ , Zn2+ byEDTA.

Section-B (Physical)

1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetatecatalyzed by hydrogen ions at roomtemperature.
2. To prepare arsenious sulphide sol and compare the precipitating power of mono-, bi –and trivalent anions.

Section – C (Organic)

1. Preparation and purification through crystallization ordistillation and ascertainingtheir purity through melting pointor boilingpoint
2. (i) Iodoform from ethanol (oracetone)
   (ii) *m*-Dinitrobenzne from nitrobenzene (use 1:2 conc. HNO3 -H2SO4 mixture if fuming HNO3 is not available)

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Syllabus

Semester – I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Physics)	**MECHANICS**	**BPY 111**

Course outcome:

1. Relative motion. Inertial and non inertial reference frames.
2. Parameters defining the motion of mechanical systems and their degrees of freedom.
3. Study of the interaction of forces between solids in mechanical systems.
4. Centre of mass and inertia tensor of mechanical systems.
5. Application of the vector theorems of mechanics and interpretation of their results.
6. Newton's laws of motion and conservation principles.
7. Introduction to analytical mechanics as a systematic tool for problem solving. 8 Use of mechanical simulation software.

UNIT I

Projectile: Definition of Range, time of flight and angle of projection - Range up and down an inclined plane maximum range - two directions of projections for a given velocity and range. Impulse-Impact: Laws of impact – coefficient of restitution – impact of a smooth sphere on a fixed smooth plane – Direct impact between two smooth spheres – Loss of kinetic energy in direct impact – velocity change in oblique impact between two smooth spheres.

UNIT II

SHM: Composition of two SHM's of same period along a straight line and at the right angles to each other Lissajous figures. Dynamics of Rigid Bodies: Compound pendulum theory condition – for minimum period interchangeability of center of suspension and center of oscillation – g using compound pendulum - Bifilar pendulum – parallel and non – parallel threads.

UNIT III

Center of gravity: Center of gravity of a solid cone, Solid hemisphere, hollow hemisphere and a tetrahedron. Friction: Laws of friction - angle of friction – resultant reaction and cone of fiction – equilibrium of a body on an inclined plane under the action of a force.

UNIT IV

Center of pressure: Definition – center of pressure of a rectangular lamina and triangular lamina. Hydrodynamics: equation of continuity of flow – Bernoullie's theorem – venturimeter – Pitot's tube.Conduction and Radiation : Thermal Conductivity - definition - thermal conductivity of a bad conductor - Lee's disc method - good conductor - Searle's method - radiation - Blackbody radiation – definition - Wien's Displacement law - Rayleigh Jean's law - Planck's law - Stepan's law and experimental verification of Stepan's law - Solar constant - temperature of the sun - by Angstrom's Pyrheliometer.

UNIT V

Maxwell's Thermodynamic relations : Derivation of Maxwell's thermodynamic relations - Helmholtz function - Gibb's function - Enthalpy – T-ds equation - Clausius - Clapeyron's Latent heat equation - specific heat relations.

Books for Study:

1. Mechanics and Mathematical Methods by R. Murugesan. S.Chand and Co.
2. Dynamics by M. Narayanamurthi and M. Nagarathnam, The National Publishing Company.
3. Statics, Hydrostatics and Hydrodynamics By Narayanamurthi and M. Nagarathnam, The National Publishing Company.

1. Classical Mechanics by H. Goldstein Addition Wesley Publications 2. Mechanics by D.S. Mathur, S. Chand and Co.,

SEMESTER-I

PRACTICALS

1. Young's Modulus *(q)* – Non uniform Bending – pin and microscope method.Determination of unknown mass of an object.
2. Young's Modulus *(q)* – Non uniform bending – scale and telescope method. Determination of unknown mass of an object.
3. Torsion pendulum – Rigidity Modulus.
4. Surface tension and interfacial surface tension – Drop Weight method.
5. Compound pendulum – Determination of *g* and *k*.
6. Sonometer – frequency of a tuning fork – Determination of mass of a stone.
7. Sonometer – R.D of a solid and liquid.
8. Spectrometer – (i-d curve).
9. Spectrometer - Grating – normal incidence measurement of Wavelength.
10. Potentiometer – calibration of low range Voltmeter.
11. P.O. Box – Temperature coefficient of resistance.
12. Lee's Disc – Thermal conductivity of a bad conductor and emissivity.
13. Joule's calorimeter – Specific heat capacity of a liquid – Barton's correction.

Reference books :

1. Practical Physics – Ouseph, Srinivasan & Vijayendran.
2. Practical Physics – P. R. Sasi Kumar, PHI.
3. Advanced Practical Physics – S. P. Singh, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Syllabus
Semester – I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (BOTANY)	Diversity of Microbes & Cryptogams	BSB 111

Course Outcome:

1. Understand the diversity among Bacteria, Viruses and Algae. Know the systematic, morphology and structure, of Bacteria, Viruses and Algae.
2. Understand the life cycle pattern of Bacteria, Viruses and Algae.
3. Understand the useful and harmful activities of Bacteria, Viruses and Algae
4. Understand the morphological diversity of Bryophytes and Pteridophytes.
5. Understand the economic importance of the Bryophytes and Pteridophytes.
6. Know the evolution of Bryophytes and Pteridophytes

Course Contents:

Unit-1

Viruses- Mycoplasma and Bacteria : characteristics of viruses and mycoplasma, general account of TMV and T4 bacteriophage. Bacterial structure, nutrition, reproduction and economic importance; general account ofCynobacteria.

Unit-2

Algae - General characters, classification and economic importance; important features and life history of Chlorophyceae- Volvox, Oedogonium, Charophyceae-Chara Xanthophyceae- Vaucheria, Phaeophyceae- Ectocarpus, Sargassum, Rhodophyceae - Polysiphonia.

Unit-3

Fungi- general characters, classification and economic importance, important features and life history of Mastigomycotina- Phytophthora, Zygomycotiana-Mucor. Asco mycotina -Aspergillus, Peziza,Basidomycotina-Puccinia,Deurteromycotina-Cercospora, Colletotrichum, general account ofLichens, Study of Fungal disease, Identification of Fungal disease and their Symptoms and Sign.

Unit-4

Bryophyta - Classification, study of morphology, anatomy, reproduction of Hepaticopsida, Riccia, Marchantia, Anthrocerotopsida Anthoceros, Bryopsida- Polytrichum

Unit-5

Pteridophyta - Important characters and classification. Stelar organization.Morphology and anatomy of Rhynia. Structure, anatomy and reproduction in Lycopodium, Selaginella, Equisetum andMarsilea.

Suggested Books :

1. G.M. Smith 1971 Cryptogamic Botany. Vol - I Algae & Fungi Tata McGrraw Hill Pub. Co. New Delhi.

2.G.M. Smith 1971 Cryptogamic Botany.Vol -II Bryophytes & Pteridophytes.Tata McGrraw Hill Pub.Co. New Delhi.
3. O.P.Sharma,1992. Text book of Thallophyta McGrraw Hill Pub.Co.
4. O.P.Sharma,1990. Text book of Pteridophyta McMillan India Ltd .
5. P.D.Sharma 1991. The Fungi.rastogi& Co. Meerut.
6. H.C. Dubey.1990. an introduction of Fungi.Vikas Pub. house pvt.ltd.
7. P.Puri 1980. Bryophyta Atma Ram & Sons, Delhi.
8. A.Clifton.1958. Introduction to the Bacteria. Mcgrew Hillpub. Co.New delhi.

Practical Work : Semester-I

Scheme of practical examination **Marks:**

Algae / Fungi	05	Brophyta	10	Pteridophyta	10
Plant disease	05	Spoting	10	Sessional	10
Total	50				

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Syllabus
Semester – I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Zoology)	INVERTEBBRATA & CHORDATA	BSZ 111

Course outcome:

1. To classify Phylum Porifera with taxonomic Keys.
2. To describe the Phylum Coelenterata and its Polymorphism .
3. To explain classification of protozoa and diseases caused by them.
4. To explain general characters of Amphioxus.
5. To identify the characters of Amphibia and its parental care.

Unit-1

A brief introduction and nomenclature - Level of Organization. Phylum Protozoa: General characters- Classifications. Type study-Parameciu m-Structure and Reproduction. General Topic: Protozoan Diseases, General Characteristics of Protozoa,Importance of Protozoa,
Pathogenic Protozoa That Cause Major Diseases of Domestic Animals, Protozoa Distribution

Unit -2

Phylum Porifera: General characters- Type study- Ascon- Cellular structure. Phylum Coelenterata: Classification- Type study- Aurelia- Structure and life history. General Topic: Canal system in Sponges, Polymorphism in Coelenterates. Phylum Mollusca: General characters- Type study – Unio (Lamellidens) - External morphology and digestive system. General Topic: Mouth parts of Insects- Economic Importance ofMollusca.

Unit -3

Phylum Platyhelmenthes: General Characters- Classification- Type study- Liver fluke- Structure and Reproduction. Phylum Annelida: General characters- Type study- Nereis- External morphology and reproduction. General Topic: Helminth Parasites in Man.

Unit-4

Introduction- Type Study: Amphioxus- external characters, digestive, excretory, respiratory, and circulatory systems.
Class: Pisces, General characters – Type Study: Scoliodon-External characters, Digestive, Excretory, Respiratory and Circulatory Systems- Structure of Brain-Sense organs and Reproductive system. General Topic: Accessory respiratory organs in fishes.

Unit-5

Class : Amphibia :General characters and classification -Type Study : Frog –External characters, Digestive ,Respiratory, Circulatory and Reproductive systems - Structure of Brain.
Class: Reptelia: General characters- Type study –Calotes- External characters-Digestive, Respiratory, Circulatory and Reproductive systems- Structure of Brain. General Topic: Identification of Poisonous and Non- Poisonous snakes. Golden age of Reptiles.

References

1. Agarwal V.K (2000) Invertebrate Zoology- S.ChandCompany.
2. Barnes R.D (1987) Invertebrate Zoology- Saunders CollegePublications.
3. Barrington E.J (1981) Invertebrate Structure and Function. ELBSEditions.
4. Ekambaranatha Iyer (1993) Manual of Zoology Volume IInvertebrata.Kotpal R.L (2003) Modern text book of Zoology- Rostogi Publications,Meerut.
5. Ekambaranatha Iyer (1993) Manual of Zoology Vol.II, Viswanathan (printers& publishers)Chennai.
6. Jordon, E.L & Verma, P.S. (2000) Chordate Zoology, S.Chand & Co, NewDelhi.
7. Newman H.H., Chordata, McMilanpublishers.

SEMESTER-I
PRACTICLE-I
INVERTEBATA AND
CHORDATA

I. MajorPracticals:
Cockroach-Nervous, digestive, Reproductive system
Prawn-Nervous system

II. MinorPracticals:
Prawn –Appendeges
Mouth parts –Honey Bee, Mosquito, and Cockroach.

III. Spottors:

a) Classify givingreations:
Entamoeba, Paramecium, Leucosolenia, Hyalonema, Aurelia, Obelia, Taenia, Ascaris, Earthworm, Nereis, Penaeus, Freshwater mussel, Starfish, Cockroach, Amphioxus, Salpa, Frog, Cobra, Pigeon, Rabbit.

b) Draw LabelledSketch:
T.S. of Taenia ,T.S .of Fasciola , Ephyra larva , Nauplius larva , Zoea larva ,Quill feather , Frog – Pectoral girdle ,Pigeon –Pelvic girdle .

c) Biological Significance:
Sponge –Gemmule, Physalia, Leech, Limulus, Bipinnaria, Ascidian tadpole larva, Ichthiophis, Peripatus.

d) Relate structure andfunction
Taenia –Scolex , Nereis – Parapodium, Peneus –Petasma, Star fish –Tube feet (ventral view), Echenies, Draco, Bat.

e) Comment on Respiratory /skeletal/ dentition of thefollowing
Star fish, Synsacrum, Dentition of Rabbit and Dog.

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B.Sc. Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc.(Computer Science)	COMPUTER FUNDAMENTALS & APPLICATION	BCS 111

Course outcome:

1. To study about the basic of computer , about its history and its invention in details.
2. To learn about the hardware and the software system of the computer.
3. To know about the network , its works and internet in details.

UNIT-1

Objective, Introduction, Generations of computer, First generation, Second generation, third generation, Fourth generation, types of computers, Minicomputers, Mainframe computers, Supercomputers, Numbers or Numerals, Characters, Organization of a computer, CPU, Motherboard, System Bus, Input Devices, Output Devices.

UNIT-2

Hardware, Computer Language, Machine Language, Assembly Language, High Level languages, Operating Systems and their Applications, Disk Operating System, Unix Operating System, Windows Operating System,

UNIT-3

Software-Concept, software-Classification, What is Operating system?History of Operating system, Operating System Concepts, Disk Drives and directories.

UNIT-4

General introduction to network, Meaning of network, Definition of network, LAN, WAN, VLAN, SONET, Types of network, Common types of network, Categories of networks, Topology in network:- BUS, STAR, RING, TREE, MESH.

UNIT-5

Accessing the internet, Getting an internet account, Getting connected to internet, World Wide Web, Web page, Net surfing, Beginnings of Email, Email settings, Web browser, web Servers, HTTP,

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Semester– I

BRANCH	SUBJECTTITLE	SUBJECTCODE
B.Sc (Electronics)	FUNDAMENTALSOFE LECTRONICS	BEC 111

Course outcome:

1. To give knowledge of some basic electronic components and circuits.
2. To introduce basics of diode and transistor circuits.
3. To understand working of some I C based circuits.
4. To introduce basic aspect of electronic communication systems.
5. To expose the students to working of some power electronic dev ices, transducers and application of transducers.

UNIT-I

Diode circuits and power Supplies: Junction diode characteristics- Half and full wave rectifiers- Expressionforefficiencyandripplefactor-Constructionoflowrangepowerpeakusingdiodes - Bridge rectifier- Filter circuits- Zener Diode-Characteristics- Regulated power supply usingZener diode- Clipper and Clamper using diodes.Differentiator and integrator using resistor andcapacitor.

UNIT-II

Transistor circuits: Characteristics of a transistor in CB, CE modes - Relatively merits - Graphicalanalysis in CE configuration- Transistor as a amplifier- RC coupledB.Sc. Electronics : Syllabus(CBCS) Single stage amplifier - Frequency response - Thevenin'sand Norton's theorems - hparameters.Basis logic gates AND, OR, and NOT - Construction of basic logic gates using diodesandtransistors.

UNIT-III

Amplifiers:Generalprinciplesofsmallsignalamplifiers-Classifications-RCCoupledamplifiers- Gain- Frequency response- Input and outputimpedance- Multistage amplifiers-Transformer coupled amplifiers- Equivalent circuits at low, medium and high frequencies –Emitterfollower.ClassAandClassBpoweramplifiers-Singleendedandpush-pullconfigurations-Power dissipation and output power calculations.

UNIT-IV

Feedback Amplifiers: Basic concept of feedback amplifiers- Transfer gain with feedback-General characteristics of negative feedback amplifier- Effect of negative feedback on gain -Gain stability- Distortion and bandwidth - Input and output resistance in the case of various typesoffeedback -Analysis of voltageand currentin feedback amplifiercircuits.

UNIT-V

OperationalAmplifiers:Principles-Transfercharacteristics-Variousoffsetparameters-Differential gain - CMRR - Slew rate - Bandwidth.Op-amp Circuits: Basic operational amplifiercircuitsunderinvertingandnoninvertingmodes-Adder-Subtractor-Integrator-ifferentiator
- Comparator-Sine, square and triangular waveform generators- Active filters- Sample andHold.circuits.Oscillators:Positivefeedback-Stabilityissues-Feedbackrequirementofoscillations -Barkhausen criterion for oscillation- Hartley, Colpitts, Phase shift and Wien bridgeoscillators-Conditionforoscillationandfrequencyderivation-Crystaloscillator-UJTrelaxationoscillator.Monostable,bistable andastable multivibrators-Schmitttrigger.

TextBooks

1. ElectricityandMagnetism-M.NarayanamoorthiandOthers,NationalPublishingCo.,Chennai.
2. ElectricityandMagnetism -R.Murugeshan,S.Chand&Co.Ltd.,New Delhi,
3. RevisedEdition, 2006.
4. PrinciplesofElectronics-V.K.Mehta, S.Chand&Co.,4/e,2001.
5. BasicElectronics - B.L.Theraja,S.Chand&Co.,4/e,2001.
1. FundamentalsofElectricityandMagnetism-B.D.Duggal&C.L.Chhabra,ShobanLalNaginChand &Co., Jallundur.
2. Physics,Vol.II -Resnick, Halliday&Krane, 5/e,JohnWiley&Sons,Inc.,.
3. BasicElectronics - B. Grob,McGraw-hill, 6/e,NY,1989.
4. ElementsofElectronics-Bagde&Singh,S.Chand&Co.B.Sc.Electronics:Syllabus(CBCS)
1. BasicElectronics- A TextLabManual-Zbar, Malvino&Miller -Tata McGraw Hill.
2. B.E.S.Practicals-R.SugarajSamuel&HorsleySolomon-DepartmentofElectronic

6.Science,C.T.M.CollegeofArtsandScience,Chennai.

3. ATextBookofPracticalPhysics-M.N.Srinivasan&others-SultanChand&Sons,NewDelhi.
4. PracticalPhysics -St.Joseph'sCollege,Tiruchirappalli.
5. PracticalPhysics-M.ArulThalapathi,ComtekPublishers,Kanchipuram
6. Linear IntegratedCircuits-D.RoyChoudhury&ShailJain,NewAge International
7. (P)Limited.B.Sc.Electronics:Syllabus(CBCS)

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B.Sc. Courses

Semester – I

Branch	Subject title	Subject code
B.Sc (Mathematics)	**Algebra and Trigonometry**	**BMM-111**

Course outcome:

1. Understand the concepts of vector spaces, subspaces, bases, dimension and their properties.
2. Use computational techniques and algebraic skills essential for the study of systems of Linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, Orthogonality and Diagonalization. (Computational and Algebraic Skills).
3. Discuss the behaviour of the Trigonometrical function.
4. Find Boolean Algebra and graph theory**..**
5. Expand sinnθ, cosnθ and tannθ by using Demoivre's theorem.
6. Expand cosnθ, sinnθ and tannθ in terms of θ.

UNIT-I

Linear Algebra:-Rank of a Matrix, Eigen values, Eigen vectors, Characteristics equation of a matrix, Cayley Hamilton theorem and its use in finding inverse of matrix, Application of matrix to a system of linear(both homogenous and non- homogenous) equations, theorems on consistency and inconsistency of a system of linear equations, Solving the linear equations with three unknowns.

UNIT-II

Theory of Equations .Relation between the roots and coefficients of a general polynomial equation in one variable, Transformation of equations, sum of r^{th} powers of roots; Reciprocal equations; Descartes rule of Sign.

UNIT-III

Expansion of Trigonometrical function-Expansions of sin x, cos x, tan x in terms of x; sin nx, cos nx, tannx, $\sin^n x$, $\cos^n x$, $\tan^n x$, hyperbolic and inverse hyperbolic functions – simple problems.

UNIT-IV

Group Theory and number theory :-Equivalence relations; Groups; subgroups – cyclic groups and properties of cyclic groups – simple problems;

UNIT-V

Boolean Algebra and graph theory:-Algebra of logic, Boolean algebra, Basic theorem, Construction of truth table, Boolean function and Boolean expression, Switching circuit, graph theory and Application of graphs.

Reference Books :-

1. Algebra : T. K. Manickavachagam Pillal and others (S. Viswanathanpublications)
2. Trigonometry : P.Duraipandian
3. Plane Trigonometry part 2 : S. L. Loney, (Macmillan and Co.London)

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Semester – I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc(Microbiology)	**Fundamental of Microbiology**	**BMB 111**

Course outcome:

1. Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures
2. Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also
3. Understand the structural similarities and differences among various physiological groups of bacteria/archaea
4. Know various Culture media and their applications and also understand various physical and chemical means of sterilization
5. Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
6. Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively
7. Comprehend the various methods for identification of unknown microorganisms

UNIT I

History, Taxonomy and Classification:

History and Scope of microbiology- Contributions of pioneers, Introduction to major groups of microorganisms and fields of Microbiology, Spontaneous generation *versus* biogenesis hypothesis, Whittaker's classification system of prokaryotes. Introduction to Bergey's manual of determinative and systematic classification, Bacterial nomenclature.

Unit II

Microscopy and Staining Techniques

Bright Field, Dark Field, Phase Contrast, Fluorescence and Scanning and Transmission Electron Microscopy, Stains and staining techniques- Stains and Dyes: classification and types, Types of staining- Simple (Monochrome, Negative), Differential (Gram and Acid fast).

Unit III

Morphology of Bacteria

Size, shape and arrangement of bacterial cells, Structures external to cell wall- Flagella, pili, capsule, sheath and prosthecae, Structures internal to cell wall- Cell membrane, nuclear material, cell wall (Protoplast and Spheroplast), spores, cytoplasmic inclusions, magnetosomes and plasmids.

Unit IV Microbial Taxonomy:

Bacteria with unusual properties- *Rickettsia, Chlamydia, Mycoplasma, Archaebacteria, Cyanobacteria, Actinomycetes,* Microbes of extreme environments– Adaptations and industrial importance of Thermophiles, Alkalophiles and Halophiles.

Unit V

Introduction to acellular forms of life

Introduction to viruses, viroids and prions, Structure of animal, plant and bacterial viruses, Classification and cultivation of viruses, Multiplication of bacterial viruses (lytic and lysogenic cycles).

Recommended Books (Semester-I)

1. Microbiology, Authors- Pelczar, Chan andKreig.
2. Microbiology- an Introduction- (8th Edn), Authors- Tortora, G.J., Funke, B.R., Case,C.L.
3. General Microbiology, Authors- Stainer, Ingharam, Wheelis andPainter.
4. General Microbiology, Authors- Stainer RY. Ingharam JL. Wheelis ML. PainterPR
5. Biology of Microorganisms, Authors- Brock andMadigan.
6. Fundamental Principles of Bacteriology, Author- A.J.Salle.
7. Introduction to Microbiology, Authors- Ingraham and Ingraham.
8. Microbial Physiology, Authors- Moat andFoster.
9. Prokaryotic Development Authors- Brun, Y.V. and Shimkets, L.J. 2000, ASMPress

LIST OF EXPERIMENTS

1. Principles and working knowledge of instruments like autoclave, pH meter, incubator, hotair oven, centrifuge, microscope and colonycounter.
2. Preparation of solid and liquid culture media and theirsterilization.
3. Growth of bacteria on agar slant, agar stab, Petri plate and inbroth.
4. Staining techniques- Simple staining, Gram staining, Negative staining, Endosporestaining, Metachromatic granule staining, Spirochetestaining.
5. Isolation of microorganisms by streak platemethod.
6. Isolation of microorganisms by pour platemethod.
7. Motility by hanging dropmethod.

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B.Sc. Courses

SEMESTER I

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (FOOD SCIENCE)	INTRODUCTION TO FOOD TECHNOLOGY	BFS 111

Course outcome:

1. To understand the relationship between food, nutrition and health.
2. To understand the history and the concept of food science.
3. To know the classification of food.
4. To study about the food adulteration and food additive.

Unit I
Introduction to food science

Definition, history Food science concept- Basic SI unit of length, volume and weight, temperature, relative density, pH or potential hydrogen

Physico-chemical properties of food- boiling point, evaporation, melting point, smoke point, surface tension, osmosis, humidity, freezing point and specific gravity.

Unit II
Colloidal systems in foods

Constituents of food, true solution, suspension, stability of colloidal system. Type of colloidal system in food- sol, gel, emulsion, foam

Classification of food

Health food, ethnic food, organic food, functional food, nutraceuticals, fabricated foods, convenience foods, GM foods, space foods

Unit III
Food additive and adulteration

Food additives, antioxidants, sequestrants, preservatives, nutrient supplement, emulsifiers, stabilizers and thickening agents, bleaching and maturing agent, sweeteners, humectants and anti caking agents coloring and flavoring substance

Food adulteration: Types of adulterants- intentional and incidental adulterants, methods of detection

Unit IV
Sampling and sample preparation

Population and sample

Methods of sampling-simple random sampling, systematic sampling, stratified random sampling

Summary Measures – Measures of central Tendency – arithmetic mean, geometric mean, harmonic mean, median, mode

Unit V

Food safety, quality and evaluation

Food safety and quality assurance- definition

Evaluation of food- subjective and objective

Food standards - PFA, BIS, AGMARK, FPO, FAQ, ISI

Reference

- Blackburn, C. W. and McClure, P.J Food borne Pathogens Woodhead Publishing Limited Cambridge England 2005.
- Frederick,J.F. Encyclopedia of Food Science and Technology. Second edition vol 1-4, a widely interscience publication, 2000
- Goldberg, I. Functional foods, Designer foods, pharma foods and nutraceuticals. An aspen publication, gaithers burg, marylamd, 1999.
- Roday, S., food science and nutrition. Third edition, Oxford University Press, New Delhi, 2008.
- Joseph,K.X. Statistics third edition Calicut University central co-operative stores Ltd. 2004.
- Khader,V. Text book of Food science and Technology. Published by India Council of Agricultural Research, NewDelhi 110012, 2001
- Kothari, C.R, Research Methodology- Methods and Techniques, 2nd edition New age International (P) Ltd publishers, New Delhi. 2000
- Manay, N.S, Shadaksharaswamy, M., Foods- Facts and Principles, New Age International Publishers, New Delhi, 2004.
- Srilakshmi, B. Food Science (3rd edition), New Age International (P) Limited Publishers, New Delhi, 2003.
- Reddy Y.S, Newer concept and applications for food industry. Gene tech Books, New Delhi 110002, 2006

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B.Sc. Courses

SCHEME
Semester – II

No	Subject Code	Subject Type	Subject Title	Marks Allotted						
				Assignment Marks		Theory Marks		Practical Marks		Total Marks
				Max	Min	Max	Min	Max	Min	
1	FC-201/1 Foundation course	Core	हिन्दी भाषा संरचना	10	4	40	14	-	-	50
2	FC-201/2 Foundation Course	Core	Environment	10	4	40	14	-	-	50
3	BSZ 121 Zoology	Core	Cell Biology & Genetics	20	8	80	27	50	17	150
4	BSB 121 Botany	Core	Cell Biology & Genetics	20	8	80	27	50	17	150
5	BCH 121 Chemistry	Core	Based on Inorganic, Organic And Physical Chemistry	20	8	80	27	50	17	150
6	BPY 121 Physics	Core	PROPERTIES OF MATTER AND SOUND	20	8	80	27	50	17	150
7	BBT 121 Biotechnology	Elective	BIOMOLECULES&ORGANICMECHANISMSIN BIOLOGY	20	8	80	27	50	17	150
8	BCS-121 Comp. Sci.	Elective	Operating System	20	8	80	27	50	17	150
9	BEC 121 Electronics	Elective	SEMICONDUCTOR DEVICES AND IC FABRICATION TECHNOLOGY	20	8	80	27	50	17	150
10	BMM 121 Maths	Core	Calculus and Numerical Analysis	20	8	80	27	-	-	100
11	BMB 121 Micro. Bio.	Elective	MICROBIAL PHYSIOLOGY & MICROBIAL GENETICS	20	8	80	27	50	17	150
12	BFS 121 Food Sci	Elective	BASIC NUTRITION	20	8	80	27	50	17	150

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B.Sc. Courses

Every candidate appearing in B.Sc. Semester 2nd examination shall be examined in

(c) Foundation Course F.C (Compulsory) for all students.

(d) Any one of the following combinations:

1 Physics, Maths, Computer Science.
2 Physics, Maths, Electronics.
3 Physics, Chemistry, Maths.
4 Chemistry, Botany, Zoology.
5 Chemistry, Botany or Zoology, Biotechnology.
6 Chemistry, Botany or Zoology, Microbiology.
7 Chemistry, Botany or Zoology, Food Science.

Provided that the courses of studies for Physics offering combinations from (i) to (iii) and for Chemistry offering combinations from (iii) to (vii) shall be those prescribed for biology group.

Electives Subjects	**Core Subjects**	**Combinations Available**
BBT 121 Biotechnology	BSZ 121/BSB 121 (Zoology/Botany), BCH 121 Chemistry	BSZ 121/ BSB 121, BCH 121, BBT 121.
BMB 121 Microbiology	BSZ 121/BSB 121 (Zoology/Botany), BCH 121 Chemistry	BSB 121/ BSZ 121, BCH 121, BMB 121.
BEC 121 Electronics	BMM 121 Mathematics, BPY 121 Physics	BMM 121, BPY 121, BEC 121.
BFS 121 Food Science	BSZ 121/BSB 121 (Zoology/Botany), BCH 121 Chemistry	BSZ 121/ BSB 121, BCH 121, BFS 121.
BCS 121 Computer Science	BMM 121 Mathematics, BPY 121 Physics	BMM 121, BPY 121, BCS 121.

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B.Sc. Courses

Core Subjects	Combinations
BMM 121 Mathematics	BCH 121 Chemistry/BCS 121 Computer Science/ BEC 121 Electronics, BPY 121 Physics.
BPY 121 Physics	BCH 121 Chemistry/BCS 121 Computer Science/ BEC 121 Electronics, BMM 121 Mathematics.
BCH 121 Chemistry	BMM 121Mathematics, BPY 121 Physics or, BBT 121 Biotechnology, BSZ 121/BSB 121 (Zoology/Botany) or, BMB 121 Microbiology, BSZ 121/BSB 121 (Zoology/Botany) or, BSB 121 Botany, BZB 121 Zoology or, BFS 121 Food Science, BSZ 121/BSB 121 (Zoology/Botany),
BSZ 121 Zoology	BCH 121 Chemistry,BBT 121 Biotechnology or, BCH 121 Chemistry,BMB 121 Microbiology or, BCH 121 Chemistry,BSB 121 Botany or, BCH 121 Chemistry,BFS 121 Food Science.
BSB 121 Botany	BCH 121 Chemistry,BBT 121 Biotechnology or, BCH 121 Chemistry,BMB 121 Microbiology or, BCH 121 Chemistry,BSB 121 Zoology or, BCH 121 Chemistry, BFS 121 Food Science.

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B.Sc. Courses

Semester – II

Course	Subject	Subject Code
B.Sc. (FOUNDATION COURSE)	हिन्दी भाषा संरचना	**FC-201/1**

COURSE OUTCOME

1: पाठ्यक्रमपूराकरनेकेबाद, एकशिक्षार्थीकोहिंदीभाषा के बारे मेंएकउन्नतसमझहोगी

2:पाठ्यक्रम पूरा करने के बाद, लेख लिखने के साथ-साथ अधिग्रहण करने के लिए एक शिक्षार्थी,वक्तृत्व में और हिंदी भाषा में अध्ययन में निपुणता होग

3:हिंदीविद्वानोंकोबढ़ावादेनेकेलिएऔरउन्हेंप्रासंगिकलिखनेऔरअनुवादकरनेकेलिएप्रोत्साहितकरनेकेलिए

4:छात्रोंकोउनकीसमृद्धसांस्कृतिक, नैतिक, साहित्यिकऔरवैज्ञानिकविरासतऔरकेलिएजागृतकरना

इकाई–1

भारतवंदना(काव्य) : सूर्यकांतत्रिपाठी'निराला'
जागतुझकोदूरजाना : सश्रीमहादेवीवर्मा
स्वतंत्रतापुकारती(काव्य) : जयशंकरप्रसाद'
हमअनिकेतन(काव्य) : बालकृष्णशर्मानवीन'
भाषाकीमहत्ताऔरउसकेविविधरूप
भाषा–कौशल

इकाई–2

कहानी(निबंध) : आचार्यरामचन्द्रशुक्ल
समन्वयकीपत्रिका(निबंध) : रामधारीसिंहदिनकर'
बिच्छीबूआ(कहानी) : डॉलक्ष्मीविष्णुबटरोही'
अनुवाद : परिभाषाप्रकार,महत्व,विशेषताएं
हिन्दीकेशब्द–संपदापरिभाषिकश
ब्दावली

इकाई–3

विलायतपहुँचहीगया(आत्मकथांश) : महात्मागांधी
अफसरीयांय) : शरदजोशी
तीर्थयात्रा(कहानी) : डॉमिथिलेशकुमारीमिश्र
मकड़ीकाजाला(व्यंग्य) : डॉरामप्रकाशसक्सेना
वाक्य–संरचनातत्सम,तद्भवदेशजविदेशी

इकाई–4

अप्पदीपोभव(वक्तृत्वकला) : स्वामीश्रद्धानन्द
भारतकासामाजिकव्यक्तित्व(प्रस्तावना) : जवाहरलालनेहरू
पत्रमंसूरकेमहाराजाकेा(पत्र–लेखन) : स्वामीविवेकानन्द
बनीरहेगीकिताब(आलेख) : डॉसुनीतारानीघोष
पत्र–लेखनमहत्वऔरउसकेविविधरूप
सड़कपरदौड़तीहैहामृग(निबंध)डॉश्यामसुन्दरदास

इकाई–5

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Semester – II

योगकीशक्ति(डायरी) : डां.हरिवंशरायबच्चन
कोशकंअखाडेमंकोईपहलवाननहीउतरता (साक्षात्कार) : भाषाविद्डां.हरदेवबाहरीसेप्रो.त्रिभुवननाथशुक्ल
नीगोसैनिकस्नोईट(यात्रा–संस्मरा) : डां.देवेन्द्रसत्यार्थी
यदिबानहोतीतोशायदगांधीकोयह ऊँचाईनमिलती(साक्षात्कार)5कथाकारगिरिराजकिशोरसेसत्येन्दशर्मा
सर–लेखन,भाव–पल्लवनसाक्षात्काररप्रयोजनऔरकौशल
निर्धारितपाठ्यपुस्तक : "हिन्दीभाषासंरचना"मध्यप्रदेशहिन्दीग्रन्थअकादमीद्वारा प्रकाशित

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Semester – II

Course	Subject	Subject Code
B.Sc. (FOUNDATION COURSE)	**Environment/पर्यावरण**	**FC-201/2**

COURSE OUTCOME

1: The subject facilitate the students' understanding of complex environmental issues from a problem-oriented, interdisciplinary perspective

2: Understand environmental problems and ways of addressing them, including interactions across local to global scales.

3: Upon the completion of the course the students will be able to appreciate the ethical, cross-cultural, context of environmental issues and the links between human and natural systems.

4: They will reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Unit-I

Study of Environmental and ecology:

(a) DefinitionandImportance. (b) Environmental Pollution andproblems.

(c) Public participation and Publicawareness.

पर्यावरणएवंपारिस्थितकीयअध्ययन

(क) परिभाषाएवंमहत्व (ख) पर्यावरणप्रदूषणएवंसमस्याएं

(ग) जनभागीदारीएवंजनजागरण।

Unit-II

Environmental Pollution :

(a) Air, water, noise, heat and nuclearpollution.

(b) Causes, effect and prevention ofpollution.

(c) Disaster management – Flood, Earthquake, cyclones andlandslides.

पर्यावरणीयप्रदूषण

(क) वायु,जल,ध्वनि,तापएवआणविकप्रदूषण (ख) प्रदूषकोंकारण,प्रभावएवंरोकथाम

(ग) आपदाप्रबंधन–बाढ़भूकंप,चक्रवातएवंभूस्खलन

Unit-III

Environment and social problems :

(a) Development – non-sustainable toSustainable. (b) Energy problems ofcities.

(c) Water preservation – rain-watercollection.

पर्यावरणएवंसामाजिकसमस्याएं

(क) आधारभूतसंरचनाविकास (ख) नगरोंकी ऊर्जासमस्या

(ग) जलसंरक्षा–वर्षाजल–संग्रहण

RKDF UNIVERSITY, BHOPAL

B.Sc. Courses

Semester – II

Unit-IV

Role of mankind in conserving natural resources :

(a) Food resources – Worldfoodproblem (b)Energy resources – increasing demand forenergy.

(c) Land resources – Land asresources.

प्राकृतिकसंसाधनोंकेसंरक्षणमेंमनुष्यकीभूमिका

(क) खाद्य–आहारसंसाधन–विश्वआहारसमस्या (ख) ऊर्जासंसाधन– ऊर्जाकीबढ़तीमांग

(ग) भूमिसंसाधन–भूमिसंसाधनकगृपम,भूमिअवनयन,मनुष्यकतभूस्खलन

Unit-V

Environment conservation laws :

(a) Conservation laws for air and waterpollution.

(b) Wildlife conservationlaws.

(c) Role of information technology in protecting environment &health.

पर्यावरणसंरक्षाकानून

(क) वायतथाजलप्रदूा–संरक्षाकानून ण

(ख) वन्यप्राणिरक्षाकानूण

(ग) पर्यावरणतथास्वास्थ्यरक्षामसूचनाप्रौद्योगिकीकीभूमिका

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester – II

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (CHEMISTRY)	Based on inorganic, organic and physical chemistry	BCH-121

Course outcome:

1. To learn about the Rate of reaction, rate equation and its explanations of its reactions.
2. Explanations of metallic bond and semiconductors.
3. To study about the various theory and about alkenes.
4. To learn about the different laws and its applications.

UNIT-I

Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Vander WaalsForces

Metallic Bond and Semiconductors

Metallic Bond- Brief introduction to metallic bond, band theory of metallic bond Semiconductors- Introduction, types and applications.

UNIT-II

Rate of reaction, rate equation, factors influencing the rate of a reaction – concentration, temperature, pressure, solvent, light, catalyst.Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction.Half life period of a reaction.Methods of determination of order of reaction.

Kinetics-II

Effect of temperature on the rate of reaction – Arrheniusequation. Theories of reaction rate – Simple collision theory forunimolecular and bimolecular collision. Transition state theory of Bimolecular reactions.

UNIT-III

Electrolytic conduction, factors affecting electrolytic ,.Arrhenius theory of ionization, Ostwald's Dilution Law. Debye-Huckel – Onsager's equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included). **Electrochemistry-II** Kohlarausch's Law, calculation of molar ionic conductance and effect of viscosity.Application of Kohlarausch's Law in calculation of conductance of weak electrolytes at infinite diloution.Applications of conductivity, Definition of pH and pKa, Buffer solution, Buffer action, Henderson – Hazelequation, Buffer mechanism of buffer action.

UNIT-IV

Nomenclature of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities o falkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration–oxidation, oxymercuration reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4.

UNIT-V

IUPAC nomenclature of branched and unbranched alkanes , thealkyl group, classification of carbon atoms in alkanes. Isomerismin alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction Cycloalkanes nomenclature, synthesis of

cycloalkanes and their derivatives –photochemical (2+2) cycloaddition reactions, dehalogenation of β,β-dihalides, ,pyrolysis of calcium or barium salts of dicarboxylic acids, Baeyer's strain theory and its limitations.

Book suggested :

1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, JohnWiley.
2. Chemistry of the Elements. N.N. Greenwood and A. Earnshow,Pergamon.
3. J. March., Advanced Organic Chemistry: Reactions, Mechanisms and Structure, JohnWiley.
4. P. S. Kalsi., Organic Reactions and their Mechanisms, New AgeInternational
5. J. P. Lowe and K.Peterson, Quantum Chemistry AcademicPress.

Paper (Practical's)
Section-A (Inorganic)
Paper Chromatography
Qualitative Analysis of the any one of the following Inorganic cautions and
anions by paper chromatography (Pb2+ , Cu2+ , Ca2+ , Ni2+ , Cl- , Br- , I- and PO43-and NO3-

Section-B (Physical)
1. To determine the surface tension of a given liquid by drop numbermethod.
2. To determine the viscosity of a given liquid**.**
3. To determine the specific refractivity of a givenliquid.

SECTION – C (Organic)
1. Dibenzalacetone from acetone andbenzaldehyde
2. Aspirin from salicylic acid. To study the process of) sublimation of camphor and phthalicacid

Books for practical:

1. Vogel's Textbook of Quantitative Analysis, revised, J. Bassett, R.C. Denney, G.H.Jeffery and J. Mendham,ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L. Jolly. PrenticeHall.
3. Experiments and Techniques in Organic Chemistry, D.P.Pasto, C. Johnson and M.Miller, Prentice Hall.
4. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C.Heal

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester – II

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Physics)	PROPERTIES OF MATTER AND SOUND	BPY 121

Course outcome:

1. Study the elastic behavior of materials
2. Analyze the relationship between various types of experiments
3. Perform the procedure as per standard values
4. Understand the applications

UNIT-I

Elasticity: Three types of elastic moduli - Poisson's ratio - Bending of beams - Expression for bending moment - Depression of the loaded end of a Cantilever - uniform - non uniform bending - theory - experiment pin and microscope method - work done in uniform bending – Koenig's method – non-uniform bending - theory - expression for couple per unit twist - determination of rigidity modulus - Static torsion method with scale and telescope - Rigidity modulus by torsion pendulum with mass.

UNIT-II

Interference and Interferometers : Coherence - temporal coherence and spatial coherence - Air wedge – testing the planeness of a surface - Michelson Interferometer - types of fringes - Difference in wavelength of Sodium D1, D2 lines and thickness of a thin transparent plate. Multiple beam interference - Febry - Perot interferometer - formation of fringes.
Holography : Holography - recording and reconstruction.

UNIT-III

Surface tension and Osmosis : Surface energy - angle of contact and its determination - excess of pressure inside curved surface - formation of drops - Experimental study of variation of Surface tension with temperature - drop weight method of determining surface tension and interfacial surface tension - angle of contact of mercury - Quincke's method - surface tension and vapour pressure osmosis - experimental determination of osmotic pressure - Laws of osmosis pressure - osmotic and vapour pressure of a solution.

UNIT-IV

Sound: Definition of free, damped and forced vibrations – Theory of forced vibrations - Resonance - Sharpness of resonance - Fourier's theorem - application for Saw- tooth wave and square wave. - Sonometer - determination of A.C. frequency using sonometer - Determination of frequency using Melde's apparatus.

UNIT-V

Ultrasonics: Ultrasonics - Production - Piezo electric method – magneto-striction method - detection - properties - applications. Acoustics : Acoustics of buildings - reverberation time - derivation of Sabine's formula - determination of absorption coefficient.

BOOKS FOR STUDY:

1. Elements of properties of matter by D. S. Mathur S. Chand & Co., (2005).
2. Properties of matter by R. Murugesan, S. Chand & Co., (2005).
3. Properties of matter by Brijlal and N. Subramaniam S. Chand & Co., (2005).
4. Properties of matter and Acoustics by R. Murugesan, S. Chand & Co., (2005).
5. A Text Book of Sound by N. Subramaniam and Brijlal, S. Chand & Co., (2005).

BOOKS FOR REFERENCE:

1. Fundamentals of General Properties of Matter, H. R. Gulati, S. Chand & Co., (2005).
2. Properties of Matter, Subramania Iyer and Ranga Rajan, Viswanathan Publication (2002).
3. A Text Book of Sound (2005), R. L. Saighal, S. Chand & Co.,
3. Geometrical and Physical Optics - P. K. Chakrabarti, New Central Book Agency (P) Ltd, Kolkata., 2005.
4. Optics - D.R. Khanna and H.R. Gulati, R. Chand & Co, New Delhi., 1979.
5. Engineering Physics - G. Vijayakumari, Vikas Publications.

: 1. Optics - Eugene Hecht, Fourth Edition, Pearson Education, New Delhi. 2007.
2. Fundamentals of Optics - Jerkins A Francis and White E Harvey, McGraw Hill Inc., New Delhi, 1976.
3. Optical Physics - S.G. Lipson, H. Lipson and D.S. Tannhauser, Cambridge University Press. 1995.
4. Fundamentals of Optics - M.G. Raj, Anmol Publications Pvt. Ltd., New Delhi, 1996.

SEMESTER-II

PRACTICALS PRACTICAL

01. Young's modulus *(q)* - uniform bending - pin and microscope.
02. Young's modulus (q) - uniform bending - scale and telescope method.
03. Static Torsion – Rigidity modulus.
04. Torsion Pendulum – Moment of Inertia and Rigidity modulus – symmetrical masses.
05. Coefficient of Viscosity of a liquid - graduated burette - radius by mercury pellet method.
06. Melde's apparatus - frequency - transverse and longitudinal modes.
07. Specific heat capacity of a liquid by cooling - verification of Newton's law of cooling.
08. Air Wedge - thickness of a wire and its insulation.
09. Spectrometer - grating - minimum deviation – Determination of wavelength of mercury lamp.
10. Potentiometer - ammeter calibration.
11. Potentiometer - Specific resistance of the given coil and length of second coil without unwinding.
12. *M* and *BH* - Deflection Magnetometer - *TAN A* and *TAN B* position.
13. Field along the axis of a coil - deflection magnetometer – determination of *BH*.
14. Carey-Foster's bridge - Specific resistance of a coil.
15. BG - Comparison of Capacities.
16. BG - Comparison of EMF's of two cells.
17. Zener diode – Voltage regulator using four diodes and percentage of regulation.
18. Verification of De Morgan’s theorem.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (BOTANY)	Cell Biology & Genetics	BSB 121

Course Outcome:

1. Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. Students will understand how these cellular components are used to generate and utilize energy in cells
3. Students will understand the cellular components underlying mitotic cell division.
4. Students will apply their knowledge of cell biology to selected examples of changes orlosses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation.

Unit-1

The cell envelope: plasma membrane, bilayer lipid structure, function of the cell wall. Structure and function of cell organells: Golgibodies,ER, Peroxisome, Vacuole, Chloroplast and Mitochondrion.

Unit-2

Ultrastructure and function of nucleus: Nuclear membrane, Nucleolus, Extranuclear genome, Presenceand functions of mitochondrial and plastid-DNA, Plasmids. Chromosomal organization; morphology, centromere And telomere, special types of chromosome, Mitosis and Meiosis

Unit-3

Variations in chromosomes structure : Deletions, duplications translocations. inversions; variation in chromosome number, aneuploidy, polyploidy, DNA the genetic material, DNA structure and replication, the nucleosome model, satellite and repetitiveDNA.

Unit-4

Structure of gene: genetic code, transfer of genetic information; trascription, translation, protein syntesis, tRNA, and ribosomes. Regulation of gene expression in prokaryotes and eukaryotes.

Unit-5

Genetic inheritance: Mendelism; laws of segregation and independent assortment; linkage analysis; interactions of genes. Genetic variations; mutations, spontaneous and induced; transposable elements; DNA damage and repair.

Suggested Books :

1. Alberts B.D. Lewis, J.Raff, M.Rubers, K. and Watson I.D. 1999 molecular Biology of cell Garland Pub. Co. Inc. New York,U.S.A.
2. P.K. Gupta 1999 A text Book of cell and Molecular Biology, Rastogi Pub. MeerutIndia.
3. Kleinsmith L.J. and Molecular Biology (2nd edition) Harper Collins College pub. New YorkUSA.
4. P.K. Gupta Genetic's Rastogi Pub.Meerut.
5. Sinha & Sinha cytogenetics & plant Breeding VikasPub.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester – II

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (ZOOLOGY)	CELL BIOLOGY & GENETICS	BSZ 121

Course Outcome:

1. Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. Students will understand how these cellular components are used to generate and utilize energy in cells
3. Students will understand the cellular components underlying mitotic cell division.
4. Students will apply their knowledge of cell biology to selected examples of changes orlosses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation.

UNIT 1

Prokaryotic and eukaryotic cells –Ultrastructure and Organization.Plasma membrane–Ultra structure– Chemical compositon and functions of modifications of plasma membrane. Endoplasmic reticulum: Morphology, Ultra structure, chemical composition and functions. Golgi complex: Ultra structure, chemical composition and functions.

UNIT 2

Lysosomes: Ultra structure and polymorphism- chemical composition and functions: Peroxisomes and glyoxysomes. Mitochondria: Ultra structure- chemical composition-enzyme systems- functions-Oxidation- Respiratory chain (ETP)- Kreb's cycle, ATP Production and Biogenesis.

UNIT 3

Ribosomes: Ultra structure-types- chemical composition - functions. Nucleus and Neucleolus: Ultra structure of Nucleus and Nucleolus. Nucleic Acids: DNA –Ultra structure-replication- transcription, Chromosomes: Ultra structure of Chromosomes and Giant Chromosomes, Cell division- mitosis and meiosis. Cell cycle,

UNIT 4

Introduction –Laws of Mendel –Interaction of genes (Epistatic gene ,Complementary genes and Lethal genes . Inheritance of Blood group in man and Coat colour in Rabbit .
Mechanism of linkage and crossing over –Types and theories - Chromosomal
Mapping –Sex linked inheritance (haemophilia, and colour blindness). Sex limited inheritance and sex influenced inheritance .

UNIT 5

Sex determination in man, Drosophila and Bonellia. Mutations – Point mutation and Chromosomal aberrations and mutagens **.**Inbreeding and out breeding, heterosis –Genetic applications in animals. DNA as genetic material –Experiments . Syndromes (Down syndrome and Turners syndrome in man)**.**

TEXT BOOKS:

Cell biology. Veer Bala Rastogi, Rastogi Publications.
Cell Biology, Power.Verma P.S. and Agarwal V. K . –Concepts of Genetics .
Rastogi V.B. A text book of Genetics, K.Ramnath, Meerut.

YEAR-I,SEMESTER-II
PRACTICAL
CELL BIOLOGY AND GENETICS

A. Major Practicals

Use Microscopes, Camera Lucida, Stage and Ocular micrometers.

Total Counting of RBC / WBC Using haemocytometer.

Blood Smear Prepartion, Differential count of WBC.

Mounting Buccal Epithelium and observing living cells using vital

staining.Study of mitotic division using onion root tips.

Study of prepared slides of different

tissues.Submission of practical record.

B.GENETICSPRACTICALS

Observation of common mutants of drosophila
Preparation of mounting of the salivary gland in chironomous larva
Submission of practical record

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Biotechnology)	**BIOMOLECULES & ORGANIC MECHANISMS IN BIOLOGY**	**BBT-121**

Course outcome:

1. Through this course the students are exposed to importance of biological macromolecules.
2. They acquire knowledge in the quantitative and qualitative estimation of biomolecules.
3. They study the influence and role of structure in reactivity of biomolecules.
4. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions.

Unit -I

Biomolecules: configuration and conformation. Properties of water as biological solvent. Carbohydrates: Chemical structures, nature, properties, Classification and Importance in Biological Systems.

Amino acids: Classification, properties, structure, nature. Proteins: Classification, Structure and Function. Primary, Secondary, Tertiary and Quaternary Structure and their functional significance.

Unit - II

Enzymes: Classification, Characteristics, Factors affecting enzyme activity. Enzyme Kinetics, Km & Vmax, Activation and Inhibition of Enzymes. Non- Protein Enzymes, Application of Enzymes *invitro* and *in vivo*.

Unit - III

Nucleic acids: Bases, nucleosides and nucleotides, DNA & RNA structure, DNA forms, RNA types. Watson and crick model. Nucleosome model of chromosome. Genome organization and Packaging of DNA

Unit-IV

Carbohydrate Metabolism – Aerobic & Anaerobic glycolysis, sequence of reactions in glycolysis, regulation in glycolysis, citric acid cycle, glycogenesis, glycogenolysis (sequence of reactions & regulation), Pentose-phosphate pathway (sequence of reactions & regulation), extraction of energy from food sources.

Unit-V

Amino acid Metabolism – Amino acid breakdown (amino acid deamination, Urea cycle, metabolic breakdown of individual amino acids – glucogenic & ketogenic amino acids), amino acids as biosynthetic precursors (haem biosynthesis & degradation, biosynthesis of epinephrine, dopamine, seretonin, GABA, histamin, glutathione); biosynthesis of essential & non-essential amino acids.

Suggested Readings

1. Principle of Biochemistry : Leinger , A. L.
2. Biochemistry (1995) Lubert Stryer
3. Text Book of Biochemistry (1997) Devlin , Thomas M.
4. Biochemistry (1993) Geoffery, Zubay
5. Basic Biological Chemistry : Mahler and Cordes
6. Harper's Review of Physiological Chemistry(1993) Murray, R. K., Mayes, P. A. Gramner, D. K. and Rowell V. W.
7. Lehninger's Principle of Biochemistry D L Nelson & M M Cox 5th Edition
8. Biochemistry – Keshav Trehan Wiley Eastern Publications
9. Fundamentals of Bochemistry-J.L.Jain S.Chand and Company
10. Biochemistry- Prasaranga, Bangalore University
11. Fundamental of Biochemistry – Dr.A.C.Deb
12. Textbook of Organic Chemistry (A Modern Approach)
13. The Biochemistry of Nucleic acid – Tenth Edition-Roger L.P.Adams, John T. Knowler andDavid P.Leader, Chapman and Hall Publications

PRACTICLE

1. Determination of pH from unknown biological samples using pH paper and pH meter.
2. Measurement of energy by Bomb colorimeter.
3. Analysis of carbohydrates (sugars, starch), proteins, lipids, and amino acids in biological samples.
4. Assays of amylase, peroxidase, catalase from biological samples using Spectrophotometer.
5. Separation of plant pigments and amino acids by PC and TLC.
6. Demonstration of gel electrophoresis.
7. Fractionation of biological material into its various components by Centrifuge.
8. Qualitative analysis of Carbohydrates, Proteins and Lipids.
9. Quantitative estimation of Protein by Folin-Lowry unitary method.
10. Quantitative estimation of sugar by Nelson Somogy's unitary method.
11. Quantitative estimation of sugar by DNS method.
12. Analyzing the enzyme activity.
13. Study the effect of pH on enzyme activity.
14. Study the effect of temperature on enzyme activity.
15. Determination of urine urea nitrogen.
16. Isolation of serum albumin by salting out method.
17. Determination of serum albumin by Bromocresol green method.
18. Determination of serum bilirubin.
19. Blood group analysis
20. Determination of haemoglobin content by haemoglobinometer.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Computer Science)	Operating System	BCS-121

Course outcome:

1. To study about the system porgraming and its opareting system, its history.
2. To learn the files , process and others .
3. Explanation of memory managements in details.

UNIT I

Introduction to System Programs & Operating Systems, Evolution of Operating System (mainframe, desktop, multiprocessor, Distributed, Network Operating System, Clustered & Handheld System), Operating system services, Operating system structure, Operating system design & Implementations. Types of Operating System: Bare machine, Batch Processing, Real Time, Multitasking & Multi programming, time-sharing system.

UNIT II

File: concepts, access methods, free space managements, allocation methods, directory systems, protection, organization, sharing & implementation issues, I/0 devices organization, I/0 buffering, I/O Hardware.

UNIT III

Process: Concept, Process Control Blocks (PCB), Scheduling criteria Preemptive & non Preemptive process scheduling, Scheduling algorithms, inter process communication.
Deadlock: Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

UNIT IV

Memory Hierarchy, Concepts of memory management, MFT & MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation .Structure & implementation of Page table. Concepts of virtual memory, Cache Memory Organization, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.

UNIT V

Distributed operating system:-Types, Design issues, File system, Remote file access, RPC,RMI, Distributed Shared Memory(DSM), Computer Worms & Virus, Security Design Principle, Authentications, Protection Mechanisms. introduction to Sensor network and parallel operating system. Case study of Unix, Linux & Windows.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Electronics)	SEMICONDUCTOR DEVICES AND IC FABRICATION TECHNOLOGY	BEC 121

Course outcome:

1. Understand the characteristics of IC and Op-Amp and identify the internal structure.
2. Derive and determine various performances based parameters and their significance for Op-Amp.
3. Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
4. Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event.
5. Understand and apply the functionalities of PLL to Frequency synthesizer, multiplier, FM, and AM demodulators.
6. Learn to Design & implement a triggering / gate drive circuit for a power device like SCR,MOSFET etc.

UNIT-I

Digital Electronics

Analog and digital signals - Digital circuits - Binary number system - conversion of Binary to decimal - decimal to binary - logic gates - OR gate - AND gate - NOT gate - Combination of Logic gates - NANDand NOR as universal building blocks.

UNIT-II

Number system and codes: Decimal, binary, octal, hex numbers, conversion from one to another - codes, BCD, excess 3, gray codes conversion from one to another -Error correction / detection codes.Boolean algebra and theorems: Basic, Universal logic gates - Boolean Theorems - sum of products, products of sums expression, simplification by Karnaugh Map method, simplification based on basic Boolean theorems - don't care conditions.Combinational Digital Circuits: Arithmetic building blocks, Basic Adders and Subtractors, BCD adders - Data processing circuits, multiplexers, demultiplexers, encoders, decoders - TTL, CMOS digital logic families.

UNIT-III

Sequential Digital Circuits: Flip - Flops, RS, clocked SR, JK, D, T, master-slave types -shift registers, ring counters-ripple counters - Design of counters - modulus of counters - timer IC 555, applications.DAC and ADC: Parameters, Accuracy, Resolution - DAC, variable resistor network, R-2R ladder network types - ADC, counting, continuous, successive approximation, dual-slope types - comparison of various types of ADC and DAC.

UNIT-IV

Transistors - Working of PNP and NPN transistors - Transistor connections -Relation between β and α - Expression for collector current - Transistor characteristics in CE mode - Transistor as an amplifier and oscillator its performance -Semiconductor devices numbering system - Phototransistor.Construction, working characteristics of FET and MOSFET (D and E type) -Parameters of FET - Difference between FET and BJT - Difference between FET and MOSFET - Applications of FET and MOSFET - Advantages of MOSFET.

UNIT-V

Construction, working characteristics of UJT and SCR I Equivalent circuit of UJT -SCR as a switch and rectifier - Applications of UJT and SCR - Characteristics of TRIAC. Schottky effect - Working characteristics of MIS, MIM diodes - Working and merits of CCD, LED and LCD - LDR - Photodiode - Solar cell - Semiconductor LASER diode and its application.Integrated circuit - Monolithic Integrated Circuit technology - Fabrication of IC components - Resistors, Capacitors, Diodes, Transistors, FET and MOSFET - Thin and thick film technology - LSI - MSI - VLSI - IC package and symbols - Merits and demerits of ICs**Text Books**

1. Electronic Devices and Circuits (Applied Electronics Vol. I) - G.K. Mithal, Khanna
2. Electronic Principles - A.P. Malvino, Tata McGraw Hill Publishing Co. Ltd.
3. A Text Book of Applied Electronics - R.S. Sedha, S. Chand & Co.,
4. Digital Fundamentals - V. Vijayendran, S.Viswanathan Publishers, Chennai.
5. Modern Digital Electronics - R.P. Jain, 2/e, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
6. Micro Electronics - J. Millman, McGraw Hill International Book Company, New Delhi, 1990.
7. Digital Principles and Applications - A.P.Malvino & D.P.Leach, 4/e, Tata McGraw Hill PublishingCo. Ltd.
8. Digital Integrated Electronics - H. Taub & D. Schilling, McGraw-Hill Book Company.
9. Digital Fundamentals - T.L. Floyd, Pearson Education, 8/e.
10. Digital Electronics - W.H. Gothmann, Prentice Hall of India Private Limited, 2/e.B.Sc. Electronics.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Branch	Subject title	Subject code
B.Sc (Mathematics)	Calculus and Numerical Analysis	BMM-121

Course outcome:

1. Assimilate the notions of limit of a sequence and convergence of a series of real numbers.
2. Calculate the limit and examine the continuity of a function at a point.
3. Understand the consequences of various mean value theorems for differentiable functions equations.
4. Sketch curves in Linear Differential equations and equations reducible to thelinear form.
5. Apply derivative tests in optimization problems in numerical integration.
6. Student will be to understand differentiation and fundamental theorem in differentiation and various rules.

Unit-1

Successive differentiation, Leibnitz theorem, Maclaurin and Taylor series expansions, Curvature, Tests for concavity and convexity, Points of inflexion, Multiplepoints, Tracing of curves in Cartesian co-ordinates.

Unit-2

Limit and continuity of functions of two variables, Introduction of Partial

differentiation, Euler's Theorem on homogeneous function, Jacobians, Differentiability of real-valued functions of two variables, Taylor's theorem for functions of two variables, Double and triple integrals, Dirichlet's integrals.

Unit-3

Numerical integration**:** General quadrature formula, Trapezoidal rule, Simpson's one- third rule, Simpson's three-eigth rule, Weddle's rule, Euler-Maclaurin Summation formula, Sterling's formula for n!.

Unit-4

Linear Differential equations and equations reducible to the linear form, Exact differential equation, First order and higher degree equations Solvable for x, y and p, Clairaut's form and singular solutions, linear differential equations with constant coefficients.

Unit-5

Vector differentiation, Gradient, Divergence and Curl, Vector integration, Theorem of Gauss (without proof) and problems based on it, Theorem of Green (without proof) and problems based on it, Stoke's theorem (without proof) and problems based onit. **Texts Book**

1. Gorakh Prasad – Differential Calculus, Pothishala pvt. Ltd. Allahabad
2. Gorakh Prasad – Integral Calculus, Pothishala pvt. Ltd. Allahabad
3. D.A. Murray : Introductory Course in Differential Equations, Orient Long man, India 1967.
4. N. Saran & S.N. Nigam – Introduction to Vector Analyss, Pothishala Pvt. Ltd., Allahabad.

Reference Book

1. P.K. Jain and S. K. Kaushik, An introduction of Real Analysis, S.Chand & Co. New Delhi 2000.
2. Calculus of finite differences and Numerical Analysis by Gupta-Malik, Krishna prakastan Mandir, Meerut.
3. Numerical Analysis by B.D. Gupta, Konark publishing.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Microbiology)	Microbial Physiology & Microbial Genetics	BMB 121

Course outcome:

1. Know the terms and terminologies related to molecular biology and microbial growth.
2. Understand the properties, structure and function of genes in living organisms at the molecular level
3. Explain the significance of central dogma of gene action
4. Have a conceptual knowledge about DNA as a genetic material, enzymology, and replication strategies
5. Understand the molecular mechanisms involved in transcription and translation

Unit I

Cultivation and Pure Culture Techniques

Nutrition and nutritional types of bacteria, Bacteriological media (types and uses), cultivation of aerobic and anaerobic microbes, Isolation of microorganisms, pure culture and cultural characteristics.

Unit II

Microbial Growth

Mathematical expression of bacterial growth, generation time and growth rate, Growth curve and phases of growth cycle, Batch, continuous and synchronous cultures; diauxic growth, Factors affecting microbial growth.

Measurement and Preservation Methods

Quantitative measurement of bacterial growth by cell mass, cell number and cell activity, Maintenance and preservation of cultures,

Unit III

Control of Microorganisms- I

Microbial death curve under adverse condition, Concept of sterilization, disinfection, asepsis and sanitation, Physical methods of control- Temperature, radiation, desiccation, osmotic pressure, filtration.

Unit IV

Fundamentals of Genetics

DNA as genetic material, Structure and types of DNA and RNA, Genetic code, Protein synthesis - Transcription and translation.

DNA Replication and Gene Structure

DNA replication, Cis-trans complementation test, Fine structure analysis of r II region of T4 by Benzer.

Unit V

Mutation

Evidence for spontaneous nature of mutation, Molecular basis of mutation- Types of mutation, Types of bacterial mutants and their isolation, Mutagenic agents- Physical and chemical, Mutation rate and Ames test.

Genetic Recombination- I

Gene transfer in bacteria, Transformation- Competence, DNA uptake, artificially induced competence, electroporation, Transposable elements, Plasmid- Structure, properties and types of plasmids.

Reference Books:

1. Genes XI, Author- B. Lewin.
2. Principles of Genetics, Authors- Gardner, Simmons and Snustad.
3. Concepts of Genetics, Authors- Klug and Cummings.
4. Microbial Genetics, Authors- Freifelder.
5. Genetics, Authors- Arora and Sandhu.
6. Text of Microbiology, Authors- Ananthanarayanan and Paniker..
7. Textbook of Microbiology, Authors- Dubey and Maheshwari.
8. Microbiology, A Practical Approach. Authors- Patel and Phanse
9. Experiments in Biotechnology. Authors- Nighojkar and Nighojkar
10. General Microbiology, Authors- Powar and Daginawala.
11. Fundamentals in Microbiology, Authors- Frobisher and Hinsdinn.
12. Immunology, Microbiology and Biotechnology, Author- K.C. Soni.
13. Microbiology, Author- R.P.Singh.

List of Practicals:

1. Preparation of McFarland scale.
2. Use of counting chamber for bacterial count.
3. Effect of temperature on bacterial growth.
4. Effect of pH on bacterial growth.
5. Effect of osmotic pressure (salt and sugar concentration) on bacterial growth.
6. The oligodynamic action of heavy metals on bacterial growth.
7. One step growth of bacteriophage.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Food Science & Tech.)	BASIC NUTRITION	BFS 121

Course outcome:

1. To understand the relationship between food, nutrition and health.
2. To understand digestion, absorption, functions and food sources of various nutrients
3. To appreciate the concept of balanced and healthy diets.
4. To know the different methods of cooking and ways to prevent nutrient losses.
5. To be able to plan and prepare meals and nutritious dishes for various age groups.
6. To be able to assess nutritional status of adults
7. To know the important nutrients of body in details.

Unit I

Introduction to nutrition

Definition, optimum nutrition, nutritional status, good nutritional status, poor nutritional status, malnutrition, under nutrition, signs of good nutritional status, signs of poor nutritional status, definition and functions of nutrients

Unit II

Food and our body

Food and its functions, digestion, absorption and metabolism of food

Buccal digestion, gastric digestion and intestinal digestion, factors that affect digestion, absorption and metabolism

Five food groups.

Unit III

Energy metabolism

Introduction, unit of measurement, energy value of food- calorimetry or bi proximate

composition; energy needs of the body- reference man and reference woman; basal metabolic rate, factors affecting the BMR

Carbohydrates

Introduction, classification of carbohydrates, digestion, absorption and metabolism, functions, deficiency, recommended dietary intake and sources.

Role of dietary fibre in prevention and treatment of diseases

Unit IV

Proteins

Introduction, classifications of proteins, nutritional classification of amino acids protein quality - biological value, net protein utilization, protein efficiency ratio.

Function, deficiency, sources and requirements

Fat

Introduction , classification of lipids, saturated and unsaturated fatty acid, functions of fat, digestion, absorption and metabolism of fat, deficiency, food sources and RDA

Unit V

Vitamins

Classification- fat soluble and water soluble vitamins;

Fat soluble vitamins, A, D, E and K - introduction, function, deficiency, sources, RDA Water soluble vitamins- B complex and C-introduction, functions, deficiency, sources, RDA

Minerals

major or macro minerals- General functions of minerals, deficiency, sources and RDA Major minerals- calcium, phosphorus, sodium, potassium, iron

Minor minerals- iron and manganese Trace elements –
iodine, fluorine, zinc

Water

Introduction, functions, water, daily intake of water, daily loss of water, body water, water balance, deficiency of water, retention of water, daily requirements, fat.

REFERENCES

- Begum, R. A text book of foods, Nutrition and Dietetics. Second revised edition, Sterling Publishers (P) Ltd, New Delhi, 1991.
- Joshi, S. A Nutrition and dietetics. Third edition, Tata McGraw Hill education pvt ltd, New Delhi, 2010
- Mudambi, S. R., Rajagopal M. V., Fundamentals of food and Nutritions, 2nd edition, Wiley Eastern Ltd, New Delhi 1990.
- Roday, S., food science and nutrition. Third edition, Oxford University Press, New Delhi, 2008.
- Srilakshmi, B, Nutrition Science, New age international (P) Ltd publishers, New Delhi, 2006.
- Swaminathan, M., Hand book of Food & Nutrition, Bappco Ltd, Bangalore, 1978.
- Swaminathan, M. Essential of food and Nutrition, Vol.I. Bangalore Printing and Publishing Co. Ltd Bangalore.

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B.Sc. (Courses)

SCHEME
Semester – III

No	Subject Code	Subject Type	Subject Title	Marks Allotted						
				Assignment Marks		Theory Marks		Practical Marks		Total Marks
				Max	Min	Max	Min	Max	Min	
1	**FC-301/1** (Fonndation Course)	**Core**	**Values & Spirituality**	**10**	**4**	**40**	**14**	**-**	**-**	**50**
2	**FC-301/2** (Fonndation Course)	**Core**	**Environment**	**10**	**4**	**40**	**14**	**-**	**-**	**50**
3	**BSZ 131** (Zoology)	**Core**	**Animal Physiology & Developmental Biology And Immunology**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
4	**BSB 131** (Botany)	**Core**	**Diversity & systematics of seed plants**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
5	**BCH 131** (Chemistry)	**Core**	**Based on Inorganic, Organic And Physical Chemistry**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
6	**BPY 131** Physics	**Core**	ELECTRICITY AND MAGNETISM	20	8	80	27	50	17	150
7	**BBT 131** Biotechnology	**Elective**	**Food Biotechnology & Bioprocess Engineering**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
8	**BCS-131** Comp. Sci.	**Elective**	**Network Security**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
9	**BEC 131** Electronics	**Elective**	**ELECTRONIC COMMUNICATION SYSTEMS**	20	8	80	27	50	17	150
10	**BMM 131** Maths	**Core**	**Linear Algebra**	**20**	**8**	**80**	**27**	**-**	**-**	**100**
11	**BMB 131** Micro. Bio.	**Elective**	**Microbial Biochemistry & Environmental Microbiology**	20	8	80	27	50	17	150
12	**BFS 131** Food Sci	**Elective**	**BASIC PRINCIPLES OF FOOD ENGINEERING**	20	8	80	27	50	17	150

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Every candidate appearing in B.Sc. Semester 3rd examination shall be examined in

(e) Foundation Course F.C (Compulsory) for all students.

(f) Any one of the following combinations:

1 Physics, Chemistry, Maths
2 Physics or Chemistry, Botany, Zoology
3 Physics or Chemistry, Botany, Biotechnology
4 Physics or Chemistry, Botany, Microbiology
5 Physics, Chemistry or Electronics, Maths
6 Chemistry, Botany or Zoology, Food Science
7 Physics, Computer Science, Maths

Provided that the courses of studies for Physics offering combinations from (ii) to (vi) shall be those prescribed for biology group.

Electives Subjects	**Core Subjects**	**Combinations Available**
BBT 131 Biotechnology	BSZ 131/BSB 131 (Zoology/Botany), BCH 131 Chemistry	BSZ 131/ BSB 131, BCH 131, BBT 131.
BMB 131 Microbiology	BSZ 131/BSB 131 (Zoology/Botany), BCH 131 Chemistry	BSB 131/ BSZ 131, BCH 131, BMB 131.
BEC 131 Electronics	BMM 131 Mathematics, BPY 131 Physics	BMM 131, BPY 131, BEC 131.
BFS 131 Food Science	BSZ 131/BSB 131 (Zoology/Botany), BCH 131 Chemistry	BSZ 131/ BSB 131, BCH 131, BFS 131.
BCS 131 Computer Science	BMM 131 Mathematics, BPY 131 Physics	BMM 131, BPY 131, BCS 131.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Core Subjects	**Combinations**
BMM 131 Mathematics	BCH 131 Chemistry/BCS 131 Computer Science/ BEC 131 Electronics, BPY 131 Physics.
BPY 131 Physics	BCH 131 Chemistry/BCS 131 Computer Science/ BEC 131 Electronics, BMM 131 Mathematics.
BCH 131 Chemistry	BMM 131Mathematics, BPY 131 Physics or, BBT 131 Biotechnology, BSZ 131/BSB 131 (Zoology/Botany) or, BMB 131 Microbiology, BSZ 131/BSB 131 (Zoology/Botany) or, BSB 131 Botany, BZB 131 Zoology or, BFS 131 Food Science, BSZ 131/BSB 131 (Zoology/Botany),
BSZ 131 Zoology	BCH 131 Chemistry,BBT 131 Biotechnology or, BCH 131 Chemistry,BMB 131 Microbiology or, BCH 131 Chemistry,BSB 131 Botany or, BCH 131 Chemistry,BFS 131 Food Science.
BSB 131 Botany	BCH 131 Chemistry,BBT 131 Biotechnology or, BCH 131 Chemistry,BMB 131 Microbiology or, BCH 131 Chemistry,BSB 131 Zoology or, BCH 131 Chemistry, BFS 131 Food Science.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Semester – III

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Values & Spirituality**	**FC-301/1**

COURSE OUTCOME

C 01: The course aims to teach and inculcate the importance of value based living among students and give them a deeper understanding about the purpose of life.

C 02: Upon the completion of the course the students will understand the importance of value based living.

C 03: Students will understand and start applying the essential steps to become good leaders and emerge as responsible citizens with clear conviction to practice values and ethics in life.

C 04: Students will become value based professionals and will contribute in building a healthy nation.

Chapter 1: **VALUE EDUCATION**

1.1	Objectives	1.2	Introduction	1.3	Concepts ofValues
1.4	Definition and Types ofvalues			1.5	The need for Education in values
1.6	Challenges for Value adoption			1.7	Character development
1.8	Vision of a betterworld			1.9	Summary
1.10	Glossary			1. 11	Suggested reading

Chapter 2: INCULCATION OF VALUES

2.1	Objectives	2.2	Introduction	2.3	Classification of values
2.4	Personal Values	2.5	Family Values	2.6	Social Values
2.7	Spiritual values	2.8	Benefits of value adoption	2.9	Summary
2.10	Glossary	2.11	Suggested reading		

Chapter 3: MAJOR RELIGIONS OF THE WORLD

3.1	Objectives	3.2	Introduction	3.3	Hinduism
3.4	Jainism	3.5	Buddhism	3.6	Christianity
3.7	Islam	3.8	Sikhism	3.9	Summary
3.10	Glossary	3.11	Suggested reading		

Chapter 4: EXPLORING THE SELF

4.1	Objectives	4.2	Introduction	4.3	Anatomy of theself
4.4	The cyclic processes withinthe self			4.5	States of theawareness
4.6	Innatequalities	4.7	Acquiredqualities	4.8	Empowering theself
4.9	Summary	4.10	Glossary	4.11	Suggestedreading

Chapter 5: THOUGHT AND THE THINKER

5.1	Objectives	5.2	Introduction	5.3	Know themind(TEAM)
5.4	Thoughtpower	5.5	Typesofthoughts	5.6	Thinkingprocess
5.7	Positive thinking	5.8	PowerandActs	5.9	Summary
5.10	Glossary	5.11	Suggestedreading		

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Semester – III

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Environment**	**FC-301/2**

COURSE OUTCOME

C 01: The course aims at providing students with a broad interdisciplinary liberal arts framework for understanding the relationship between humans and their environment;

C 02: Students will contribute to and facilitate interdisciplinary research and problem solving, through independent and collaborative work

C 03: Upon the completion of the course students will be able to demonstrate an integrative approach to environmental issues with a focus on sustainability;

C 04: Communicate complex environmental information to both technical and non-technical audiences;

C 05: Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world

Unit - I

Problems of natural resources:

(a) Problems of water resources- Utilization of surface and ground water overutilization, flood, draught, conflict over water, Dams and relatedproblems.

(b) Problems of forest resources -uses and over utilization, deforestation, Dams and its effects on forests andtribes.

(c) Problems of land resources -land as a source , erosion of land, man-induced, land slides and desertification.

प्राकृतिकसंसाधनकीसमस्याए

(क) जलसंसाधनकीसमस्या–संसाधनहएभूजलकाउपयोग,अतिदोहनबाढ़संसाधन,जलपरसंघर्ष,बाँध–लाभएवंसमस्याए

(ख) वनसंसाधनकीसंस्याए–उपयोगएवंअतिदोहन,वनोन्मूलन,इमारतीलकड़ी,निस्सारा,बाध्यएवंउनकाबनआर आदिवासीयंपरप्रभाव

(ग) भूमिसंसाधनकीसमस्याएँ-स्त्रोतकेक्रयमभूमिकाअवक्रमा,मानवप्रेरित–स्खलनआरमरुस्थीकर।

Unit - II

Bio-diversity and its protection -

(a) Value of bio-diversity -consunable use: productive use, social, alternative, moral asthetic and values

(b) Bio - diversity and multi -diversity at global and nationallevels.

(c) Threats to bio -diversity -loss of habitat, poaching of widlife, man wildlifeconflicts.

जैवविविधताअंरउसकासंरक्षा–

(क) जैवविविधताकामूल्य–उपभोग्य,उपयोग,उपादकउपयोग,सामाजिक,नैतिकसौंदर्यगततथाप्रकल्पिकमूल्य

(ख) वैश्विक,राष्ट्रीयतथास्थानीयस्तरोंपरजैवविविधतावृहतविविधताअंकेराष्ट्ररूपमेंभारत।

(ग) जैवविविधताकेखतर–आवासीयहानि,वन्यजीवनमअनाधिकारप्रयुक्तिठतथामानव,वन्यजीवन—संघ

Unit - III

Human population and environment

(a) Population growth, disparities betweencountries.

(b) Population explosion, family welfareprogramme

(c) Environment and humanhealth

पर्यावरणऔरजनसंख्यातथापर्यावरण ए

(क) जनसंख्या–वृद्धि,राष्ट्रकेबीचअंतर

(ख) जनसंख्या–विस्फोट,परिवारकल्याणकार्यक्रम ए

(ग) पर्यावरणऔरमानवस्वास्थ्य

Unit - IV

Multidisciplinary nature of environmental studies :

(a) Naturalresources

(b) Social problems and theenvironment

(c) Environmentelawareness

पर्यावरणऔरउसकाबहुआयामीस्वरूप

(क) प्राकृतिकसंसाधन

(ख) सामाजिकसमस्याएंऔरपर्यावरण ए

(ग) पारिस्थितितंत्र

Unit - V

Multidisciplinary nature of environmental studies :

(a) Naturalresources

(b) Social problems and theenvironment

(c) Environmentelawareness

पर्यावरणऔरउसकाबहुआयामीस्वरूप

(क) प्राकृतिकसंसाधन

(ख) सामाजिकसमस्याएंऔरपर्यावरण ए

(ग) पारिस्थितितंत्र

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Syllabus
Semester – III

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Chemistry)	Based on inorganic, and Physical Chemistry	BCH-131

Course outcome:

1. To study about the elements of IInd and IIIrd transition series and its details.
2. To learn about the thermodynamics and its laws and applications.
3. To know about the carbolic acid and alcohols and epoxides.

UNIT-I

Definition of transition elements, position in the periodic table, General characteristics & properties of Ist transition elements, Structures & properties of some compounds of transition elements– TiO_2, $VOCl_2$, $FeCl_3$, $CuCl_2$ and $Ni(CO)_4$.**Chemistry of Elements of IInd & IIIrd transition series** General characteristics and properties of the II^{nd} and III^{rd} transition elements Comparison of properties of 3d elements with4d & 5d elements with reference only to ionic radii, oxidation state, magnetic and Spectral properties and stereochemistry.

UNIT-II

Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes. **Non-aqueous Solvents** Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.

UNIT-III

Definition of thermodynamic terms: system, surrounding etc. First law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – Joule – Thomson coefficient for ideal gas and real gas: and inversion temperature. **Thermodynamics-II** Calculation of w.q. dU &dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process, Temperature dependence of enthalpy, Kirchoffs equation.Bond energies and applications o f bondenergies.

UNIT-IV

Monohydric alcohols nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters.Hydrogen bonding.Acidic nature.Reactions of alcohols.**Epoxides** Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening.

UNIT-V

Nomenclature of Carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids,.Preparation of carboxylic acids.Reactions of carboxylic acids.**Acid Derivatives** Structure , nomenclature and preparation of acid chlorides, esters, amides and acid anhydrides. Relative stability o f acyl derivatives. Physical properties, inter convers ion of acid derivatives by nucleophilic acyl substitution. Mechanisms of esterification and hydrolysis (acidic and basic).

Book suggested :

1. R. G. Mortimer, Mathematics for Physical ChemistryElsevier.
2. F. L. Pilar, Elementary Quantum Chemistry , DoverPublication
3. E. L. Eliel, Stereochemistry of Carbon Compounds,McGraw-Hill
4. S. M. Mukherji and S. P. Singh, Reaction Mechanism in OrganicChemistry,
5. Comprehensive Coordiantion Chemistry eds., G. Wilkinson, R.D. Gillars and J.A.Mc Cleverty,Pergamon.

Paper (Practicals)

Section – I (Inorganic)

1**. Gravimetric Analysis**

Quantitative estimations of, Cu2+ as copper thiocyanate and Ni2+ as Ni – dimethylglyoxime.

Section-B (Physical)

1. To determine the CST of phenol – watersystem.
2. To determine the solubility of benzoic acid at various temperatures and to determine the H of the dissolutionprocess
3. To determine the enthalpy of neutralisation of a weak acid/weak base vs. strongbase/strong acid and determine the enthalpy of ionisation of the weak acid/weakbase.

Section-C (Organic)

Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the following simple mono and bifunctional organic compounds: Naphthalene , anthracene, acenaphthene, benzyl chloride, *p*-dichlorobenzene, *m*-dinitrobenzene, *p*-nitrotoluene, resorcinol , hydroquinone, -naphthol, -naphthol, benzophenone, ethyl methyl ketone, benzaldehyde, vanillin, oxalic acid, succinic acid,

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Syllabus

Semester –III

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Physics)	ELECTRICITY AND MAGNETISM	BPY 131

Course outcome:

1. Study the electric field using coloumbs inverse square law in electrostatics of current
2. Analyse the chemcial and heating effect of current
3. Analyse the relations between b, h and m
4. Understand the faradays laws of electromagnetic induction by rayleigh's method
5. Analyse he value of maxwell equation- boundary conditions

UNIT- I

Principle of a capacitor - energy stored in a capacitor - energy density - change in energy due to dielectric slab - force of attraction between plates of a charged capacitor - capacitance of a spherical and cylindrical capacitors - types of capacitors - electrometers - Kelvin's attracted disc electrometer - quadrant electrometer - measurement of potential, ionization current and dielectric constant (solid).

UNIT - II

Positive ray analysis - Thomson's parabola method - theory - determination of e/m and mass of positive ions - Astons mass spectrograph determination of masses of isotopes - uses of mass spectrographs – separation of isotopes - mass spectrograph method - diffusion method - thermal diffusion method - pressure diffusion
method.

UNIT - III

Theory of alpha scattering - Rutherford scattering formula – experimental verification - nature of privileged quantum orbits - Bohr's correspondence principle - effect of motion of nucleus - evidences in favour of Bohr's theory - Determination of critical potential - Davis and Goucher's method - Sommerfield's relativistic atom model -application to fine structure of Hα line.

UNIT -IV

Transient current - growth and decay of current in a circuit containing resistance and inductance - growth and decay of charge in a circuit containing resistance and capacitance - measurement of high resistance by leakage - growth and decay of charge in a *LCR* circuit - condition for the discharge to be oscillatory - frequency of oscillation - Importance in wireless telegraphy.

UNIT- V

Alternating current - peak, average and *RMS* value of current and voltage - form factor - *j* operator - ac circuit containing resistance and inductance - choke coil - ac circuit containing resistance and capacitance - series and parallel resonance circuits - *Q* factor - power in an ac circuit containing *LCR* – Wattless current - Transformer - construction, theory and uses - energy loss - skin effect – Tesla coil.

Books for Study:

1. Electricity and Magnetism - Brijlal and Subramaniam, S. Chand & Co., (2005).
2. Electricity and Magnetism - R. Murugesan, S. Chand & Co., (2005).

Books for Reference:

1. Electricity and Magnetism - D. N. Vasudeva, S. Chand & Co., (2005).
2. Electricity and Magnetism- K. K. Tewari, S. Chand & Co., (2005)

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Semester III

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Botany)	**Diversity & systematics of seed plants**	**BSB 131**

Course Outcome:

1. Know the conceptual development of taxonomy & systematics. Understand the general range of variations in the group of angiosperms.
2. Trace the history of development of systems of classification emphasizing angiospermic taxa.
3. Learn about the characters of biologically important families of angiosperms.
4. Know the floral variations in angiospermic families, their phylogeny and evolution. Understand various rules, principles and recommendations of plant nomenclature.
5. Know modern trends in taxonomy.
6. Understand major evolutionary trends in various parts of angiospermic plantsStudents will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles

UNIT – 1

Characteristics and Classification of Gymnosperms, Heterospory and Origin of Seed Habit, Evolution and Diversity of Gymnosperms, Geological Time Scale, and Fossilization.Fossil Gymnosperms: Lyginopteris and Lagenostoma.

UNIT – 2

Morphology, Anatomy Reproduction and life cycle of Cycas, Pinus and Ephedra.

UNIT – 3

Origin and Evolution of Angiosperms, Fundamental components of α, β, γ taxonomy, Plant Identification, Principles and rules of Botanical Nomenclature, Herbarium and Botanical gardens; Classification of Angiosperms: Bentham and Hooker, and Hutchinson, Modern trends inTaxonomy.

UNIT –4

Diagnostic characteristics and Economic Importance of Families –Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, and Apiaceae.

UNIT – 5

Diagnostic characteristics & Economic Importance of Families –Asteraceae, Asclepiadaceae, Solanaceae,Lamiaceae,Euphorbiaceae, Liliaceae and Poaceae.

Practical Exercises + Scheme (Marks- 50)

Gymnosperms- 10

-Morphological and anatomical study of Cycas, Pinus, and Ephedra (all parts).

- Study of permanent slides of Cycus, Pinus and Ephedra.

Angiosperms- 15

-Study of types of inflorescence and flowers with labelled sketches.

- Technical description of common flowering plants belonging to families mentioned in theory syllabus.

Spotting- 10

Viva-voce- 5

Practical record- 10

SUGGESTED READINGS:--

1. Agarwal, S.B. 2007. Unified Botany, Shivlal Agarwal & CompanyIndore.

2. Bhatnagar, S. P. and Moitra 1996. Gymnosperms. New Age International Limited, NewDelhi.

3. Davis, P.H. and Heywood, V.H. 1963, Principles of Angiosperm taxonomy. Oliver and Boyd,London.

4. Gangulee, H. C. & Kar, A. K. 2006. College Botany Voll.III, New Central Book Agency (P) Ltd. Kolkata,700009.

5. Heywood,V.H.andMoore,D.M.(eds)1984.Currentconceptsinplanttaxonomy.Academicpress London.

6. Jeffery, C. 1982. An Introduction of plant taxonomy. Cambridge University Press Cambridge,London.

7. Jones, S.B. Jr. and Luchsinger, A.E. 1986. Plant Systematic. Mc Graw Hill Book Co. NewYork.

8. Kaushik, M.P. 2003. Modern Textbook of Botany, Prakash Publication Muzaffar NagarU.P.

9. Mukherjee, S.K. 2006. College Botany Voll.II, New Central Book Agency (P) Ltd. Kolkata,700009.

10. Pandey, B. P. 2010. A Text book of Botany- Angiosperms, S. Chand & Company Ltd. Ramnagar, New Delhi-110055.

11. Radford, A.E. 1986. Fundamentals of Plant Systmatics, Happer and Raw, NewYork.

12. Saxena and Sarabhai. 1989. Text book of Botany. Rastogi PublicationMeerut.

13. Singh, G. 1999. Plant Systematics : Theory and Practice. Oxford and IBH Pvt. Ltd. New Delhi.

14.Vasishta,P.C.2005.BotanyfordegreestudentsVoll.V,Gymnosperms.S.Chand&CompanyLtd. Ramnagar, New Delhi- 110055.

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

Syllabus
Semester – III

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Zoology)	**ANIMAL PHYSIOLOGY & DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY**	**BSZ 131**

Course outcome:

1. Identify various stages of embryological development of Amphioxus, frog.
2. To study the difference types of nutrition.
3. To learn about the excretion of organisms.
4. To study about spermatogenesis.

Unit-1

Nutrition –types, Enzymes – Enzyme action, Coenzymes, Digestion in man. Respiration – Respiratory pigments, role in transport of O2 and CO2 in man. Circulation - blood composition, origin and conduction of heart beat in an – blood pressure, Heart diseases– heart attack.

Unit-2

Excretion – types of nitrogenous wastes – structure of the mammalian kidney and urine formation – renal failure – kidney stone – kidney transplantation. Osmotic – ionic regulation in freshwater, marine, estuarine and terrestrialorganisms

Unit-3

Amoeboid, ciliary and flagellar movements.Types of muscles – ultra structure of skeletal muscle – Muscle contraction and theories.Neuron, - Types- Impulse transmission, -synaptic transmission - reflex action.-Endocrine glands in man, secretions and disorders.

Unit-4

Spermatogenesis – definition – process and significance, structure of mammalian sperm. Oogenesis – definition – process and significance – Types of eggs and egg membranes. Fertilization – definition – process and significance. Parthenogenesis – definition and significance – types of parthenogenesis.

Unit-5

Cleavage patterns (types) – Cleavage in Frog, Chick and Mammals.Morula and Blastulation.
Introduction – cells and organs involved in immune response. Types of immunity – Innate & adaptive immunity of acquired immunity, humoral and cell mediated immunity, active and passive immunity.

TEXT BOOKS:

Verma P.S. & Tyagi B.S. Animal Physiology, 6th edition. S.Chand & Co.
Agarwal, V.K. Agarwal, R.A.Srivastava A.K. & Kausha Kumar, Animal physiology & Biochemistry, S. Chand & Co.,
De Beer, G.R. Embryos and Ancestors. Clarenden Press, Oxford.
Verma.P.S and Agarwal, V.K. Chordate Embryology, S.Chand and Co. Ltd., New Delhi (1998).
Bodmer, Modern Embryology, Saunders International student edition, Philadelphia.3 rd Edition 1981.
Eli Benjamini et al.,(1991) Immunology – A short course – Wiley Publishers, NY.

REFERENCES:

Hoar, W.S (1987) General and Comparative physiology, prentice – Hall.
M.K.Chanddrashekaran – Circadian Rhythms – Madras science foundation, Chennai.

YEAR-II SEMESTER-III
PRACTICAL
(ANIMAL PHYSIOLOGY, AND DEVELOPMENTAL BIOLOGY)

I MajorPracticals:

1) Qualitative analysis of digestive enzymes incockroach.

2) Estimation of the rate of o2 consumption in fish/crab with reference to bodyweight.

3) Detection nitrogenous waste products in fish tank water, bird excreta & mammalianurine.

4) Study of human salivary activity in relation totemperature.

5) Qualitative analysis of carbohydrates, proteins, and aminoacids.

II MinorPracticals:

Kymograph –simple twitch, Trappe, Fatigue, Tetanus, Spigmomanometer, pH meter, Colorimeter, Haemometer, Enzyme action – graphs (temperature, concentration of substrate and enzyme.)

RKDF UNIVERSITY, BHOPAL

B.Sc. (Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Biotechnology)	**FOOD BIOTECHNOLOGY & BIOPROCESSENGINEERING**	**BBT-131**

Course outcome:

1. This course enables the students to understand application of biotechnology in Food processing industries.
2. To List out the commercially important enzyme used in food industries.
3. To make the student to understand the causes of food spoilage, control and preventive measures for harmful microorganism.
4. At the end of this course, the student will have an idea of food constituents, importance and their daily dietary allowances; scope and prospects for food industries.

Unit-I

Food as a substrate for microorganisms: pH, moisture content, redox potential, nutrient content and inhibitory substances.

Microorganisms important in food industry: Molds, identification of molds of industrial importance, yeasts & yeasts like fungi, yeasts of industrial importance, bacteria.

Unit-II

General principles underlying spoilage: Causes of spoilage, factors affecting kinds and members of microorganisms in food, factors affecting growth of microorganisms in food. Chemical changes caused by microorganisms.

Unit-III

Foods and enzymes produced by microorganisms – Bread, malted beverages, wines, distilled liquors, vinegar, fermented vegetables, fermented dairy products & oriental fermented goods. Microorganism as food: single cell protein, fats and amino acids from microorganisms. Production of microbial enzymes.

Unit-IV

Introduction to fermentation: rate of microbial growth and death. Fermentation - types, classification, basic requirements, design of a fermentor, factors involved in fermentor design - basic functions - containment body construction - temperature control-stirring and mixing – viscosity

UNIT-V

Isolation and preservation of industrially important micro organisms - strain development mutation and recombination - upstream processing, media for industrial fermentation - characteristics of an ideal production medium - raw material - screening for production media - media formulation - sterilization - (batch and continuous) - addition of antifoaming agents.

References:

1. Fraizier, Food Microbiology, 1978, McGraw Publishers.
2. Pelczar: Microbiology.
3. Prescott: Microbiology.
4. Stanburry P.P. and Whitaker, A. 1984. Principles of Fermentation Technology. Pergamon Press, Oxford UK.
5. Steinkraus, K.H. 1983. Handbook of Indigenous Fermented Foods. Marcel Dekker, NewYork.
6. Casida, J.E., 1968. Industrial Microbiology, Wiley Eastern Publication
7. Cruegar, W. and Cregar, A., 1989. Biotechnology: A text book of industrial Microbiology,2nd edition. Panima Publishing Corporation, New Delhi.
8. Patel. A.H. 1966. Industrial Microbiology, Mac Millan India Ltd.
9. Stanbury, A.H., A. Whittaker and Hall S.J. 1995. Principles of fermentation technology2nd edition, Pergamon Press.

YEAR-I SEMESTER-III
PRACTICLE: FOOD BIOTECHNOLOGY & BIOPROCESS ENGINEERING

1. Quality testing of milk by resazuring test.
2. Determination of phasphatase activity in butter, whey, milk powder.
3. Microbiological analysis of food production.
4. Presumptive test for coliform in butter.
5. Analysis of mycotoxin in fungal contaminated food materials.
6. Introduction of fermenter.
7. Isolation of industrially important microorganisms.
8. Determination of thermal death point (TDP) and thermal death time (TDT) of microorganism for design of a sterilizer.
9. Suggested Readings

10. Plant tissue culture : Bajaj, Y.P.S. Series.
11. Plant tissue culture : Gamborg and Phillip.
12. Basic and Agricultural Biotechnology (1993) Purohit and Mathur
13. Plants, Genes, and Agriculture : Chrispeels, M. J. and Grierson, D.
14. Genetic Engineering of crop plants : Lycett, G. W. and Grierson, D.
15. Biotechnological innovation in Animal productivity: (Biotol Series)
16. Culture of Animal cell: A mannual of Basic Techniques(4th ed.) (2000) Freshn

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Computer Science)	NETWORK SECURITY	BCS-131

Course outcome:

1. To study the security trends and cryptography.
2. To know about the Trojans and back doors in details.
3. To study about the different function like hash and all.
4. Knowledge about IP in details.

UNIT I

Security trends – Attacks and services .types of attacks. Intrusion. Intrusion detection system. Intrusion detection tools. Vulnerability Assessment. Types of Penetration Testing, Risk Management.

UNIT II

Cryptography, Classical Cryptographic Techniques, Encryption, Decryption, Code Breaking Methodologies:-Cryptanalysis, Cryptography attacks, Brute Force Attack, Use of Cryptography, public key cryptography, Blowfish.

UNIT III

Hash functions, One way hash functions, SHA(Secure Hash Algorithm), Authentication Requirements, Authentication Functions, Kerberos, Message Authentication Codes, MD5, Message Digest Functions, SSL (Secure Sockets Layer),SSH(Secure Shell).

UNIT IV

Trojans and Backdoors- Overt and Covert Channels, Working, Types (Remote Access Trojans, Data Sending Trojans, Proxy Trojans, FTP Trojans).

Viruses and Worms- Characteristics, Working, Infection phase, Attack phase, Sniffers, Sniffing, Vulnerable Protocols, Types.

UNIT V

IP Security, web Security, firewalls, trusted systems, Computer Forensics, Hacking, classes of hacker(Black Hats, White Hats ,Grey Hats, Suicide Hackers), Foot printing, E-mail Spiders.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Electronics)	ELECTRONIC COMMUNICATION SYSTEMS	BEC 131

Course outcome:

1. Explain and apply the concepts telecommunication switching, traffic and networks.
2. Explain and apply concepts of GSM and CDMA system.
3. Carry out Link power budget and Rise Time Budget by proper selection of components and che. ck its viability.
4. Carry out Satellite Link design for Up Link and Down Link.
5. Understand the transmission of voice and data through various networks.

Basic communication systems: **UNIT I**

Block diagram - information source and input transducer - Transmitter medium -Noise - Receiver - Destination - Necessity for modulation - Types of communication systems. Amplitude Modulation: Definition - AM waveforms - Frequency spectrum and hand width - Modulation index - DSB - SC, SSB, Independent SB, Vestigial SB - Comparison and application of various AM schemes.

UNIT-II

Modulation - Needs for Modulation - Types of Modulation - Amplitude Modulation - Generation and detections circuits - Balanced Modulator - DSB/SC and SSB Modulation - VSB modulation. Block diagram of AM Radio transmitter and super heterodyne Receiver.Frequency Modulation - Definition - Derivation of Modulated wave - Generation of FM - Varactor diode and Reactance tube Modulators - Detectors - Balanced slope detector, Foster Seeley discriminator, ratio detector - Block diagram of FM transmitter and receiver.

UNIT-III

Pulse Modulation - Sampling theorem - PAM, PWM, PPM, PCM - quantizing, sampling, coding, decoding, quantization error, delta modulation and adaptive delta modulation. Multiplexing - FDM, TDM, CDMA - ASK, FSK, PSK - Advantages of Digital Communication - Introduction to Microwave, Fiber optic, Satellite Communications - RADAR - range equation.Antenna - Effective resistance - Efficiency - Directive gain - Bandwidth, Beam width and polarization - Dipole - Folded dipole - Arrays - Yagi - Uda

- Helical - Discone -Parabolic - Dish Antennas - Ground wave, sky wave and space ware propagation - Skip distance - Maximum usable frequency.

UNIT-IV

Frequency and phase modulation: Definition - Relationship between FM & PM - Frequency deviation - Spectrum and transmission BW of FM, comparison of AM and FM systems.UNIT-IV: Radio Transmitter and Receiver AM transmitters - High level and low level transmitters - SSB transmitters - FM transmitters

- Block diagram - stereo FM transmitter.AM receivers - operation - performance parameters - Communication Transceivers -Block diagram - SSB receiver - FM receivers - Block diagram.

UNIT-V

Television of TV system - Block diagram - Scanning - Synchronisation - VSB transmission and reception Colour signal transmission.

Text Books

1. Basics of electronic Communications NIIT, prentice - Hall Pvt. Ltd, New Delhi, 2007
2. Modern digital and analog communications - BP lathi third edition 1998, Oxford University press
3. Communication System: Analog & digital Singh and sapre, TMH 1995.
4. Electronic Communication Systems - George Kennedy, McGraw Hill Book Company, 4/e, 2005.
5. Communication Engineering - T.G. Palanivelu, Anuradha Publicatons, 1/e, 2002.
6. Communication System - Roddy & Coolen, 4/e, Pearson Education, 2005.
7. Principles of Communication Engineering - Anok Singh, 4/e, Sathyaprakasam Publications, 2004.
8. Electronic Communication Systems Wayne Tomasi, 4/e, Pearson Education, 2004.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Branch	Subject Title	Subject code
B.Sc (Mathematics)	**Linear Algebra**	**BMM-131**

Course outcome:

1. Understand the concepts of vector spaces, subspaces, bases, dimension and their properties
2. .Relate matrices and linear transformations, compute eigen values and eigen vectors of linear transformations.
3. Learn properties of inner product spaces and determine orthogonality in inner product spaces.
4. Realise importance of adjoint of a linear transformation and its canonical form.

UNIT:-I

ALGEBRA : Partial fractions, binomial, exponential and logarithmic series (without proof) summation and approximation-simple problems.

UNIT:-II

THEORY OF EQUATIONS : Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equations. Newtons method to find a root approximately - simple problems.

FINITE DIFFERENCES : Operators E, difference tables, Newton's forward and backward interpolation formulae, Lagrange's interpolation formulae.

UNIT:-III

Laplace transformations: Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorem, Differentiation and integration of transforms, Inverse Laplace transforms, Convolution theorem, Applications of Laplace, transformation in solving linear differential equations with constant coefficients

UNIT:-IV

DIFFERENTIAL CALCULUS: Series Solution of Differential Equations-Power series Method, Bessel’s Equation ,Bessel’s function and its properties, recurrence and generating relations, Legendre’s Equation, Legendre’s function and its properties,

UNIT:-V

Groups :- Normal sub group, Quotient groups, homomorphism and isomorphism of groups, Kernel of homomorphism of groups, fundamental theorem of homomorphism of groups, Permutation groups (even and odd permutations), Alternating groups An, Cayley's theorem.

Reference Books:

, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra, Wiley Eastern, New Delhi, 1997. 1.
T.M. Apostol Mathematical Analysis Narosa Publishing House New Delhi 1985.

2. Murray R.Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd. New Delhi.
5. P.B. Bhattacharya
6. I. S. L.uther and I.B. S. Passi, Alegebra Vol- I , II, Narosa Publishing House
7. R.R. Goldberg, Real Analysis, I.B.H. Publishing Co. New Delhi, 1970.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Microbiology)	**Microbial Biochemistry & Environmental Microbiology**	**BMB 131**

Course outcome:

1. Describe the concepts of electrolytes and electrolytic dissociation, pH and its biological significance, buffers, Henderson-Hasselbalch equation, biological buffer systems and their importance.
2. Understanding the laws of thermodynamics , concepts of entropy, enthalpy and free energy changes and their application to biological systems and various biochemical studies and reactions.
3. Conceptual knowledge of air, food, water and soil microbiology.
4. Overview of major biomolecules –carbohydrates, lipids, proteins, aminoacids, nucleic acids, classification, structure, function of the above mentioned biomolecules
5. Discuss the biosynthesis and the degradation pathways involved.
6. Specify the biological significance of biomolecules in metabolism
7. Conceptual knowledge of properties, structure, function of enzymes, enzyme kinetics and their regulation ,enzyme engineering, Application of enzymes in large scale industrial processes

Unit I

Carbohydrates

Chemical structures, nature and properties, Classification and importance in biological cells, Aerobic and anaerobic metabolism. Amino acids- Classification and properties. Structure, Zwitterion nature, Proteins- Classification, Structure and function. Primary, secondary, tertiary and quaternary structure, Proteolysis,

Unit II

Enzymes & Bioenergetics

General characteristics. Factors affecting enzyme activity, Regulation of enzyme activity, Enzyme kinetics, Km, activation and inhibition, Coenzymes and cofactors. Non-protein enzymes Applications of enzymes. Principles of bioenergetics and high energy phosphate compounds, Mode of energy production- Photophosphorylation, Bacterial photosynthesis.

Unit III

Lipids, vitamins and hormones

Saturated and unsaturated fatty acids, Structure, classification, properties and function of lipids and vitamins, Distribution and functions of lipids in microorganisms, Beta-oxidation of lipids, Hormones: Steroid hormones, Structure and function.

Unit IV

Soil Microbiology, Water Microbiology

Formation and composition of soil, Estimation of soil microflora, Soil management, Rhizosphere- Positive and negative interactions among soil microflora. Microbiology of water and water bodies, Water purification, Eutrophication.Primary treatment, Secondary treatment, Advanced and final treatment.

Unit V

Food Microbiology & Air Microbiology

Introduction to microbiology of food and milk, Food intoxications, spoilage of food- Fresh food, canned food, vegetables and milk products, Preservation of food and milk, Composition of milk, grading of milk- MBRT,. Composition and analysis of air, Aeromicroflora of different habitats, Aeroallergens, Biogeochemical cycles- Role of microbes in Nitrogen and Carbon cycles.

SEMESTER-III

Recommended Books (Semester-III)

1. Principles of Biochemistry, Author- A.L. Lehniger
2. Fundamentals of Biochemistry, Author- J. L. Jain
3. Biochemistry, Author- Voet and Voet.
4. Textbook of Biochemistry- S.P. Singh.
5. Biochemistry, Author- Stryer.
6. Introduction to protein structure, Authors- Branden and Tooze.
7. Fundamental Principles of Bacteriology, Author- A.J. Salle.
8. Principles of Biochemistry, Authors – Zubey, Parson and Vance.
9. Microbial Diversity, Author- D. Colwd.
10. Microbiology A Practical Approach Authors- Patel and Phanse, .
11. Nighojkar and Nighojkar, Experiments in Biotechnology.
12. Food Microbiology, Authors- Frazier and Westhoff.
13. Food Microbiology, Authors- Adams and Moss
14. Introductory Food Microbiology. Author – H.A. Modi
15. Environmental Microbiology, Author- P.D. Sharma.
16. Environmental Microbiology, Author- K.G. Vijaya.
17. The nature and properties of soil. Authors- Harry buckman and Nyle C. brady.
18. Introduction to soil Microbiology Internationals. Authors- Martin Alexander.

YEAR-I SEMESTER-III
LIST OF EXPERIMENTS

1. Detection of carbohydrates, proteins and lipids.
2. Estimation of activity of enzymes like amylase, protease and lipase.
3. Effect of pH on enzyme activity.
4. Effect of temperature on enzyme activity.
5. Effect of substrate concentration on enzyme activity.
6. Effect of enzyme concentration on enzyme activity.
7. Quantitative estimation of protein by Folin Lowry's Mehod.
8. Quantitative estimation of carbohydrates by Nelson Smogyi's Method.
9. Isolation of organisms from air.
10. Isolation of organisms from water and sewage.
11. Isolation of organisms from food sources.
12. Isolation of Yeast.
13. Isolation of phosphorous solubilizing bacteria/fungus from soil sample.
14. Isolation of *Xanthomonas citri* from citrus canker.
15. Gradation of milk by Methylene Blue Reduction Test (MBRT).

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B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Food Science & Tech.)	BASIC PRINCIPLES OF FOOD ENGINEERING	BFS 131

Course outcome:

1. Understand cold preservation ,Freezer types and functioning
2. Understand Dehyration, Dryer types and functioning
3. Understand the engineering units
4. To know the process of heat transfer in food.

Unit I

Engineering units

Dimensions – Primary, secondary

Engineering units- Base units, derived and supplementary units. system – state of system, extensive properties, intensive properties.

Unit II

Heat transfer in food processing

systems for heating and cooling food products, plate heat exchanger, tubular heat exchanger, scraped surface heat exchanger, steam infusion heat exchanger Thermal properties of foods- specific heat, thermal conductivity.

Modes of heat transfer – conductive heat transfer, convective heat transfer, radiation heat transfer, steady state heat transfer, heat conduction in multilayer system, estimation of convective heat transfer co-efficient, role of insulation in reducing heat loss from process equipment.

Unit III

Mechanical operations

Mixing-different type of mixers used in food in industry, continuously stirred mixing tanks. Filtration- batch filtration, continues filtration, ultra filtration, reverse osmosis

Clarification and concentration process- evaporation, diffusion concentration, single and multiple stage freeze concentration, reverse osmosis.

Dehydration systems - kiln, tunnel, cabinet, drum and spray driers.

Unit IV

Mechanical separation- sedimentation, centrifugation, filtration, phase separation, distillation

Thermal processing of packaged foods- retort/ autoclave sterilization, UHT radiation treatment – electron beam X-ray and gamma rays

Unit V

Food Freezing

Introduction

Thermodynamics of food freezing – Freezing temperature depression, Unfrozen water fraction.

Freezing and freeze drying, IQF, plate freezers, air blast freezers, fluidized bed freezer, freeze drier, cryogenic freezing

Reference

- Dincer, I. Heat Transfer Food Cooling Applications. Taylor and Francis Publishers, USA. 1997.
- Heldman, D. R. and Lund, D.B. Handbook of Food Engineering 2nd edition. CRC press, Newyork. 2007.
- Singh, R.P. Introduction to Food Engineering 3rd edition. Academic Press, London. 2004

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

SCHEME
Semester – IV

No	Subject Code	Subject Type	Subject Title	Marks Allotted						
				Assignment Marks		Theory Marks		Practical Marks		Total Marks
				Max	Min	Max	Min	Max	Min	
1	**FC-401/1** (Fonndation Course)	**Core**	**English Language**	**10**	**4**	**40**	**14**	**-**	**-**	**50**
2	**FC-401/2** (Fonndation Course)	**Core**	**Development of Entrepreneurship**	**10**	**4**	**40**	**14**	**-**	**-**	**50**
3	**BSZ 141** (Zoology)	**Core**	**Ecology & Evolutionary Biology**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
4	**BSB 141** (Botany)	**Core**	**Structure, development & reproduction in flowering plants**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
5	**BCH 141** (Chemistry)	**Core**	**Based on Inorganic, Organic And Physical Chemistry**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
6	**BPY 141** Physics	**Core**	ELECTRICITY AND MAGNETISM	20	8	80	27	50	17	150
7	**BBT 141** Biotechnology	**Elective**	**Molecular Immunology & Recombinant DNA Technology**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
8	**BCS-141** Comp. Sci.	**Elective**	**Software Designing**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
9	**BEC 141** Electronics	**Elective**	**MICROPROCESSOR AND ITS APPLICATIONS**	20	8	80	27	50	17	150
10	**BMM 141** Maths	**Core**	**Analysis**	**20**	**8**	**80**	**27**	**-**	**-**	**100**
11	**BMB 141** Micro. Bio.	**Elective**	**Immunology & Medical Microbiology**	20	8	80	27	50	17	150
12	**BFS 141** Food Sci	**Elective**	**BIOCHEMISTRY**	20	8	80	27	50	17	150

Every candidate appearing in B.Sc. Semester 4th examination shall be examined in

(g) Foundation Course F.C (Compulsory) for all students.

(h) Any one of the following combinations:

1 Physics, Maths, Computer Science.
2 Physics, Maths, Electronics.
3 Physics, Chemistry, Maths.
4 Chemistry, Botany, Zoology.
5 Chemistry, Botany or Zoology, Biotechnology.
6 Chemistry, Botany or Zoology, Microbiology.
7 Chemistry, Botany or Zoology, Food Science.

Provided that the courses of studies for Physics offering combinations from (i) to (iii) and for Chemistry offering combinations from (iii) to (vii) shall be those prescribed for biology group.

Electives Subjects	**Core Subjects**	**Combinations Available**
BBT 141 Biotechnology	BSZ 141/BSB 141 (Zoology/Botany), BCH 141 Chemistry	BSZ 141/ BSB 141, BCH 141, BBT 141.
BMB 141 Microbiology	BSZ 141/BSB 141 (Zoology/Botany), BCH 141 Chemistry	BSB 141/ BSZ 141, BCH 141, BMB 141.
BEC 141 Electronics	BMM 141 Mathematics, BPY 141 Physics	BMM 141, BPY 141, BEC 141.
BFS 141 Food Science	BSZ 141/BSB 141 (Zoology/Botany), BCH 141 Chemistry	BSZ 141/ BSB 141, BCH 141, BFS 141.
BCS 141 Computer Science	BMM 141 Mathematics, BPY 141 Physics	BMM 141, BPY 141, BCS 141.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Core Subjects	Combinations
BMM 141 Mathematics	BCH 141 Chemistry/BCS 141 Computer Science/ BEC 141 Electronics, BPY 141 Physics.
BPY 141 Physics	BCH 141 Chemistry/BCS 141 Computer Science/ BEC 141 Electronics, BMM 141 Mathematics.
BCH 141 Chemistry	BMM 141Mathematics, BPY 141 Physics or, BBT 141 Biotechnology, BSZ 141/BSB 111 (Zoology/Botany) or, BMB 141 Microbiology, BSZ 141/BSB 141 (Zoology/Botany) or, BSB 141 Botany, BZB 141 Zoology or, BFS 141 Food Science, BSZ 141/BSB 141 (Zoology/Botany),
BSZ 141 Zoology	BCH 141 Chemistry, BBT 141 Biotechnology or, BCH 141 Chemistry, BMB 141 Microbiology or, BCH 141 Chemistry, BSB 141 Botany or, BCH 141 Chemistry, BFS 141 Food Science.
BSB 141 Botany	BCH 141 Chemistry, BBT 141 Biotechnology or, BCH 141 Chemistry, BMB 141 Microbiology or, BCH 141 Chemistry, BSB 141 Zoology or, BCH 141 Chemistry, BFS 141 Food Science.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Semester – IV

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**English Language**	**FC-401/1**

COURSE OUTCOME

C 01: The course aims at exposing students to the examples of prose and poetry in English so that they realize the beauty and communicative power of English

C 02: Upon the completion of the course thr students will develop the ability to appreciate ideas and think critically

C 03: On successful completion of the Programme, the students will be accurate both in oral and written communication as they will be strong in Writing skills and its usage.

C 04: They can express a thorough command of English and its linguistic Structures.

Unit-I

1. WilliamWordsworth : "The World is Too Much WithUs"
2. K.Aludiapillai : "Communication Education and InformationTechnology"
   "Democratic Decentralisation"
3. S.C. Dubey : "Basic Quality ofLife"
4. SisterNivedita : "The Judgment Seat ofVikramaditya"
5. JuliunHuxley : "War as a BiologicalPhenomenon"
6. RobertFrost : "Stopping by Woods on a SnowyEvening"
7. RuskinBond : "The CherryTree"

Unit-II

Short Essay of about 250-300 words.

Unit-III

Translation of a short passage from Hindi to English.

Unit-IV

Drafting CV, writing e-mail message for officialpurpose.

Unit-V

Language Skills, One-word substitution, homonyms, homophones, words that confuse, Punctuation, Idioms

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Semester – IV

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Development of Entrepreneurship**	**FC-401/2**

COURSE OUTCOME

C 01: The students develop and can systematically apply an entrepreneurial way of thinking that will allow them to identify and create business opportunities that may be commercialized successfully.

C 02: After the completion of the course, the students will be able to have the ability to discern distinct entrepreneurial traits

C 03: Know the parameters to assess opportunities and constraints for new business ideas

C 04: Understand the systematic process to select and screen a business idea and design strategies for successful implementation of ideas

C 05: The students will be able to write a business plan

Unit-I

Entrepreneurship - Meaning, Concept, Characteristics of entrepreneur.
उद्यमिता–काआशय,मत ,उद्यमिताकागु। प

Unit-II

Types of entrepreneurship, importance and views of various thinkers (Scholars).

- Formation of goals, How to achievegoals.
- Problems in achieving targets andsolution.
- Self motivation, elements of self motivation anddevelopment.
- Views of various scholars, evaluation,

solutions. Leadership capacity : Its development
andresults.
उद्यमिताकाप्रकार,महत्वआरविभिन्नविद्वानोंकामत ,लक्ष्यनिर्मा,लक्ष्यकास्व ाप्तकर ालक्ष्यप्राप्तिमसमस्याए,उनकासमाधान,
स्वप्रेरणा,स्वप्रेरणाकतत्वआत्मविकास,विभिन्नविद्वानाकामत ,आकलन,निष्कष,नेतत्वसमता,उसकानिकासआरप्रतिफलन

Unit-III

Projects and various organisations (Govt., non-Govt.), Govt. Projects, Non-Govt. projects.Contribution of Books, their limitations,scope.
परियोजनाएंतथाविभिन स्व ांगठन(शासकीय–अशासकीय),शासकीयपरियोजनाएं–अशासकीयपरियोजना ं–बैंकाकायोगदान,उनकी
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Unit-IV

Functions, qualities, management of a good entrepreneur.Qualities of the entrepreneur (Modern and traditional).Management skills of the entrepreneur.Motive factors of the entrepreneur.
अच्छेउद्यमांककागन–कनसकार्य,गु,पबंधनइत्यादि,अच्छउद्यमांकागुआधनिकऔरपरंपरागत),उद्यमांकीप्रबंधनकला,उद्यमांक
प्रेरकतत्व

Unit-V

Problems and Scope of the Entrepreneur :

- Problem ofCapital
- Problem ofPower
- Problem ofregistration
- Administrative problems
- Problems ofOwnership.

उद्यमीकीसमस्याएंक्षे,ंज्ञानकीसमस्या,शक्तिकर□किसमस्या,ंज्ञानीक्तककीसमस्या,प्रशासनिकस्नमस्याएं,स्वामित्वकीसमस्याइत्यादि

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester – IV

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Chemistry)	BASED ON INORGANIC, AND PHYSICAL CHEMISTRY	BCH-141

Course outcome:

1. To learn about the details of lanthanide compounds and actinides.
2. To describe Electrolytic and Galvanic cells.
3. Students will be able to explain the quantitative relationship between T,V,n & P as described by kinetic molecular theory.
4. To study about the carbonyl group.

UNIT-I

Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds. **Actinides-**General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, Comparison of properties of Lanthanides and Actinides and with transition elements .

UNIT-II

Second law of thermodynamics, need for the law, , Carnot's cycles and its efficiency, Carnot's theorem, .Thermodynamics scale of temperature. Concept of entropy - entropy as a state function, entropy as a function of V & T, entropy as a function of P & T,

Thermodynamics-IV Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function(G) and Helmholtz function (A) as thermodynamic quantities, A &G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.

UNIT-III

Electrolytic and Galvanic cells – reversible & Irreversible cells ,conventional representation of electrochemical cells. EMF of cell and its measurement, Wes ton standard cell, activity and activity coefficients .Calculation of thermodynamic quantities of cell reaction (G, H & K).Types of reversible electrodes – metal- metal ion gas electrode, metal –insoluble salt- anion and redox electrodes.Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential.Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions electrochemical series and its applications.

UNIT-IV

Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabrielphthalimide reaction, **Diazonium Salts** Mechanism of diazotisation, structure of benzene diazoniumchloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2reaction and its syntheticapplication.

Nitro Compounds Preparation of nitro alkanes and nitro arenes and their chemical reactions.

UNIT-V

Nomenclature and structure of the carbonyl group.Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, **Ketones** Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations.Condensation with ammonia and its derivatives.Wittig reaction.Mannichreaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction.MPV, Clemmensen, Wolff-Kishner, LiAlH4 and NaBH4 reductions.

Book suggested :

1. I. L. Levine, Quantum Chemistry , Prentice-Hall Inc., NewJersey.
2. T. Engel and P. Reid, Physical Chemistry,Benjamin-Cummings.
3. S. M. Mukherji and S. P. Singh, Reaction Mechanism in Organic Chemistry,Macmillan
4. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, JohnWiley.

(Practicals)

SECTION – I
(Inorganic)
Colorimetry:

1. To verify Beer - Lambert law for KMnO4/K2Cr2O7 and determine the concentration of the given KMnO4/K2Cr2O7 solution.
2. Preparations: Preparation of Cuprous chloride, prussion blue from iron fillings, tetraammine cupric sulphate, chrome alum, potassium trioxalatochromate (III).

Section-B (Physical)

3. To determine the enthalpy of solution of solid calciumchloride 4 .To study the distribution of iodine between water and CCl4.

Section C (Organic)

Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the following simple mono and bifunctional organic compounds: benzoic acid,salicyclic acid, aspirin, phthalic acid, cinnamic acid, benzamide, urea, acetanilide, benzanilide, aniline hydrochloride, p- toluidine, phenyl salicylate (salol), glucose, fructose, sucrose, *o*-, *m*-, *p*nitroanilines,thiourea.

Books for practical:

1. Vogel's Textbook of Practical Organic Chemistry, A.R. Tatchell, JohnWiley.
2. Practical Physical Chemistry, A.M. James and F.E. Prichard,Longman.
3. Findley's Practical Physical chemistry, B.P. Levitt,Longman.
4. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C.Health.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester –IV

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Physics)	ELECTRICITY AND MAGNETISMBASIC ELECTRONICS	BPY 141

Course outcome:

1. Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.
2. Use an understanding of calculus along with physical principles to effectively solve problems encountered in everyday life, further study in science.
3. Predict the behavior of any electrical and magnetic circuits.
4. Formulate and solve complex AC, Dc circuits.
5. Identify the type of electrical machine used for that particular application

UNIT I

Special diodes : Light Emitting Diode (LED) and its advantages – multicolor LEDs and its applications - Photo diode – characteristics and applications – Tunnel diode and its characteristics – Tunnel diode as an Oscillator – Varactor diode – Theory and its applications – Shockley diode – PIN diode and its applications.

UNIT II

Hybrid (*h*) parameters - determination of *h*-parameters – *h*-parameters equivalent circuit – performance of a linear circuit in *h*-parameter – the h-parameter of a transistor – Nomenclature for transistor *h*- parameters – input impedance, voltage gain and current gain in *h*- parameters – experimental determination of *h*-parameters – limitations of *h*-parameters.

UNIT III

Common emitter transistor as an amplifier - DC and AC load line analysis - Transistor biasing - stabilization - base resistor method -feed back resistor method - Voltage divider bias method - Construction of JFET – its characteristics and parameters - Common source JFET amplifier - MOSFET - Depletion MOSFET- Enhancement MOSFET - UJT, SCR - Construction, working, V- I characteristics and their application.

UNIT IV

Multistage amplifier – definition of gain, frequency response, decibal gain and bandwidth – operation, frequency response, advantage, disadvantage and applications of RC coupled CE transistor amplifier (two stage) and transformer coupled amplifier.

Principle of feedback in amplifiers – positive and negative feedback – effect of negative feedback - emitter follower – positive feedback amplifier as an oscillator - Hartley oscillator, Wien-bridge oscillator and Piezo electric crystal oscillator.

UNIT V

Multivibrators - astable, monostable and bistable multivibrator using transistor. Operational Amplifier : Differential amplifier - basic circuit and its operation –CMRR – Op-amp – Block diaram and explanation – applications – differentiator , integrator and comparator – multistage op- amp – solving simultaneous equations.

Books for Study:

1. Basic Electronics (Solid state), B.L. Theraja, S. Chand & Co., (2000).
2. Principles of Electronics, Metha, V.K. S. Chand & Co., (2001).
3. Elements of electronics, M.K. Bagde and S.P. Singh, S. Chand & Co. (1982).
4. Foundations of electronics, D. Chattopadhyay and etal., New Age International Publishers (1999).
5. Hand book of Electronics - Gupta & Kumar, Pragati Prakhasan (2005).

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B.Sc.Courses

Semester IV

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Botany)	**Structure, development & reproduction in flowering plants**	**BSB 141**

Course Outcome:

1. Study of the families with respect to morphological characters using botanical terms, floral formula, floral diagram and classification giving.
2. Identification of genus and species with the help of flora of the plant materials.
3. Preparation of artificial, bracketed/indented dichotomous keys based on vegetative and reproductive characters.
4. Study of Morphological and biological peculiarities of plants.

UNIT –1

The Root system: Root apicalmeristems, Differentiation of primary and secondary tissues and their roles, Anatomy of Monocot and Dicot roots, Morphological modification of root for storage, respiration, reproduction and interaction withmicrobes.

UNIT – 2

The Shoot system: Shoot apical meristemand histological organization, Anatomy of primary stem in Monocotyledons and Dicotyledons, Secondary growth in stem and root – Vascular cambium and its functions, Characteristics of growth rings, Sapwood and Heart wood, Secondary Phloem, Cork Cambium andPeriderm.

UNIT –3

The Leaf system: Origin, Development, Diversity in size, shape and arrangement, Internal structure of Dicot and Monocot leaf in relation to photosynthesis and water loss, Adaptations to water stress, senescence and abscission.

UNIT – 4

The Flower system: Concept of flower as a modified shoot, Structure of Anther, Microsporogenesis and Male Gametophyte, Structure of Pistil, Ovules, Megasporogenesis and Development of Female Gametophyte (Embryo Sac) and its types, Pollination – Mechanism and Agencies of Pollination, Pollen Pistil interactions and Selfincompatibility.

UNIT – 5

Double Fertilization, Development and types of Endosperm and its morphological nature, Development of Embryo in Monocots and Dicots, Fruit development and maturation. Seed structure and dispersal, VegetativePropagation.

Practical Exercises + Scheme

(Marks- 50)

1- Cutting, staining and mounting of cross section of two materials of monocotyledons/dicotyledons root and stem and leaf like Sunflower and Maize or otheravailablematerial. 15

2- Organisation of shoot Apex andRootApex. 5

3- Study of Ovules and Anthers andtheirtypes 5

- Structure of stigma and style (Hibiscus, Maize, Ocimum, Citrus andClitoria

(Aprajita) or plant studied by you.

4-Spotting- 10

5-Viva- voce- 5

6-Practical Record- 10

SUGGESTED READINGS:--

1•Gangulee, H.C., Das, K. S. And Dutta, C. 2007. College Botany Voll.I, New Central Book Agency (P) Ltd. Kolkata, 700009.
2•Hywood, V.H. & Moore, D.M. (eds) 1984. Current concepts in plant taxonomy. Acedemic press London.
3•Jones, S.B. Jr. and Luchsinger, A.E. 1986, Plant taxonomy (III edition) Mc Graw Hill Book Co. New York.
4•Maheshwari, P.1978.Plant Embryology.
5• Pandey, B. P. 2010.A Text book of Botany- Angiosperms, S. Chand & Company Ltd. Ramnagar, New Delhi- 110055.
6• Radford, A.E. 1986.Fundamentals of Plant Systematics, Harper and Row, New York.7• Shrivastava and Das.Modern text book of Botany Vol-III & IV.
8• Singh, V., Pande P.C. and Jain , D. K. Structure & Development in Angiosperms. Rastogi Publication, Meerut.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester – IV

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Zoology)	**ECOLOGY & EVOLUTIONARY BIOLOGY**	**BSZ 141**

Course outcome:

1. To Describe Environmental Population and its control measures.
2. To understand methods of wildlife and conservation and endangered species .
3. To describe Innate and Acquired types of behavior.
4. Knowledge regarding principles, applications and management of environmental science.
5. To study of the ecosystem of pond.

UNIT I

Abiotic factors of the Environment : Temperature, Light and .Oxygen. Bio geo chemical cycles with special reference to Nitrogen Phosphorous and Carbon. Biotic factors of the environment - Animal relationship.

UNIT II

Population : characteristics –Natality, Mortality, Density, and age distribution, population control, life-tables, Food chains, Food webs and Ecological pyramids. Air pollution, Water pollution and Oil pollution. Noise pollution and Thermalpollution.

UNIT III

Pond as a Ecosystem, energy flow and ecological succession. Habitats – Terrestrial – Aquatic – Marine, Fresh water and estuary. Environmental resources- renewable and non renewable resources.Forest resources- Protection – Chipko movement- A forestation.Wild life management- Wild life sanctuaries and National Parks.

Unit-IV

History of Evolutionary thought - Origin of life –Chemical evolution. Evolution of self replicating systems –DNA world and RNAworld.

Evidences from Paleontology -Comparative anatomy, Embryology, Physiology and Bio chemistry. Bio geography –Distribution in continents ,Continuous and discontinuous distribution - Endemism .

Unit-V

Natural selection- Species and Speciation- Sympatric and allopatric speciation.Isolating mechanism-mutation and genetic drift.

Adaptation and adaptive radiation, Colouration-mimicry-Darwins finches.Polymorphism-types and significance.Convergent-Divergent-parallel and co-evolution of Man and cultural evolution.

TEXT BOOKS

1. H.D.Kumar, Modern concepts of Ecology. Vikas Publishinghouse.
2. E.P. Odum, Fundamentals of Ecology.
3. G.C. Clarke, Elements of Ecology, John Wiley sons, NewYork
4. Rostogi, V.B. Organic Evolution, Kedernath, Ramnath publishers,Meerut.
5, Verma P.S. & Agarval, V.L. concepts of evolution S.Chand&Company.

REFERENCES:

Introduction to evolution-Dodson-Evolution: process and product.

PRACTICAL

Spotters:

Description and uses of autoclave, Hot air oven, Incubator, Water both, Centrifuge, Refrigerator, pH meter, Colori meter, Microtome, Rain gauge, Anemometer, Maximum minimum thermometer, Hygrometer, and Barometer.

Computer applications - Hardware of computer, storage device,

mouse.Submission of field Report.

Submission of Practical Record.

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Biotechnology)	MOLECULAR IMMUNOLOGY & RECOMBINANT DNATECHNOLOGY	BBT-141

Course outcome:

1. Understanding the concept of Gene and the gene architecture.
2. Overview of the central dogma of life and various molecular events.
3. Understanding the principles and applications of Polymerase Chain Reaction(PCR).
4. Molecular Events of Transcription and processing of transcripts, RNA editing.
5. Learn on assigning gene function through mutagenesis and genetic engineering.

UNIT-I

Historical perspectives - overview of immune system, innate and acquired immunity, immune - systematic structure and organization.
Antigen and antigenicity, Immunoglobulins - structure, complements, antigen - antibody interaction - monoclonal antibodies.

UNIT-II

Organisation and expressions of immunoglobulin genes - histocompatability complex.
Cytokines: Structure and function-cytokine receptors-biological functions of cytokines - cell mediated immunity; reports and T cell activation - Humoral response; B cell activation and proliferation - hypersensitive reactions.

UNIT-III

Immune regulation, autoimmunity, vaccines and immune response to infectious diseases - Immunodeficiency diseases (AIDS) - immune suppression & transplantation.

Unit -IV

History of Recombinant DNA Technology. Isolation and Quantification of DNA and RNA. Host controlled Restriction –Modification system, Restriction Endonucleases. Cutting and joining of DNA molecules *in vitro*. Phosphatases, Ligases and Polymerases. Vectors: Plasmid, Bacteriophage, Cosmids, Phagemid and other (SV 40) Virus vectors. Expression Vectors.

Unit -V

Gene transfer methods in animals: Microinjection, Electroporation, Microprojectile bombardment, Shot Gun method, Ultrasonication, Lipofection, Micro laser. Selection and Screening of Recombinants by genetic, immunochemical and hybridization methods, Southern, Northern and Western blotting.

REFERENCE

1. Immunology (V Edition),- Richard A.Goldsby, Thomas. J. Kindt, A. Osborne, JanisKuby,2003. W.H. Freeman and company
2. Immunology, Ivan Roitt, 2001. Harcourt publishers, ltd.
3. Essential immunology, Ivan Riott, 2000. Blackwell Science, 9th Edition.
4. Immunology - An Introduction, Tizard.
5. Glick, B.R & Pasternak J.J (1994) Molecular Biotechnology, Princi[ples and Applicatiopnsof Recombinant DNA, American Society for Microbiology, Washington D.C
6. Christopler H. (1995) Gene cloning and Manipulating, Cambridge Universoty Press Nicholl, D.S.T (1994) An Introduction of Genetic Engineering, Cambridge University Press.
7. Old. R.W. and Primrose, S.B. (186) Principles of Gene manipulation, An introduction togenetic engineering (3rd Edition) Black well Scientific Publications
8. Watson J.D. Hopins, N.H Roberts, J.W.Stectz J.A and Weiner A.M. (1988). Molecularbiology of society for Microbiology
9. Lewin b. (1994) Genes VI, New York,Oxford University Press.

PRACTICLE- IMMUNOLOGY

1. Blood grouping
2. Blood cell analysis
3. Lymphocyte subset identification and enumeration.
5. Routes of inoculation
6. Preparation of Antigen - Protocol of immunization
7. Methods of bleeding
8. Preparation of serum components
9. Immuno diffusion
11. Immuno electrophoresis
13. Haemoagglutination.
14. Serum electrophoresis.
15. Antigen-antibody reaction (precipitation & agglutination reaction tests)

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc.(Computer Science)	**SOFTWARE DESIGNING**	**BCS-141**

Course details:

1. Learn the phases of software development.
2. Develop process models and process system models.
3. Gather, understand, analyze and specify requirements
4. Develop architectural design, and implement by following coding principles

UNIT I

Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model.

UNIT II

Requirement, Analysis, and Specification Functional and Non functional requirements, Object oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

UNIT III

The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function oriented Design.

UNIT IV

Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing Fundamentals, Software Test Process, Testing Levels, Black-Box Testing, White-Box Unit Testing and Unit Testing Frameworks,

UNIT V

Software Maintenance & Software Project Measurement

Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering,

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc(Electronics)	MICROPROCESSOR AND ITS APPLICATIONS	BEC 141

Course outcome:

1. Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.
2. Identify a detailed s/w & h/w structure of the Microprocessor.
3. Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.
4. Distinguish and analyze the properties of Microprocessors & Microcontrollers.
5. Analyze the data transfer information through serial & parallel ports.

UNIT-I

Architecture of 8085 microprocessor - Registers - Flags - ALU - Address and data buses - Demultiplexing the address / data bus - Control and status signals -I0nstruction set of 8085 - Addressing modes - Assembly language programming -Programs for addition, subtraction, multiplication and division of binary and BCD numbers (8-bit only)

UNIT-II

Stack and stack related instructions - Subroutines - Advanced programming techniques - Code conversions - Block transfer of data - Sorting of data - Time delays using single register and register pair - Delaycalculations.

UNIT-III

Semiconductor memories - Classification - Instruction cycle, Machine cycle and Tstate - Timing diagrams for opcode fetch, memory read, memory write, I/O read and I/O write machine cycles - Interfacing memorychips - Interfacing an input port -Interfacing an output port - I/O mapped I/O and memory mapped I/O techniques.

UNIT-IV

Interrupts - Hardware and software interrupts - Interrupt priorities - SIM and RIM instructions - Polled I/O and interrupt controlled I/O data transfer - Interfacing programmable devices - Programmable Peripheral Interface 8255 - Internal architecture - Control register and control word - Programming 8255 - Interfacing hex-keyboard and seven segment display.

UNIT-V

Interfacing D/A converter and waveform generation - Interfacing A/D converters -Keyboard / Display Controller 8279 - Internal architecture and working -Programmable Interval Timer 8253/54 - Internal architecture and different modes of operation - Stepper motor interface - Temperature controller - Traffic lights controller.

Text Books

1. Microprocessor Architecture, Programming and Applications with the 8085 -Ramesh S. Gaonkar, 5/e,Penram International Publishing (India).
2. Fundamentals of Microprocessors-8085 - V. Vijayendran, S. Viswanathan (Printers & Publishers), Pvt.Ltd., 2002.
3. Microprocessor and its Applications - A. Nagoor Kani, 1/e, RBA Publications, Chennai.
4. Introduction to Microprocessors - Aditya P. Mathur, 3/e, Tata McGraw Hill Publishing CompanyLimited.
5. Fundamentals of Microprocessors and Microcomputers - B. Ram, Fifth Revised and Enlarged Edition,Dhanpat Rai Publications, New Delhi.

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B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Mathematics)	**Analysis**	**BMM-141**

Course outcome:

1 To apply appropriate numerical methods to solve the problem with most accuracy.
2 Using appropriate numerical methods determine approximate solution of ODE and system of linear equation.
3 Compare different methods in numerical analysis w.r.t accuracy and efficiency of solution.
4 Find numerical solutions of system of Cauchy's theorem and check the accuracy of the solutions.

Unit-1

Group automorphisms, inner automorphism, Group of automorphisms, Conjugacy relation and centraliser, Normaliser, Counting principle and the class equation of a finite group, Cauchy's theorem for finite abelian groups and non- abelian groups.

Unit-2

Introduction to rings, subrings, integral domains and fields, simple properties and examples, ring homomorphism, ideals and quotient rings. Divided differences and Newton's divided differences formula for interpolation and Lagrange's formula for interpolation.

Unit-3

Laplace Transformation (LT) - definitions, LT of the function t, e^{at}, cos at, sin at, e^{at} cos bt. e^{at} sin bt, Transform f' (t), f'' (t) - inverse LT relating to the above standard functions. Convolation theorem based problem
Maxima, Minima and saddle points of functions of two variables, Improper integralsand their convergence, Comparison test, Abel's and Dirichlet's tests,

Unit-4

Partial Differential equations of the first order, Lagrange's solution, Some special types of equations which can be solved easily by methods other than general methods, Charpit's general method of solution, Partial differential equations of second and higher orders, Partial differential equations reducible to equations with constant coefficients.

Unit-5

Continuity and differentiability of Complex functions, Analytical function, Cauchy Riemann equation, Harmonic function, Mobius transformations, fixed points, cross ratio.

Text Books :

1. I.N. Sneddon, Elemets of partial Differential equatiins Mc graw Hill, Co. 1988
2. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co.,New Delhi.
3. Calculus of finite differences and Numerical analysis by Gupta-Malik, Krishna Prakastan Mandir, Meerut.
4. Numerical Analysis by B.D. Gupta,

Reference Books:

1. T.M. Apostol, Mathematical Analysis Narosa Publishing House, New Delhi 1985
2. Shanti Narayan, A Text Book of Modern Abstract Algebra, S. Chand & Co. New Delhi
3. . P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra, Wiley Eastern,New Delhi, 1997.
4. . I. S. L.uther and I.B. S. Passi, Alegebra Vol-I,II,Narosa Publishing House. R. V. Churchill & J.W. Brown, ComplexVariablesandApplications,5th Edition

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Microbiology)	**IMMUNOLOGY & MEDICAL MICROBIOLOGY**	**BMB 141**

Course outcome:

1. Demonstrate an understanding of key concepts in immunology
2. Understand the overall organization of the immune system
3. Conceptualize how the collection of individual clones of lymphocytes (termed the "immune repertoire") arises from rearrangement within two genetic loci: the Ig gene in B cells and the antigen receptor in T cells.
4. Learn how "clonal selection" allows for the expansion of a limited number of antigen-recognizing lymphocytes in response to an specific antigenic stimulus
5. Begin to appreciate the significance of maintaining a state of immune tolerance sufficient to prevent the emergence of autoimmunity
6. To make them understand the salient features of antigen antibody reaction & its uses in diagnostics and various other studies.

Unit I

Infection

Normal flora of human body, Infection and its types, Mechanism of pathogenesis.

Immune System

Organs of Immune system- Spleen, thymus and lymph nodes, Cells of Immune system- T cells- its types and receptors. B cells and its receptors.

Unit II

Immune Response

Immunity- Innate and acquired, Host defense mechanism- First, second and third line of host defense, Primary and secondary responses.

Antigens and Antibodies

Antigens- Properties and types, Adjuvants, Immunoglobulins- Separation, structure and types, Generation of antibodies, Antibody diversity.

Unit III

Antigen and Antibody Reactions

Agglutination and precipitation reactions, Hemagglutination and PHA, Immunofluorescence, ELISA, RIA, Coombs test (Direct and Indirect), Complement- Components and biological activities.

Unit IV

Epidemiology of Infectious Diseases

Epidemiological study, Transmission of diseases, Types of diseases- Epidemic, pandemic and sporadic, Nosocomial infections.

Antimicrobial Agents

Antibiotics- Mode of action, Development of resistance, Transmission of drug resistance, ntiviral and antifungal drugs.

Unit V

Hypersensitivity

Hypersensitivity- Immediate and delayed type, Autoimmune diseases, Skin tests.

Microbial Diseases- I

Gram Positive Cocci- *Staphylococcus aureus* and *Streptococcus pneumonia,* Gram Negative Bacilli- *Salmonella typhi* and *Vibrio cholarie,* Acid fast bacteria- *Mycobacterium tuberculosis.* Virus- Hepatitis and HIV.

Recommended Books (Semester-IV)

1. Immunology, Author- J. Kuby.
2. Fundamental Immunology, Author– W.E. Paul.
3. Fundamentals of Immunology, Authors– Coleman, Lombord and Sicard.
4. Immunology – Weir and Steward.
5. Immunology, A Textbook, Author- C.V. Rao.
6. Lecture Notes in Immunology, Author- I.R.Todd.
7. Essentials of Immunology, Authors- Roitt, I.M.
8. Immunology-Understanding of Immune System, Author- Klaus D. Elgert (1996)
9. Text Book on Principles of Bacteriology, Virology and Immunology, Authors- Topley &
10. Wilson's (1995)
11. The Experimental Foundations of Modern Immunology. Author- Clark, V.R.,
12. Medical Microbiology, Vol. 1 : Microbial Infection, Vol. 2 : Practical Medical Microbiology,
13. Authors- Mackie and McCartney.
14. Epidemiology and Infections, Author- Smith
15. Lecture Notes in Immunology, Author- I.R. Todd
16. Microbiology in Clinical Practice, Author- D.C. Shanson.
17. Diagnostic Microbiology, Authors- Baron, Peterson and Finegold.

YEAR-II SEMESTER-IV
LIST OF EXPERIMENTS

1. Estimation of haemoglobin by Sahli's method.
2. Estimation of haemoglobin by Cyname haemoglobin mehod.
3. Total count of W.B.C.
4. Total count of R.B.C.
5. Differential W.B.C. count.
6. Flocculation reaction- VDRL
7. Agglutination reaction- Widal test, Blood Grouping.
8. Immuno-diffusion techniques- ODD and RID.
9. UV as a mutagenic agent.
10. Replica plating technique.
11. Estimation of skin microflora.

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B.Sc.Courses

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Food Science & Tech.)	**BIOCHEMISTRY**	**BFS 141**

Course outcome:

1. Understand and describe the general chemical structures of the major components of foods (water, proteins, carbohydrates, and lipids).
2. Give a molecular rationalization for the observed physical properties and reactivity of major food components.
3. Provide a theoretical explanation for observed extent and rates of reactions that are common to foods Predict how processing conditions are likely to change the reactivity of food components
4. To predict how changes in overall composition are likely to change the reactivity of individual food
5. To know the different metabolisms of nutrients.

Unit I

Carbohydrates: classification , monosaccharaides, oligosaccharides, polysaccharides, structure and configuration of aldose, ketoses, triose, tetrose, pentose, hexose, starch, inulin, glycogen, cellulose, cell and biomolecules, prokaryotic and eukaryotic cells, nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus, lysosomes, peroxisomes.

Unit II

Lipids: classification of lipids, fatty acids, essential fatty acids, triglycerols, phospholipids, glycolipids, lipoprotein, sterols, amphipathic lipids, digestion absorption transportation and utilization, functions source and requirement , effect of deficiency

Unit III

Proteins and amino acid: amino acid, classification, properties, essential amino acid, structure of proteins-primary, secondary, tertiary, quaternary structure of proteins; protein denaturation.

Unit IV

Enzymes: Nomenclature and classification , kinetics of enzymic reactions, types of enzymes, enzyme inhibition, reversible inhibition, irreversible inhibition, conditions affecting enzymatic reactions, co-enzymes,

Vitamins: classification, functions, requirement and deficiency conditions, vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Pantothenic acid

Unit V

Metabolism of carbohydrates: glycolysis and tricarboxylic acid (TCA) cycle, HMP shunt

Metabolism of proteins: - Transamination, deamination, decarboxylation, urea cycle.

REFERENCE:

- Berg, J. M., Tymocezko, J. L, Biochemistry, Sixth edition, W H Freeman and Company, New York, 2007
- Das, D. Biochemistry, Seventh Edition, Academic publishers, calcutta, 1992
- Jain, J. L., Fundamentals of Biochemistry, Fifth Edition, S. Chand and Company Ltd, 2001
- Satyanarayana, U. and Chakrapani, U. Biochemistry, Third edition, Books and Allied Pvt ltd, Kolkata, 2006

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B.Sc.Courses

SCHEME
Semester – V

No	Subject Code	Subject Type	Subject Title	Marks Allotted						
				Assignment Marks		Theory Marks		Practical Marks		Total Marks
				Max	Min	Max	Min	Max	Min	
1	**FC-501/1** Foundation course	**Core**	Values & Spirituality	**10**	**4**	**40**	**14**	**-**	**-**	**50**
2	**FC-501/2** Foundation Course	**Core**	Basic Computer Information Technology-I	**10**	**4**	**40**	**14**	**-**	**-**	**50**
3	**BSZ 151** Zoology	**Core**	Microbiology And Biochemistry	**20**	**8**	**80**	**27**	**50**	**17**	**150**
4	**BSB 151** Botany	**Core**	Based On Inorganic, Organic And Physical Chemistry	**20**	**8**	**80**	**27**	**50**	**17**	**150**
5	**BCH 151** Chemistry	**Core**	Plant Physiology And Biochemistry	**20**	**8**	**80**	**27**	**50**	**17**	**150**
6	**BPY 151** Physics	**Core**	NUCLEAR PHYSICS	20	8	80	27	50	17	150
7	**BBT 151** Biotechnology	**Elective**	**Instrumentation & Basic Biostatistics**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
8	**BCS-151** Comp. Sci.	**Elective**	**Computer Network**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
9	**BEC 151** Electronics	**Elective**	**COMMUNICATION**	20	8	80	27	50	17	150
10	**BMM 151** Maths	**Core**	**Real Analysis I**	**20**	**8**	**80**	**27**	**-**	**-**	**100**
11	**BMB 151** Micro. Bio.	**Elective**	**Bioinformatics, Biostatistics & Industrial Microbiology**	20	8	80	27	50	17	150
12	**BFS 151** Food Sci	**Elective**	**FOOD MICROBIOLOGY**	20	8	80	27	50	17	150

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B.Sc.Courses

Every candidate appearing in B.Sc. Semester 5th examination shall be examined in

(i) Foundation Course F.C (Compulsory) for all students.

(j) Any one of the following combinations:

1 Physics, Maths, Computer Science.
2 Physics, Maths, Electronics.
3 Physics, Chemistry, Maths.
4 Chemistry, Botany, Zoology.
5 Chemistry, Botany or Zoology, Biotechnology.
6 Chemistry, Botany or Zoology, Microbiology.
7 Chemistry, Botany or Zoology, Food Science.

Provided that the courses of studies for Physics offering combinations from (i) to (iii) and for Chemistry offering combinations from (iii) to (vii) shall be those prescribed for biology group.

Electives Subjects	**Core Subjects**	**Combinations Available**
BBT 151 Biotechnology	BSZ 151/BSB 151 (Zoology/Botany), BCH 151 Chemistry	BSZ 151/ BSB 151, BCH 151, BBT 151.
BMB 151 Microbiology	BSZ 151/BSB 151 (Zoology/Botany), BCH 111 Chemistry	BSB 151/ BSZ 151, BCH 151, BMB 151.
BEC 151 Electronics	BMM 151 Mathematics, BPY 151 Physics	BMM 151, BPY 151, BEC 151.
BFS 151 Food Science	BSZ 151/BSB 151 (Zoology/Botany), BCH 151 Chemistry	BSZ 151/ BSB 151, BCH 151, BFS 151.
BCS 151 Computer Science	BMM 151 Mathematics, BPY 151 Physics	BMM 151, BPY 151, BCS 151.

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B.Sc.Courses

Core Subjects	Combinations
BMM 151 Mathematics	BCH 151 Chemistry/BCS 151 Computer Science/ BEC 151 Electronics, BPY 151 Physics.
BPY 151 Physics	BCH 151 Chemistry/BCS 151 Computer Science/ BEC 151 Electronics, BMM 151 Mathematics.
BCH 151 Chemistry	BMM 151Mathematics, BPY 151 Physics or, BBT 151 Biotechnology, BSZ 151/BSB 111 (Zoology/Botany) or, BMB 151 Microbiology, BSZ 151/BSB 151 (Zoology/Botany) or, BSB 151 Botany, BZB 151 Zoology or, BFS 151 Food Science, BSZ 151/BSB 151 (Zoology/Botany),
BSZ 151 Zoology	BCH 151 Chemistry, BBT 151 Biotechnology or, BCH 151 Chemistry, BMB 151 Microbiology or, BCH 151 Chemistry, BSB 151 Botany or, BCH 151 Chemistry, BFS 151 Food Science.
BSB 151 Botany	BCH 151 Chemistry, BBT 151 Biotechnology or, BCH 151 Chemistry, BMB 151 Microbiology or, BCH 151 Chemistry, BSB 151 Zoology or, BCH 151 Chemistry, BFS 151 Food Science.

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B.Sc.Courses

Semester – V

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Values & Spirituality**	**FC-501/1**

COURSE OUTCOME

C 01: The course aims to teach and inculcate the importance of value based living among students and give them a deeper understanding about the purpose of life.
C 02: Upon the completion of the course the students will understand the importance of value based living.
C 03: Students will understand and start applying the essential steps to become good leaders and emerge as responsible citizens with clear conviction to practice values and ethics in life.
C 04: Students will become value based professionals and will contribute in building a healthy nation.

Chapter 1: THE SUPREME- SOURCE OF VALUES

6.1 Objectives 6.2 Introduction 6.3 All about the Supreme
6.4 Name &Form of the Supreme 6.5 Abode of the Supreme
6.6 Attributes of the Supreme 6.7 Action of benediction
6.8 Auspicious confluence (Now never) 6.9 Summary
or
6.10 Glossary 6.11 Suggested reading

Chapter 2: HEALING RELATIONSHIPS WITH THE SUPREME

7.1 Objectives 7.2 Introduction 7.3 Significance of the relationships
7.4 All relations with ONE 7.5 major relations 7.6 True and eternal relations
7.7 Benefits of variousrelationships7.8 Thetimeless dimensions 7.9 Summary
7.10 Glossary 7.11 Suggestedreading

Chapter 3: RAJYOGA MEDITATION

8.1 Objectives 8.2 Introduction 8.3 Methods of Meditation
8.4 Rajyoga meditation with adifference 8.5 Five fold impact of Rajyoga meditation
8.6 Stages of Rajyogameditation 8.7 Attainments of Meditation
8.8 Research studies onmeditation 8.9 Summary
8.10 Glossary 8.11 Suggested reading

Chapter 5: SPIRITUAL LIFE STYLE

9.1 Objectives 9.2 Introduction 9.3 Early morning meditation
9.4 Regular spiritual study 9.5 Authentic life style 9.6 SatwicDiet
9.7 Selfless service 9.8 Review of Personal Progress
9.9 Summary 9.10 Glossary 9.11 Suggested reading

Chapter 5: EXERCISES FOR PRACTICE

Quiet reflection- Practice introversion-Being an observer-Stand back and observe -Self awareness (Soul consciousness)-Experiencing Body free stage-Reflect on original qualities-Visualize the Divine-Think attributes of the Supreme-Developing a living relationship-Surrender to God-Create Good wishes for all-Visualization in Meditation: Orbs of Light- The forest-The Balloon

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B.Sc.Courses

Semester – V

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Basic Computer Information Technology-I**	**FC-501/2**

COURSE OUTCOME

C 01: After studying this course the students will understand the fundamental hardware components that make up a computer's hardware and the role of each of these components.

C 02: Have an understanding about an operating system and an application program, and what each is used for in a computer

C 03: Demonstrate a basic understanding of computer hardware and software.

C 04: Students will apply the computer concepts and skills learned to solve business problems

C 05: Students will understand the basic concepts and terminology related to computer technology

Unit – I

INTRODUCTION TO COMPUTER ORGANIZATION –I :-History of development of Computer system concepts. Characteristics, Capability and limitations.Generation of computer.Types of PC's Desktop.Laptop, Notebook.Workstation & their Characteristics.

dEI;wVjvKWxZUKBZTS'KUdkifjp;&I

कम्प्यूटरकाइतिहास,कम्प्यूटरसिस्टमविचारधारा,विशेषताएयोग्यताएवसीमाएकम्प्यूटरकीपीढ़ियां,पी.सी.कपकार, डेस्कटॉपकपकार,लेपटॉपकपकार,नोटबुक,वर्कस्टेशनआदिकीविशेषताएं

Unit – II

INTRODUCTION TO COMPUTER ORGANIZATION –II :-Basic components of a computer system Control Unit, ALU. Input/ Output function and Characteristics, memory RAM, ROM, EPROM, PROM.

कम्प्यूटरआर्किटेक्चरकापरिचय-प

कम्प्यूटरसिस्टमकआधारउपकरण,कंट्रोलयूनिट,ए.एल.यू.इन्पुट/आउटपुटफंक्शनऔरविशेषताएं,मेमोरीरैम,रोम,ईपी रोम,पीरोम,औरअन्यपकारकीमैमोरी।

Unit – III

INPUT & OUTPUT DEVICES :- Input Devices : Keyboard, Mouse, Trackball. Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen. **Output Devices:** Monitors Characteristics and types of monitor, Video Standard VGA, SVGA, XGA, LCD Screen etc.Printer, Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer.Plotter, Sound Card and Speakers.

इन्पुटतथआउटपुटडिवाईसेस

इन्पुटडिवाइसकीबोर्ड,माउस,ट्रेकबॉल,जॉयस्टिक,डिजिटाईजिंगटेबलेट,स्कैनर्स,डिजिटलकेमरा,एमआईसीआर,ओसीआर, ओएमआर,बारकोडरीडर,आवाजकापहचानवाला,लाइटपेन,टचस्क्रीन।

आउटपुटडिवाइसमॉनीटरकीविशेषताएंएवंमॉनीटरकेकपकार,वीडियोस्टैण्डर्डइइटळ ।ए ै टळ ।ए ग्ळ ।एस्व्क स्क्रीनआदि, प्रिंटर्स,डेजीव्हील,डॉटमैट्रिक्स,इंकजेट,लेजर,लाइनप्रिंटर,प्लॉटर,साउंडकार्डसएवंस्पीकर्स।

Unit – IV

STORAGE DEVICES :-Storage fundamental primary Vs Secondary. Various Storage Devices magnetic Tape.Cartridge Tape, Data Drives, Hard Drives, Floppy Disks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, DVD-RW.

स्टोरेज डिवाईज़ेस

स्टोरेजफंडामेंटल प्राइमरीवि रूद्ध सेकेण्डरीस्टोरेजडिवाईजेज मैग्नेटिकटेप ,कार्टरीजटेप ,डाआइडाईव्स,हाईडिस्कड्राईव्स,फ्लोपी डिस्कस ,सी.डी.वी.सी डी.सी.डी.–आर.सी.डी.–आर.डब्ल्यू,जीपड्राईव ,डी.वी.डी.,डी.वी.डी.,–आर.डब्ल्यू।

Unit – V

INTRODUCTION TO OPERATING SYSTEM :-Introduction to operating systems, its functioning and types. basic commands of dos & Windows operating System.

Disk Operating System (DOS)

- Introduction, History and Versions ofDOS.

DOS Basics

- Physical Structure of disk, Drive name, FAT, file & directory structure and naming rules, booting process, DOS system files.

DOS Commands

- Internal DIR, MD, CD, RD, Copy, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPEetc.
- External CHKDSK, SCOPE, PRINT DISKCOPY, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, MODE, ATTRIB HELP, SYSetc.

ऑपरेटिंगसिस्टमकापरिचय

ऑपरेटिंगसिस्टमकापरिचय ,इसकेलक्षणएवंप्रकार,डॉसएवंविंडोसकामूलकमाहः।ऑपरेटिंगसिस्टमडिस्कआपरेटिंग सिस्टमक्वैे,परिचयएइतिहासएववर्जनऑफडॉस।

डॉस बेसिक्स –

फिजीकलस्ट्रक्चरऑफडिस्क,ट्रेक्स,सेक्टर,फाईलएवंडायरक्ट्रीस्ट्रक्चरएवंकमान्ड्स,बूटिंगप्रक्रिया,डॉससिस्टम फाईल्स।

डॉस कमाण्डस–

- आंतरिककमा.M1DIR,MD, CD, RD, Copy,DEL,REN, VOL, DATE, TIME,CLS,PATH,TYPEvkfnA
- बाह्यकमा.M1CHKDSK, SCOPE, PRINT DISKCOPY, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, MODE, ATTRIB HELP, SYSvkfnA

Books Recommended-

1- डॉ.एस.के.विजय,डॉ.पंकजसिंहकम्प्यूटरविज्ञानएवंसूचनाप्रौद्योगिकी,मध्यप्रदेशहिन्दीग्रंथअकादमी,भोपाल

2- डॉ.पंकजसिंहकम्प्यूटरअध्ययन,रामप्रसादएडसंस

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Basic Computer Information Technology-I**	**FC 501/2**

PRACTICALS

DOS :

- DOS commands : Internal & ExternalCommands.
- Special batch file : Autoexec, Bar Hard disksetup.

Windows 98:

- Desktop setting : New folder, rename bin operation, briefcase, function. Control panelutility.
- Display properties: Screen saver, backgroundsettings.

Ms-Word:

- Creating file: save, save as HTML, Save as Text, template, RTFFormat.
- Page setup utility: Margin settings, paper size setting, paper source,layout.
- Editing: Cut, paste special, undo, redo, find, replace, gotoetc.
- View file: page layout, Normal Outline, master document, ruler header, footer, footnote, full screen.
- Insert: break, page number, symbol, date & time, auto text, caption file, object, hyperlink, pictureetc.
- Format: font, paragraph, bullets & numbering, border & shading, change case,columns.
- Table : Draw label, insert table, cell handling, table auto format, sortformula.

RKDF UNIVERSITY, BHOPAL

B.Sc.Courses

Syllabus
Semester – V

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Chemistry)	**BASED ON INORGANIC, ORGANIC & PHYSICAL CHEMISTRY**	**BCH-151**

Course outcome:

1. To study about the monosaccharide and its details.
2. To descried about the transition metal complex of the various properties.
3. Various spectroscopy methods and spectrums.
4. To learn about organo compounds.

UNIT-I

Limitations of valence bond theory, an elementary idea of crystal-field theory, crystal field split ting in octahedral, tetrahedral and square planar complexes, **Magnetic Properties of Transition Metal Complex** Types of magnetic behavior, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, **Electron Spectra of Transition Metal Complexes** Types of electronic transitions, selection rules for d-d transitions ,spectroscopic ground states, spectro chemical series. Orgel-energy level diagram for d1 and d9 states, discussion of the electronic spectrum of [Ti(H2O)6]3+ complex ion.

UNIT-II

Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance of Postulates of quantum mechanics , quantum mechanical operator, commutation relations, Hamiltonial operator, Hermitian operator, average value of square of Hermitian as appositive quantity, Role of operators in quantum mechanics, To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance.

UNIT-III

Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, **Rotational Spectrum** Diatomic molecules. Energy levels of rigid rotator (semi-classical principles),selection rules. .**Vibrational spectrum** Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, effects of an harmonic motion and isotopic effect on the spectra., idea of vibrational frequencies of different functional groups. **Raman Spectrum**: Concept of polarizibility, pure rotational and pure vibrational Raman spectra of diatomic molecules, select in rules, Quantum theory of Ramanspectra.

UNIT-IV

Classification and nomenclature. Monosaccharides, mechanism of osazone formation, inter conversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides.Erythro and threo diastereomers.Conversion of glucose in to mannose.Formation of glycos ides, ethers and esters.Determination of ring size of glucose and fructose. Open chain andcyclic structure of D(+)-glucose & D(-) fructose. Mechanism of mutarotation.Structures of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose) without involving structure determination.

UNIT-V

Organomagnesium compounds: the Grignard reagents-formation,structure and chemical reactions. Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions.

Books:

1. P. S. Kalsi., Organic Reactions and their Mechanisms, New AgeInternational
2. Chemistry of the Elements. N.N. Greenwood and A. Earnshow,Pergamon.
3. Chemistry of the Elements. N.N. Greenwood and A. Earnshow,Pergamon.
4. P.W. Atkins , Physical Chemistry,ELBS.

(Practical)

SECTION – I

(Inorganic)

Semimicro qualitative analysis of mixture containing not more than four radicals (including interfering, Combinations and excluding insoluables):
Pb2+, Hg2+ , Hg22+, Ag+, Bi3+, Cu2+, Cd2+, As3+ , Sb3+, Sn2+, Fe3+ ,Cr3+, Al3+ , Co2+, Ni2+, Mn2+, Zn2+ , Ba2+ , Sr2+ , Ca2+, Mg2+, NH4,CO32 -, S2-, SO32 -, S2O32 -, NO2-, CH3COO-, Cl-, Br-, I-,NO3-, SO42 -,C2O42 -, PO43 -, BO3

Section-B (Physical)

1. To determine the strength of the given acid solution (mono and dibasic acid) conductometrically.
2. To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically
3. To determine the strength of given acid solution (mono and dibasic acid)/KMnO4 – Mohr salt potentiometrically.

Section-C (Organic)

1. LaboratoryTechniques

(a) Steam distillation (non evaluative)Naphthalene from its suspension in water Separation of *o*-and *p*-nitrophenols

(b) Column chromatography (non evaluative)

Separation of fluorescein and methylene blueSeparation of leaf pigments from spinach leaves

2. ChromatographyMethod

Determination of Rf values and identification o f organic compunds

(a) Separation of green leaf pigments (spinach leaves may be used)by paper chromatographic method

(b) Separation of a mixture of coloured organic compounds using common organic solventsby TLC.

3. Synthesis of the following organiccompounds:

1. To prepare p-bromoaniline fromp-bromoacetanilide.
2. To prepare m-nitroaniline fromm-dinitrobenzene.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Syllabus
Semester – V

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Physics)	NUCLEAR PHYSICS	BPY 151

Course outcome:

1. Understand the properties of positive rays, experimental proof by frank and hertz method
2. Analyse the relationship between various types of couplings
3. Understand the properties of x-ray s verification
4. Analyse the ideas of basics of nucleus and their energy
5. Perform the procedures for nuclear fission and fusion

UNIT-I

RADIOACTIVITY:

Laws of successive disintegration - transient - and secular equilibria - range of alpha particles - experimental measurement - Geiger - Nuttal Law - alpha ray spectra - Gamow's theory of alpha decay and its experimental verification - Beta ray spectra - origin of line and continuous spectrum - Fermi's theory of beta decay - K electron capture - Nuclear Isomerism.

UNIT II

NUCLEAR DETECTORS:

Principle and working - solid state detector - proportional counter - Wilson's cloud chamber - Scintillation counter.
Accelerators : Synchrocyclotron - Synchrotron - Electron synchrotron - proton synchrotron - Betatron.

UNIT III

ARTIFICIAL TRANSMUTATION:

Rutherford's experiment - Bohr's theory of Nuclear disintegration – Q value equation for a nuclear reaction - threshold energy - types of nuclear reaction - energy balance and the Q value - threshold energy of an endoergic reaction.
Neutron: Mass, charge, decay, spin and magnetic moment, Neutron diffration, absorption of neutron by matter - neutron sources - detectors - neutron collimator.

UNIT IV

NUCLEAR STRUCTURE: General properties of nucleus – size , mass and charge.
Proton - electron theory - proton - neutron theory - Nuclear size - experimental measurement of nuclear radius - mirror nuclei method - meson theory of nuclear forces - nuclear models - liquid drop model - Weizacker's semi - empirical formula - nuclear shell model.

UNIT V

NUCLEAR FISSION, FUSION AND ELEMENTARY PARTICLES
Nuclear fission - Bohr Wheeler theory - chain reaction – critical size and critical mass - Nuclear fission reactor – Nuclear fusion - source of stellar energy - Carbon – Nitrogen cycle - Proton – Proton cycle - Thermo Nuclear reaction – plasma.
Elementary Particles - types of interactions - classification of elementary particles - particle quantum numbers – baryon number - lepton number - strangeness number - hyper charge -sospin quantum number.

Books for Study:

1. Modern Physics by R. Murugesan, S.Chand & Co., (2005)
2. Atomic Physics by J.B. Rajam, S.Chand & Co., (2005)
3. Nuclear Physics by D.C.Tayal, Himalaya Publishing House.

Books for Reference:

1. A Source book on Atomic energy by Samuel Glass Stone (2002)
2. Atomic and Nuclear Physics by Albrignt Semat (2003)
3. Atomic and Nuclear Physics by Little field and Thorley. ELBS (2002)
Basic Nuclear Physics and Cosmic rays, B.N. Srivatsava, Pragti Prakasham

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Semester V

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Botany)	**Plant physiology and biochemistry**	**BSB 151**

Course Outcome:

1. Know importance and scope of plant physiology.
2. To understand the plants and plant cells in relation to water.
3. Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.
4. Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.
5. Understand the biochemical nature of nucleic acids, their role in living systems, experimental evidences to prove DNA as a genetic material.
6. Understand the process of synthesis of proteins and role of genetic code in polypeptide formation.

UNIT –1

Plant Water Relations: Properties of water, Importance of water in plant life, Diffusion, Osmosis & Osmotic relation to plant cell, Water Absorption, Ascent of Sap, Essential macro & micronutrients and their role. Transpiration: Structure & Physiology of Stomata, Mechanism of Transpiration, Factors affecting the rate oftranspiration.

UNIT –2

Photosynthesis: Chloroplast, Photosynthetic pigments, Red drop, Emerson's effect, Concept of two Photosystems, Light reaction, Dark reaction - Calvin cycle, Hatch-Slack cycle, CAM cycle, Factors affecting rate of photosynthesis &Photorespiration.

UNIT –3

Respiration: Mitochondria, aerobic and anaerobic respiration, Respiratory coefficient, mechanism of respiration - Glycolysis, Kreb's cycle, Pentose phosphate pathway, Electron transport system, Factors affecting rate of respiration, Redox potential and theories of ATPsynthesis.

UNIT – 4

Definition, classification and chemical structure: Monosaccharide, disaccharide, oligosaccharide and polysaccharides; Amino acids, essential and non essential amino acids; Lipids, saturated and non saturated fatty acids.

Classification, nomenclature and characteristics of Enzymes, Concept of holoenzyme, apoenzyme, co-enzyme and co-factors, mode & mechanism of enzyme action, Factors affecting enzyme activity.Plant Harmones, mode of action of Auxins, Gibberellins, Cytokinin and Abscissic acid.

UNIT – 5

Genetic Engineering: Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements; gene mapping and chromosome walking. Biotechnology: Functional definition; basic aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis biology of Agrobacterium; vectors for gene delivery and marker genes; salient achievements in crop biotechnology.

Practical Exercises+Scheme (Marks-50)

Question1- 20

1- Preparation of solution of specific Normality, Molal and Molar solutions.
2- Exercises related to osmosis and osmoticrelation.
3- Exercises related toTranspiration.
4- To separate Plastidial pigments by Paper Chromatography. 5-
To perform the exercise of Photosynthesis &Respiration.
6- To perform biochemical test for Carbohydrate, Lipid andProtien.
7- To extract Enzyme for any plant part and demonstrate its activity. (Any two experiments from above mentionedlist)

Question 2: Comment on any technique related to Biotechnology- 05

Spotting- 10

Viva- voce- 5

Practical Record- 10

SUGGESTED READINGS:-

1• David, L. N. and Michael, M. C. 2000.Lehninger principle of Biochemistry, Macmillan worth Pub. New York, USA.
2• Gangulee, H.C.,Das, K.S., Datta, C. and Sen, S. 2007. College Botany Voll.I, New Central Book Agency (P) Ltd. Kolkata, 700009.
3• Hopkins, W.G. 1995.Introduction of Plant physiology Pub.John wiley and sons New York.4• Jain, V.K. 1974.Fundamentals of Plant Physiology, S. Chand & Compnay.
5• Pandey, B. P. 2010.A Text book of Botany- Angiosperms, S. Chand & Company Ltd. Ramnagar, New Delhi- 110055.
6• Taiz & Zeiger, E. 1998.Plant Physiology. Sinauer associates, Inc. Pub. Massachusetts U.S.A.
7• Verma, S.K. & Verma, M.A. 1995.Text book of Plant Physiology & Biotechnology. S. Chand & Company.
8• Verma, V. 1995.Plant Physiology, Emkey Pub.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Syllabus
Semester – V

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Zoology)	**MICROBIOLOGY AND BIOCHEMISTRY**	**BSZ 151**

Course outcome:

1. To study the classification of different microorganisms.
2. To learn about the different morphology of water, soil, food microbiology and its effects.
3. Learn the structure and functions of bio-molecules and their role in metabolism.

Unit-1

Classification of microorganisms- General characteristics of Bacteria, Virus, Yeast.Bacteria- Morphology, Bacterial cell structure, Motility, Nutrition and Reproduction.Virus-discovery- Morphology, Classification, phages and life cycle.Yeast-Morphology, cell structure, Multiplication, phages andcycle.

Unit-2

Morphology of water, air soil and sewage.Water-Microoorganisms of water, total bacterial count. Air-Microorganisms in soil, nitrogen cycle. Sewage-Composition of sewage, treatment of sewage by microorganisms.

Unit-3

Food borne diseases- Microbial food poisoning by Salmonella and Clostiridium botulinum (Botulism).Measures to prevent microbial food poisoning. Food infection-Food borne diseases- Diarrhea, Dysentery, Typoid and Cholera.Water borne diseases-Hepatitis, Gastro enteritis, Camphlo bacter-diarrhea, Gardia lamblia, Cryptosporidiosis cholera. Air borne diseases-Common cold, Tuberculosis, Pneumonia, Diphtheria.

Unit-4

Biochemistry- Definition and its importance, Physio- chemical forces acting on the living body –a) Definition of pH and its determination, Maintenance of pH of blood.
b)(Definition of osmosis, abnormality in edema and dehydration.
Nucleic acids, structure and classification.

Unit-5

Carbohydrates, lipids, Amino acids & proteins-Classification, structure and their function. Metabolism-Glycolysis-TCA cycle - Electorn Transport chain, Urea cycle Deamination, Oxidation of fatty acids.

REFERENCES:

Microbiology- Pelzer.
Biology of Microorganism- Madigan-Brock
Microbiology Lab manual – Capachim.
Microbiology fundamentals and application- Atlas.R.M.
Principles of Biochemistry A.L. Lehninger, D.L. Nelson& M.M. Cox (1993) Worth publishes New York.
Biochemistry by L.Stryer (1994) freeman & co., Newyork.
Biochemistry by Zubay (1998) Macmillan publishers & co., New York.

MAJOR PRACTICALS:

1. Estimation of dissolved oxygen content in the given water sample (Wrinklersmethod).
2. Estimation of salinity and pH in given watersample.
3. Plankton study –Identification and description of any five marineplanktons.

MINOR PRACTICALS:

4. Examination of yeast, mould, protozoa and patho genicbacteria.
5. Estimation of urinesugar.
6. Bloodgrouping.
7. Problems on calculation of Mean, median,mode.

Spotters

Developmental Biology-Slides

Slides of mammalian sperm and Ovum

Slides of different developmental stages of chick embryos (24, 48, 72, 96 hrs)

Slides of blastula and gastrula of frog (morula, early gastrula, yolk plug stage, late gastrula)

Placenta of Sheep / Pig/ Rat.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Biotechnology)	INSTRUMENTATION & BASICBIOSTATISTICS	BBT-151

Course outcome:

1. Understanding the principles and operation of ELISA readers; Spectrophotometers; Freeze driers/lyophilizes.
2. Learning principle and operations of Thermal cyclers; Real-time PCR; DNA synthesizer; DNA sequencer; Microscopes: Light, stereo, phase contrast and inverted.
3. Learning various analytical techniques and principles for separation of Biopharmaceuticals including Ion exchange chromatography, Affinity chromatography, Gel filtration chromatography, HPLC method for purification of proteins.
4. To learn the Methodologies of Biostatistics and its application in selection of the Biological samples.
5. To understand Biostatistical Analysis of the Biological Experiments.

Unit -I

General Biophysical methods – Measurement of pH, Buffers, Henderson – Hasselbalch equation. Dielectric constant, Dipole moment, Osmosis, Diffusion, Isoelectric point.
Separation & Identification of Materials - concept of Chromatography (Partition Chromatography, Paper Chromatography, Adsorption Chromatography, TLC, GLC, Ion Exchange Chromatography, Gel Chromatography, HPLC, Affinity Chromatography) Electrophoresis (Gel Electrophoresis, Paper Electrophoresis).

Unit - II

Centrifugation – Basic Principle of Centrifugation, Instrumentation of Ultracentrifuge (Preparative, Analytical), Factors affecting Sedimentation velocity, Standard sedimentation Coefficient, Microscopy – Light microscopy, Bright & Dark Field microscopy, Fluorescence microscopy, Phase Contrast microscopy, TEM, SEM, X-Ray Crystallography, Xray diffraction, Bragg equation.

Unit - III

Spectroscopy: Simple theory of the absorption of light by molecules, Beer- Lambert law, Instrumentation for measuring the absorbance of visible light, Factors affecting the absorption properties of a Chromophore. Radioactive labeling & counting, Autoradiography. Scintillation counters, Geiger-Muller counter.

Unit - IV

Introduction and Definition of Biostatistics, Tabulation and classification of data, Frequency distribution and Graphical distribution of data, Measures of central tendencies Mean, Median, Mode and their properties. Computation of mean, variance and standard deviation, t-test, correlation coefficient.

Unit - V

Measures of dispersion: range, Mean deviation, Standard deviation and coefficient of Variation. Student T and Chi-square test, Concepts and problems on probability, Normal Distribution and their applications. Types of errors (Type I, II).

Suggested Readings

1. Biochemical Techniques theory and practice : White R
2. Analytical Chemistry: Christion G. D.
3. A Biologist Guide to Principle and Techniques: Willson K. and Gounding K. H.
4. An Introduction to Practical Biochemistry: Plummer D. T.
5. Undergraduate Instrumental Analysis (1995) 5th ed., Robinsan, J. W.
6. Narayanan, P (2000) Essentials of Biophysics, New Age Int. Pub. New Delhi.
7. Roy R.N. (1999) A Text Book of Biophysics New Central Book Agency.
8. Bioinformatics(2002) Bishop Martin
9. Molecular databases for protein and sequence and structure studies: Sillince A. and Sillince M.
10. Sequence Analysis primers : Gribskov, M. and Devereux, J.
11. Bioinformatics: Sequence and Genome Analysis By David W.
12. Mount, *University of Arizona, Tucson*
13. Discovering Genomics, Proteomics, & Bioinformatics, Second
14. EditionBy A. Malcolm Campbell, *Davidson College;* Laurie J.
15. Heyer, *Davidson College;* With a Foreword by Francis S. Collins

PRACTICLE- INSTRUMENTATION

1. Determination of bacterial growth curve
2. Immobilization of enzymes using sodium alginate
3. Immobilization of yeast cells using sodium alginate
4. Ethanol production using immobilized yeast cells
5. Estimation of ethanol
6. Compound separation using column chromatography and thin layer chromatography
7. Fermentors

Introduction and working to all Instruments.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc.(Computer Science)	**COMPUTER NETWORK**	**BCS-151**

Course outcome:

1. Create a new protocol and test its efficiency.
2. Design a new network architecture using protocols and interfaces.
3. Create a hybrid topologies using the existing topologies, and check in efficiency.
4. Apply different encoding and decoding mechanisms involved in different types of transmission media and to measure the transmission impairments.
5. Design a model internet with various categories of networks and test the transmission rate

UNIT I

Computer Network: Definitions, goals, components, structure, Architecture, Classifications &types, Growth, Complexity and applications etc. Layered Architecture: Protocol hierarchy, Connection Oriented & Connectionless Services,
ISO-OSI Reference Model: Principle, Model, Descriptions of various layers and its comparison with TCP/IP.

UNIT II

Data Link Layer: Need, Services Provided, Framing & its methods, Flow Control, Error control.DLL Protocol: Elementary & Sliding Window. Piggybacking &Pipelining.

UNIT III

MAC Sub layer: Static & Dynamic channel allocation, Media access control for LAN & WAN. Classification of MAC Sub layer protocol, Study of various collisions, Wireless LANs, Broadband Wireless, Bluetooth: Architecture, Application & Layering.

UNIT IV

Network Layer: Need, Services Provided, Design issues, Routing algorithms: Least Cost Routing algorithm, IP protocol, IP Addresses, Comparative study of IPv4 & IPv6, Mobile IP.

UNIT V

Processes to Processes Delivery-Transmission Control Protocol (TCP) -User Datagram Protocol, Data Traffic, Congestion Control and Quality of Service, Network Security: Cryptography, Message Security, Digital Signature, User Authentication, Key Management, Security Protocols in Internet, DNS, SMTP, FTP, HTTP, WWW.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Electronics)	COMMUNICATION	BEC 151

Course outcome:

1. To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver, Picture Tubes and Television Camera Tubes.
2. To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles.
3. To study the various Colour Television systems with a greater emphasis on television standards.
4. Able to know standing wave ratio for open, short and matched terminations on trainer kit.
5. Explain and apply the concepts telecommunication switching, traffic and networks.
6. Carry out Link power budget and Rise Time Budget by proper selection of components and check its viability.

UNIT-I

Advanced mobile phone service - Global system for mobile communication - Digital cellular system - Cordless telephony - Third generation wireless systems. Cell structure - Hand off - roaming management - Hand off detection - Channel assignment techniques - Interference - ACI, CCI - Intersystem hand off and authentication - Network signaling - Cellular digital packet data. GSM - Network signaling, mobility management, short message service - International roaming, administration and operation.

UNIT-II

Wireless application protocol - Architecture - Datagram - Transport layer securities -Transaction protocol - Session protocol application environment, wireless markup language, WML - Script wireless telephony applications. Third generation mobile services - Wireless local loop - Bluetooth technology. Characteristics of Human eye - Theory of scanning - Camera tubes - Vidicon - Silicon diode array vidicon - Picture tubes - Composite video signal.

UNIT-III

Television transmitters - Television signal propagation - Television transmission antennas - Television receiver antennas - Colour Television Antennas - Television receiver - VHF Tuner - IF Subsystems - Video amplifiers - Sync processing and AFC circuit - Deflection oscillators. Colour Television systems - Colour characteristics - Colour Television Camera -Colour picture tube - Colour signal generation - PAL, NTSC, SECAM - Comparison.

UNIT-IV

Colour Television receivers - PAL D Colour receiver, AGC, Sync - Separators and deflection circuits, Luminance channel, Colour signal processing , separation of U and V modulation products - Subcarrier generation and control. Special Topics in Television - Digital tuning techniques - Remote control - Cable Television - Satellite TV - video tape recorders - Video disc systems - Digital TV -Fundamentals of Digital TV.

UNIT-V

Power Semiconductor Devices: Power diode, Power transistor, TRIAC, MOSFET and IGBT - turn on methods, driver circuits - SCR characteristics - Two transistor analogy - Methods of turning ON and turning OFF - Series and parallel connections of SCRs.Phase controlled converters: Single phase controlled rectifier - Half wave controlled rectifier with 1.Resistive load 2.RL load 3. RL load and battery - Full wave controlled rectifier with above types of loads - Three phase controlled rectifier - HVDC transmission. Inverters: Single phase and three phase inverters - Series and parallel inverters - Bridge inverters - Current source inverter. Choppers and Cycloconverters: Various types of DC choppers - Step up chopper -AD chopper - Single phase AC chopper - Step up and step down cycloconverters -Three phase to single phase and three phase to three phase cycloconverters.Control circuits and application: Generation of control pluses - Microprocessor based implementation - Static circuit breakers for DC and AC circuits - Regulated power

Text Books

1) Power Electronics - M.H. Rashid, Prentice Hill of India Private Limited.
2) Power Electronics - P.C. Sen, Tata McGraw Hill Publishing Co. Ltd.
3) Thyristorised Power Controllers - G.K. Debye, Wiley Eastern Ltd.
4) 2. An Introduction to Thyistors and Their Applications - M. Ramamoorthy, 2/e,East West press.
5) Mobile Communications - Jochen Schiller, 7/e, Pearson Education, 2003.
6) Principles of Wireless Networks - Kauch Pahalavan & Prahanet Krishnamoorthy,2/e, Pearson Education, 2004.
7) Wireless and Mobile Networks Architecture - Yi-Bing Lin & Imnch Chlantee, JohnWiley, 2001.
8) Wireless and Mobile Communication - Rapparport, Pearson Education, 2001.
9) Television and Video Engineering - G. Nagarajan, 2/e, A.R.S Publications, 2005.
10) Monochrome and Colour Television - R.R. Gulati, 1/e, New Age International Publishers, 2003.

Basic Television - Principles and Servicing - Bernard Grob, 4/e, McGraw Hill, 1975.
Television and Video Engineering - A. M. Dhake, 2/e, Tata McGraw Hill

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Branch	Subject title	Subject code
B.Sc (Mathematics)	Real Analysis - I	BMM-151

Course Outcome:

1. Find numerical solutions of system of linear equations and check the accuracy of the solutions.
2. Solve initial and boundary value problems in differential equations using numerical methods.
3. Apply various numerical methods in real life problems.
4. Describe fundamental properties of the real numbers that lead to the formal development of real analysis.
5. Demonstrate an understanding of limits and how they are used in sequences, series, Construct rigorous mathematical proofs of basic results in real analysis.

UNIT:-I

Sets and functions :-Sets and elements; operations on sets; functions; real valued functions; equivalence; countability; real numbers; least upper bounds.

Sequences of Real Numbers :-Definition of a sequence and subsequence; limit of a sequence; convergent sequences; divergent sequences; bounded sequences; monotone sequences; operations on convergent sequences; operations on divergent sequences; limit superior and limit inferior; Cauchy sequences.

UNIT:-II

Series of Real Numbers :-Convergence and divergence; series with non-negative numbers; alternating series; conditional convergence and absolute convergence; tests for absolute convergence; series whose terms form a non-increasing sequence; the class 1^2.

Limits and metric spaces :-Limit of a function on a real line; metric spaces; limits in metric spaces.

UNIT:-III

Approximations, Errors and its types, Solution of Equations: Bisection, Secant, Regula Falsi, Newton- Raphson Method and their order of convergence, Roots of second degree Polynomials, Interpolation: Lagrange interpolation, Divided Differences, Interpolation formulae using Differences and derivations of Interpolation formula..

UNIT:-IV

Linear Equations: Direct Methods for Solving Systems of Linear Equations, Gauss elimination, Gauss Jordan Method, LU Decomposition, Cholesky Decomposition, Iterative Methods: Jacobi Method , Gauss - Seidel Method, Relaxation Method, Methods Based on Numerical Differentiation..

UNIT:-V

Ordinary Differential Equations: Euler Method, Eulers Modified Method, Single-step Methods, Runge-Kutta's Method, Multi-step Methods, Milne Method, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae, Methods Based on Numerical Integration with their derivation.

Reference Book :-

1. Treatment as in "Methods of Real Analysis" : Richard. R. Goldberg (Oxford and IBH Pubhshing Co.)
2. C E Frooerg. Introduction to Numerical Analysis, (Second Edition L Addison-Wesley - 1979,
3. M K Jain, S.R.K. Iyengar, R. K. Jain. Numerical Methods Problems and Solutions, New Age International (P) Ltd. 1996.
4. E. Balaguruswamy- Numerical Method Tata Mc Graw_ Hill Pub.Com. New Yark 5
5. K.B. Datta. Matrix and Linear Algebra, Prentice hall of India Pvt Ltd., New Delhi, 2000.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Microbiology)	BIOINFORMATICS , BIOSTATISTICS & INDUSTRIAL MICROBIOLOGY	BMB 151

Course outcome:

1. To study the bioinformatics and its application on biology.
2. To know the statistical application in biology.
3. To understand the industrial microbiology and its process.
4. To study the scale up process.

Unit I

Introduction to Bioinformatics

Bioinformatics- Definition and relation to molecular biology, Potential of bioinformatics, Application of bioinformatics.

Databases

Nucleic acid and Protein databases, Structure databases, Enzyme databases, Specialized (organism and species) databases.

Unit II

Biostatistics

Measure of central tendency- Mean, mode and median, Measure of dispersion- Standard deviation and Standard error, Diagrammatic and graphic representation of frequency distribution.

Biostatistics II

Basic idea of probability- Addition and Multiplication laws, Test of significance- Chi square test, Normal distribution and departures from normality.

Unit III

Fundamentals of Industrial Microbiology

General concepts of industrial microbiology, Primary and secondary screening, Strain development strategies, Sterilization of fermentor, media and air.

Fermentor Design

Types of fermentations processes, Design of typical batch fermentor, Factors affecting fermentor design, Control of agitation, aeration, pH, temperature and dissolved oxygen, Types of fermentors.

Unit IV

Scale up and DSP

Inoculum development, Scale up of fermentation process, Raw material for media preparation, Harvesting and product recovery.

Unit V

Industrial production – I

Production of antibiotics- Penicillin and semi-synthetic penicillins, Production of enzymes- Amylase, Immobilization of enzymes and applications of immobilized enzymes.

Industrial production – II

Production of solvent- Ethanol, Production of Vitamins- Cyanocobalamin, Production of Organic Acids- Acetic Acid, Production of Amino Acids- Glutamic Acid,

Recommended Books (Semester-V)

1. Bioinformatics, Author- Baxevanis.
2. Bioinformatics, Author- Higgins and Taylor.
3. The Internet and the New Biology: Tools for Genomic and Molecular Research, Author- Peruski and Peruski.
4. Functional Genomics- A Practical Approach, Author- Mark Schena.
5. Principles of Biostatistics, Authors- Pagano *et al.*
6. Introduction to Biostatistics, Authors- Forthoter and Lec.
7. Text of Microbiology, Author- Ananthanarayanan and Panikar.
8. Medical Microbiology, Vol. 1 : Microbial Infection, Vol. 2 : Practical Medical Microbiology, Authors- Mackie and McCartney.
9. Epidemiology and Infections, Author- Smith
10. Lecture Notes in Immunology, Author- I.R. Todd
11. Microbiology in Clinical Practice, Author- D.C. Shanson.
12. Diagnostic Microbiology, Authors- Baron, Peterson and Finegold.

YEAR-III SEMESTER-V
LIST OF EXPERIMENTS

1. Examination of urine – Physical, chemical, microscopic and bacteriological.
2. Isolation and identification of Gram positive bacteria
(a) Staphylococcus sp.
(b) Streptococcus sp.
3. Isolation and identification of Gram positive bacteria
a. E. coli
b. Proteus sp.
c. Salmonella sp.
4. Antibiotic sensitivity test by disc diffusion technique.
5. Isolation of antibiotic resistant mutants by gradient plate technique.
6. Measure of central tendencies- Mean, Mode and Median.
7. Explore NCBI.
8. To read GenBank entries.
9. To read SWISSPROT entries.
10. To perform sequence similarity search using BLAST.
11. To perform multiple sequence alignment using Clustal W.
12. To visualize PDBIB 1AJE with the help of RASMOL.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Food Science & Tech.)	FOOD MICROBIOLOGY	BFS 151

Course outcome:

1. Understand the important genera of microorganisms associated with food and their characteristics, their growth pattern and parameters.
2. Comprehend the role of the microorganisms in spoilage of foods and methods of their control .
3. Knowledge about the beneficial role of microorganisms and different types of fermented foods .
4. Identify the role of microorganisms in food borne diseases and control measures
5. Understand the laboratory techniques to detect, quantify, and identify microorganisms in foods

Unit I

Introduction to microbiology:

Microbiology in daily life, Characteristics and morphology of bacteria, fungi, virus, protozoa & algae.

Control of micro-organisms- Growth curve; Influence of environmental factors on growth-PH, Water activity, O_2 availability, Temperature, Pressure and Radiation

Unit II

Cultures & Media:

Different type of media- Selective media and differential media; Preparation of media- PDA media, Nutrient agar, Mac Conkey agar; Culturing techniques- Spread plate and streak plate, pour plate.
Indicator microorganisms: Sources, methods of detection, growth & survival; significance of coliforms, faecal streptococci, enterobacteriaceae

Unit III

Contamination and spoilage of different foods:

Cereals, sugar and their products, Milk & milk products, Fruits and vegetables, canned foods, Meat, fish, egg and poultry

Unit IV

Food borne illness:
Food intoxication- Staphylococcal intoxication, botulism

Food infection- *Salmonellosis, Clostridium perfringens, Bacillus cereus gastroenteritis, E.coli* infection and others

Unit V

Beneficial microorganisms:

SCP- Microorganisms used, raw materials used as substrate, condition for growth and production, nutritive value and use of SCP;

Fat from microorganisms- Microorganisms used, raw materials, production of fat; Production of amino acids; Production or other substances added to foods.

Production of enzymes- amylases, invertase, pectolytic enzymes, proteolytic enzymes, other enzymes

Fermentation- tempeh kedele, soya sauce production, vinegar, lactic acid bacteria fermented food, Dairy based fermented foods- Kefir, yoghurt, cheese and butter;Yeast based fermented foods- bread, wine and beer

REFERENCES

- Frazier, W.C. Food Microbiology. 4th edition. Mc Graw Hill. New York, 2008
- Khetarpaul, N. Food microbiology, Daya publishing house, New Delhi, 2009
- Narayanan, L.M. and Mani,L. Microbiology.Saras Publications, Nagercoil.
- Pelzar, H.J. and Rober, D. Microbiology 5th edition Mc Graw Hill. NewYork, 2009
- Prescott, L.M., Harley, J.P. and Klein, D.A. Microbiology. 4th edition McGraw-Hill, NewYork. 1999

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

SCHEME
Semester – VI

No	Subject Code	Subject Type	Subject Title	Marks Allotted						
				Assignment Marks		Theory Marks		Practical Marks		Total Marks
				Max	Min	Max	Min	Max	Min	
1	**FC-601/1** Foundation course	**Core**	**Values & Spirituality**	**10**	**4**	**40**	**14**	**-**	**-**	**50**
2	**FC-601/2** Foundation Course	**Core**	**Basic Computer Information Technology-I**	**10**	**4**	**40**	**14**	**-**	**-**	**50**
3	**BSZ 161** Zoology	**Core**	Biostatistics And Computer Applications & Basic Animal Biotechnology	**20**	**8**	**80**	**27**	**50**	**17**	**150**
4	**BSB 161** Botany	**Core**	Based On Inorganic, Organic And Physical Chemistry	**20**	**8**	**80**	**27**	**50**	**17**	**150**
5	**BCH 161** Chemistry	**Core**	Plant Ecology, Biodiversity And Phytogeography	**20**	**8**	**80**	**27**	**50**	**17**	**150**
6	**BPY 161** Physics	**Core**	ELECTRONIC COMMUNICATION	20	8	80	27	50	17	150
7	**BBT 161** Biotechnology	**Elective**	**Bioinformatics & Tissue Culture Technology**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
8	**BCS-161** Comp. Sci.	**Elective**	**Information Storage & Management**	**20**	**8**	**80**	**27**	**50**	**17**	**150**
9	**BEC 161** Electronics	**Elective**	**ELECTRONIC INSTRUMENTATION, DIGITAL SYSTEM DESIGN &MICROCONTROLLER**	20	8	80	27	50	17	150
10	**BMM 161** Maths	**Core**	**Programming Language with 'C' Theory**	**20**	**8**	**80**	**27**	**-**	**-**	**100**
11	**BMB 161** Micro. Bio.	**Elective**	**Analytical Microbiology & Applied Microbiology**	20	8	80	27	50	17	150
12	**BFS 161** Food Sci	**Elective**	**BIOPROCESS ENGINEERING AND TECHNOLOGY**	20	8	80	27	50	17	150

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Every candidate appearing in B.Sc. Semester 6th examination shall be examined in

(a) Foundation Course F.C (Compulsory) for all students.

(b) Any one of the following combinations:

1 Physics, Maths, Computer Science.
2 Physics, Maths, Electronics.
3 Physics, Chemistry, Maths.
4 Chemistry, Botany, Zoology.
5 Chemistry, Botany or Zoology, Biotechnology.
6 Chemistry, Botany or Zoology, Microbiology.
7 Chemistry, Botany or Zoology, Food Science.

Provided that the courses of studies for Physics offering combinations from (i) to (iii) and for Chemistry offering combinations from (iii) to (vii) shall be those prescribed for biology group.

Electives Subjects	**Core Subjects**	**Combinations Available**
BBT 161 Biotechnology	BSZ 161/BSB 161 (Zoology/Botany), BCH 161 Chemistry	BSZ 161/ BSB 161, BCH 161, BBT 161.
BMB 161 Microbiology	BSZ 161/BSB 161 (Zoology/Botany), BCH 161 Chemistry	BSB 161/ BSZ 161, BCH 161, BMB 161.
BEC 161 Electronics	BMM 161 Mathematics, BPY 161 Physics	BMM 161, BPY 161, BEC 161.
BFS 161 Food Science	BSZ 161/BSB 161 (Zoology/Botany), BCH 161 Chemistry	BSZ 161/ BSB 161, BCH 161, BFS 161.
BCS 161 Computer Science	BMM 161 Mathematics, BPY 161 Physics	BMM 161, BPY 161, BCS 161.

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B.Sc.(Courses)

Core Subjects	Combinations
BMM 161 Mathematics	BCH 161 Chemistry/BCS 161 Computer Science/ BEC 161 Electronics, BPY 161 Physics.
BPY 161 Physics	BCH 161 Chemistry/BCS 161 Computer Science/ BEC 161 Electronics, BMM 161 Mathematics.
BCH 161 Chemistry	BMM 161Mathematics, BPY 161 Physics or, BBT 161 Biotechnology, BSZ 161/BSB 161 (Zoology/Botany) or, BMB 161 Microbiology, BSZ 161/BSB 161 (Zoology/Botany) or, BSB 161 Botany, BZB 161 Zoology or, BFS 161 Food Science, BSZ 161/BSB 161 (Zoology/Botany),
BSZ 161 Zoology	BCH 161 Chemistry,BBT 161 Biotechnology or, BCH 161 Chemistry,BMB 161 Microbiology or, BCH 161 Chemistry,BSB 161 Botany or, BCH 161 Chemistry,BFS 161 Food Science.
BSB 161 Botany	BCH 161 Chemistry,BBT 161 Biotechnology or, BCH 161 Chemistry,BMB 161 Microbiology or, BCH 161 Chemistry,BSB 161 Zoology or, BCH 161 Chemistry, BFS 161 Food Science.

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B.Sc.(Courses)

Semester – VI

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**भाषाकौशलएवंव्यक्तित्वविकास**	**FC-601/1**

इकाई–1

1. भारतीयसंस्कृति
2. भारतीयसमाजव्यवस्था
3. सभ्यताएवंसंस्कार
4. वैश्विकचेतना
5. समन्वयीकरण(भारतीयएवअंतर्राष्ट्रीयसंदर्भ)

इकाई–2

1. धर्म
2. न्याय
3. दर्शन
4. नीति
5. साहित्य

इकाई–3

1. संचारसंसाधनसम्पर्ककनएक्षितिज
2. समाचार पत्र
3. भारतीयप्रेसपरिषद्
4. रेडियो
5. दूरदर्शन

इकाई–4

1. सिनेमा
2. रंगमंच
3. संगीत
4. चित्र,मूर्ति,स्थापत्यकला
5. शिल्पकला

इकाई–5

1. कम्प्यूटर
2. दूरभाषविज्ञानकीसौगात
3. मंत्र(कहानी)/प्रेमचंद
4. मातृभूमि(कविता)/मथिलीशरणगुप्त
5. साहित्यकारकादायित्व/डॉ.प्रेमभारती

संदर्भपुस्तक –मध्यप्रदेशहिन्दीग्रंथअकादमी,भोपाल द्वारापकाशित पुस्तक

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B.Sc.(Courses)

Semester – VI

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Basic Computer Information Technology-II**	**FC-601/2**

Unit-I

Word Processing: Word

- Introduction to wordProcessing.
- MS Word: features, Creating, Saving and Operating Multi document windows, Editing Text selecting, Inserting, deleting movingtext.
- Previewing documents, Printing document to file page. Reduce the number of pages by one.
- Formatting Documents: paragraph formats, aligning Text and Paragraph, Borders and shading, Headers and Footers, MultipleColumns.

Unit-II

Introduction to Excel Excel & Worksheet:

- Worksheetbasic.
- Creating worksheet, entering data into worksheet, heading information, data text, dates, alphanumeric, values, saving & quittingworksheet.
- Opening and moving around in an existingworksheet.
- Toolbars and Menus, keyboardshortcuts.
- Working with single and multiple workbook coping, renaming, moving, adding and deleting. coping entries and moving betweenworkbooks.
- Working with formulas & cellreferencing.
- Autosum.
- Copingformulas
- Absolute & Relativeaddressing.

Unit-III

Introduction to Power Point

- Features and variousversions.
- Creating presentation using Slide master and template in various colourscheme.
- Working with slides make new slide move, copy, delete, duplicate, lay outing of slide, zoom in or out of aslide.
- Editing and formatting text: Alignment, editing, inserting, deleting, selecting, formatting of text, find and replacetext.

Unit-IV

Power Point– II

- Bullets , footer, paragraph formatting, spellchecking.
- Printing presentation Print slides, notes, handouts andoutlines.
- Inserting objects Drawing and Inserting objects using Clip Arts picture andcharts.
- Slide sorter, slide transition effect and animation effects. Presenting the show making stand alone presentation, Pack and gowizards.

Unit – V

Evolution, Protocol, concept, Internet, Dial-up connectivity, leased line, VSAT, Broad band, URLs, Domain names, Portals. E-mail, Pop & web based Email. Basic of sending and receiving Emails, Email & Internet Ethics, Computer virus, Antivirus software wage, Web Browsers.

Books Recommended-

1. डं.एस.के.विजय,डं.पकंजसिंहकम्प्यटूरविज्ञानएवसूचनाप्रौद्योगिकी,मध्यप्रदेशहिन्दीगथ्रअकादमी,भोपाल 2. डं. पकंजसिहकम्प्यूटरअध्ययन,रामप्रसादएडसंन्स

Course	Subject	Subject Code
B.Sc. (Foundation Course)	**Basic Computer Information Technology-I**	**FC 601/2**

Practical

Ms-Power Point:

Creating new slide, formatting slide layout, slide show & sorter, Inserting new slide, slide no., date, time, chart, formatting slide, tool operation.

List of suggested practical work:

- Under standing of a dial up connection throughmodern.
- Configuring a computer for an e-mail and using outlook Express or NetscapeMessenger.
- Registration an e-mailaddress.
- Understanding of e-maildrafting.
- Understanding of address book maintenance fore-mail.
- Understanding of different mail programtools.
- Send and receive functions ofe-mail.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Syllabus
Semester VI

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Chemistry)	**Based on inorganic, Organic & Physical Chemistry**	**BCH-161**

Course outcome:

1. To learn about the bioinorganic chemistry and its details.
2. To different laws and equations of radiation.
3. To study about the hetrocyclic compounds.
4. To learn about the various biomolecules , classification and in details.

UNIT-I

Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases, Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness.

Bioinorganic Chemistry

Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin.Biological role of alkali and alkaline earth metal ions with special reference to Ca2+.Nitrogenfixation.

UNIT-II

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, Stark-Einstein law (law of photochemical equivalence) Jablonski diagram depiciting various processes occurring in the excited state, qualitative description offluorescence, phosphorescence, non-radiative processes (internal conversion,intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes (simple examples).

UNIT-III

Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system – Example – water and Sulpher systems. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilerisation of lead.

UNIT-IV

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.Mechanism of nucleophilic substitution reactions in pyridine derivatives.**Heterocyclic Compounds-II** Introduction to condensed five and six- membered heterocyclic.Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler- Napieralskisynthesis.

UNIT-V

Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids,sulphonamides and sulphaguanidine. Synthetic detergents alkyland aryl sulphonates.**Amino Acids, Peptides & Proteins**

Classification, of amino acids.Acid-base behavior, isoelectricpoint and electrophoresis.Preparation of β - amino acids.Structure and nomenclature of peptides and proteins.Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid–phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure.

Books:

1. Ira N. Levine, Quantum Chemistry, PrenticeHall.
2. F. A. Carey and R. J Sundberg, Advanced Organic Chemistry, Part A and B,Plenum
3. K.J. Laidler, Chemical Kinetics.McGraw-Hill.
4. Inorganic Chemistry, J.E. Huhey, Harpes &Row.
5. Valence, C. A. Coulson, Oxford UniversityPress.

(Practical)

Section-B (Physical)

1. To determine the molecular weight of a non-volatile solute by Rastmethod.
2. To standardize the given acid solution (mono and dibasic acid) pHmetrically.

Section-C (Organic)

2. ChromatographyMethod

Determination of Rf values and identification o f organic compunds

(a) Separation of green leaf pigments (spinach leaves may be used)by paper chromatographic method

(b) Separation of a mixture of coloured organiccompounds using common organicsolventsby TLC.

3. Synthesis of the following organiccompounds:

1.To prepare o-chlorobenzoic acid from anthranilicacid.

2.To prepare S-Benzyl-iso-thiouronium chloride fromthiourea.

Book for practical:

1.Synthesis and Characterization of Inorganic Compounds, W.L. Jolly. Prentice Hall.2.Experiments and Techniques in Organic Chemistry, D.P. Pasto, C. Johnson and M.Miller, Prentice Hall.

3.Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Syllabus
Semester – VI

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Physics)	ELECTRONIC COMMUNICATION	BPY 161

Course outcome:

1. Able to design and implement various digital modulation and demodulation techniques.
2. Able to identify and describe different techniques in modern digital communications, in particular in source coding using MATLAB or similar tools.
3. Able to understand and verify sampling theorem for practical applications.
4. Able to implement and verify DFT property using MATLAB
5. Able to comment on Stability and Causality of Discrete time system using Z-transform on MATLAB tool.
6. Able to design and implement digital filter and use of various windows

UNIT I

Modulation - definition - types of modulation AM, FM, PM – expression for amplitude modulated voltage - wave form of amplitude modulated wave - collector modulation circuit - single side band generation - balanced modulator - AM transmitter - block diagram and explanation - frequency modulation - expression for frequency modulated voltage - side bands in FM, AM production by transistor modulator - comparison of AM, FM, PM.

UNIT II

Demodulation - definition - diode detection of AM signals - FM detection - Foster Seely discriminator - radio receivers - straight receivers - TRF receivers - super heterodyne receivers - block diagram - explanation of each stage - FM receivers – block diagram.

UNIT III

TV - plumbicon - vidicon - scanning and interlaced scanning – block diagram of TV transmitter and receiver - colour TV - generation R, G, B signals - simplified block diagram of colour TV transmitter and receiver – TV transmitting antennas - dipole panel - TV receiving antenna - Yagi antenna - log antenna - log periodic antenna.

UNIT IV

RADAR - principle of radar - Radar equation - radar – transmitting systems - radar antennas - duplexer - radar receivers uses of radar – opto-electronic devices – photoconductive cell - solar cell - phototransistor – LED and LCD - construction and working.

UNIT V

Digital communications - digital technology - fundamentals of data communication systems - characteristics of data transmission circuits – digital codes - error detection and correction - data sets and inter connection - requirements - modern classification - modern interfacing.

Books for Study:

1. Hand book of Electronics - Gupta & Kumar, Pragati Prakhasan (2005).
2. Electronics Communication Systems - Kennedy and Davis, TMH.
3. Electronics Communications – Roody Coolen, Pearson Education Publication.
4. Electronics Communications - Frenzel, TMH.

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B.Sc.(Courses)

Semester VI

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Botany)	**Plant ecology, biodiversity and phytogeography**	**BSB 161**

Course Outcome:

1. Understand the "Science of Heredity". Realize the role of genes in evolution of species.
2. To understand linkage, segregation and mutation of genes during evolution.
3. Understand the science of plant breeding.
4. To introduce the student with branch of plant breeding for the survival of human being from starvation. To study the techniques of production of new superior crop verities.
5. To study the evolution in living organisms.

UNIT – 1

Ecosystems: Structure and types, Biotic and Abiotic components, Trophic levels, Food chains, Food webs, Ecological pyramids, Energy flow; Biogeochemical cycles: Concept, Gaseous and Sedimentary cycles, Carbon, Nitrogen, Phosphorus and Sulphurcycle.

UNIT – 2

Ecological adaptations: Morphological, Anatomical and Physiological responses, Water adaptation (Hydrophytes, Xerophytes and Mesophytes), Temperature adaptation (Thermoperiodism and Vernalization),Light adaptation (Heliophytes and Sciophytes), Plant Succession: Causes, trends and processes, types of succession - Lithosere, Hydrosere andXerosere.

UNIT – 3

Population Ecology: Distribution patterns, Density, Natality, Mortality, Growth curves, Ecotypes and Ecads; Community Ecology: Characteristics, Classification, Life forms.

Biodiversity: Basic concept, definition, Importance, Biodiversity of India, Hotspots, In situ and ex situ conservation, Endangered and threatened species, Red databook.

UNIT – 4

Soil: Physico-chemical properties, Soil formation, Development of Soil Profile, Soil classification, Soil composition, Soil factors; Pollution: Definition, Types& Causes; Global warming, Climate change and Ozone holes.

UNIT – 5

Phytogeography: Phytogeographical regions of India, Vegetation -types of Madhya Pradesh, Biosphere reserves, Sancturies and National parks of Madhya Pradesh, Natural resources – definition and classification of natural resources, Conservation and management of natural resources, Land resources management,Water resources management, Wet land resource management.

Practical Exercises + Scheme
(Marks- 50)

1-To determine the minimum size of Quadrat by species areacurvemethod. 05
- To conduct exercise on Frequency, Density andAbundance.
2- Study of soil with reference to soil texture, water holding capacity, pH and test for Carbonate andNitrate. 05
3-Preparation of slides of Xerophytic, Hydrophytic andMesophyticplants. 10
4-To comment upon Phytogeographic region (model/ charts) and National Parks(Photographs). 05
5-Spotting- 10
6-Viva- voce- 5
7-Practical Record- 10

SUGGESTED READINGS:--

1• Banerjee, S.1998.Bio diversity conservation- Agrobotamica, Bikaner.
2• Kumar, U.K 2006.Bio diversity principles and conservation, Agrobios,
Jodhpur.3• Odum, E.P. 5Th ed. 2004 .Fundamentals of Ecology. Natraj Publisher,
Dehradun. 4• Puri, G.S. 1960.Indian Forest Ecology.
5• Sharma, P.D. 7th ed. 1998.Ecology and Environment, Rastogi Publication, Shivaji Road.Meerut, 250002. India.
6• Shukla, R. S. & Chandel, P.S. 2006.A Text book of Plant Ecology.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Syllabus

Semester – VI

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Zoology)	**BIOSTATISTICS AND COMPUTER APPLICATIONS & BASIC ANIMAL BIOTECHNOLOGY**	**BSZ 161**

Course outcome:

1. To study of the data types and it's tabular and graphical representation.
2. To learn about the central tendency and its different methods and equations.
3. To learn about the computer and its application to biology.
4. To learn the Cryopreservation of cell cultures and animal cell culture.

Unit-1

Introduction-definition, date types – primary and secondary – Classification of data, Collection of data – tabular and graphical representation – Bar diagram, Pi diagram, Column graph, Histogram, Ogive curves.

Unit-2

Measures of central tendency – Mean, Mode and Median, Variance, Standard deviation, Standard error and Coefficient or variance. Simple Correlation, Simple Regression, Chi square test, student's – t- test.

Unit-3

Fundamentals of Computer: Classification, Computer organization, Input devices, processing unit, output devices, external storage devices, software, WWW, CONCEPT OF E-Mail. Computer and its application to biology-Definition and scope of Bioinformatics - application and introduction to Biological data.

Unit-4

History of animal cell culture, Laboratory requirements for animal cell culture, Sterilization techniques. Media used for animal cell culture, Types of cell culture (Primary and Secondary), Introduction to established cell lines, Stem cells.

Unit-5

Cryopreservation of cell cultures, application of animal cell cultures in production of therapeutics proteins. Hybridomatechnology.

Gene transfer methods in Animals – Microinjection, Embryonic Stem cell gene transfer, Retrovirus & Gene transfer. Transgenic Animals, Animal propagation – Artificial insemination,

REFERENCES:

Introduction of Biostatistics and Computer Science – Y.I Parkar & M.G Dhanyagude NiraliPrakashan publishers,Pune.

Biostatistics by K.S. Negi ATIBS publications & distributiors, New Delhi.Bishop O.N. Statistics for Biology. Boston, Hollghtan, Mifflin.

Introduction to Biostatistics by Pranab kumar, S.Chand company Ltd. New Delhi.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc. (Biotechnology)	BIOINFORMATICS & TISSUE CULTURE TECHNOLOGY	BBT-161

Course outcome:

1. To have knowledge on Biomolecules, their importance and Classification I Bioinformatic.
2. To explain the properties of Biomolecules.
3. To understand principles of animal culture, media preparation.
4. To explain Invitro fertilization and embryo transfer technology.
5. To describe meristem culture and clonal propagation of plants on a commercial scale.

UNIT-I

Bioinformatics-definition, history; computer - system, topology and peripherals for communication; Internet - basics, connection, web browsing and URL
Data bases - Nucleic acid sequence data bases (NCBI, EMBL, DDJB), Protein sequence data base-SWISS-PORT, data base searching - BLAST.

UNIT-II

Introduction to Techniques - Introductory history, Laboratory organization, Maintaining Aseptic environment, Basic concepts in cell culture - cell culture, Cellular Totipotency, Somatic Embryogenesis.In vitro culture : approaches & methodologies - preparation steps for tissue culture, surface sterilization of plant tissue material, basic procedure for aseptic tissue transfer, incubation of culture.

UNIT-III

Tissue nutrition : Growth Hormones - Plant cells (Composition of culture media, Growth hormones, Vitamins, Unidentified supplements, selection of media); Animal cells (substrate on which cells grow, Feeder layer on substrate, gas phase for tissue culture, media and supplements).

UNIT-IV

Tissue culture methodologies - Plant cells (Callus Culture, Cell Suspension Culture, Organ culture); Animal cells (Source of tissue, primary culture, differentiation of cells, growth kinetics, animal cell lines and their origin and chracterization).

UNIT-V

Cloning & Selection of specific cell types – cloning, somatic cell fusion and HAT election, Medium suspension fusion, selection of Hybrid clone, production of monoclonal antibodies, Organ Culture - Culture of embryonic organs, whole embryo culture, culture of adult organs.

Reference

1. Programming in ANSIC, E. Balagurusamy, 1991. Tata Mcgraw Hill.
2. Introduction to bioinformatics, 2001. AH wood, T.K. Parry smith DJ, Pearson education Asia.
3. C &Unix programming; A conceptual perspective, 1995. Kulti, Tata Mc Graw Hill.
4. Developing bioinformatics in computer skill, Gibas C, Jambeek P.S, oreilly, 2001. associates inc. Shrott publishes.
5. Plant tissue culture : Bajaj, Y.P.S. Series.
6. Plant tissue culture : Gamborg and Phillip.
7. Basic and Agricultural Biotechnology (1993) Purohit and Mathur
8. Plants, Genes, and Agriculture : Chrispeels, M. J. and Grierson, D.
9. Genetic Engineering of crop plants : Lycett, G. W. and Grierson, D.
10. Biotechnological innovation in Animal productivity: (Biotol Series)
11. Culture of Animal cell: A mannual of Basic Techniques(4th ed.) (2000) Freshney

PRACTICLE:

1. Primary cell culture
2. Continuous cell culture
3. Drug/Toxicity testing
4. Assessment of genetic variation related to plant taxa using allozyme method
5. Tissue culture methods-media preparation, sterilization, inoculation of explants, callus culture, suspension cultures, anther and ovule cultures.
6. Isolation of protoplasts, viability test for protoplasts, protoplast culture.
7. Working gel documentation system and analysis of electrophoretic gels.
8. Quantification of DNA and RNA in plant tissues by spectrophotometer method.
9. Quadratic equations
10. Mean, standard deviation
11. Factorial (using subroutine)
12. NCR using subroutine
14. Prime numbers
15. Largest and smallest numbers.

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B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Computer Science)	**INFORMATION STORAGE AND MANAGEMENT**	**BCS-161**

Course outcome:

1. To learn about the storage technology and networked storages.
2. To know about the storage systems and architecture.
3. To learn about the hybrid storage solutions.

UNIT 1

Introduction to Storage Technology: Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information Lifecycle Management, Data categorization.

UNIT-II

Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing,

UNIT-III

Introduction to Networked Storage: JBOD, DAS, NAS, SAN & CAS evolution and comparision. Applications, Elements, connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN.

UNIT -IV

Hybrid Storage solutions; Virtualization: Memory, network, server, storage & appliances. Data center concepts & requirements, Backup & Disaster Recovery.

UNIT-V

Information storage on cloud :Concept of Cloud, Cloud Computing, storage on Cloud, Cloud Vocabulary, Architectural Framework, Cloud benefits, Cloud computing Evolution, Applications & services on cloud, Cloud service providers and Models, Essential characteristics of cloud computing, Cloud Security and integration.

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B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc(Electronics)	ELECTRONIC INSTRUMENTATION, DIGITAL SYSTEM DESIGN &MICROCONTROLLER	BEC 161

Course outcome:

1. Learn importance of microcontroller in designing embedded application.
2. Learn use of hardware and software tools.
3. Develop interfacing to real world devices.
4. Able to design and implement various digital modulation and demodulation techniques.
5. Design and implementation of Basic Microcontroller Based system using 8051 and PIC Microcontroller.

UNIT-I

DC and AC indicating Instruments: Accuracy and precision - Types of errors -PMMC galvanometer, sensitivity, Loading effect - Conversion of Galvanometer into ammeter, Voltmeter and Shunt type ohmmeter- Multimeter. Electrodynamometer - Thermocouple instrument - Electrostatic voltmeter - Watt- hour meter.DC and AC bridges: Wheatstone bridge - Kelvin's bridge - Balancing condition for AC bridge
- Maxwell's bridge - Schering's bridge - Wein's bridge - Determination of frequency.Oscilloscopes: Block diagram - Deflection Sensitivity - Electrostatic Deflection -Electrostatic Focusing - CRT Screen - Measurement of Waveform frequency, phase difference and Time intervals - Sampling Oscilloscope - Analog and Digital Storage Oscilloscopes.

UNIT-II

Instrumentation Amplifiers and Signal Analysers: Instrumentation amplifier -Electronic Voltmeter and Multimeter - Digital Voltmeter - Function Generator -Wave Analyser - Fundamentals of Spectrum Analyser.Transducer and Display Devices: Strain Gauge - Unbounded Strain Gauge - LVDT - Resistance Thermometer - Photoelectric Transducer - Pen Recorder - Audio Tape Recorder - Seven Segment Display LCD.

UNIT-III

Boolean Algebra and Logic Gates: Review of binary number systems - Binary arithmetic - Binary codes - Boolean Algebra and theorems - Boolean functions -Simplifications of Boolean functions using Karnaugh map and tabulation methods -Logic gates.Combinational Logic: Combinational circuits - Analysis and design procedures -Circuits for arithmetic operations - Code conversions - Introduction to Hardware Description Language (HDL).Design with MSI Devices: Decoders and Encoders - Multiplexers and Demultiplexers -Memory and programming logic - HDL for combinational circuits.Synchronous Sequential Logic: Sequential circuits - Flip-flops - Analysis and design procedures - State reduction and state assignments - Shift registers - Counters - HDL for sequential logic circuits, shift registers and counters.Asynchronous Sequential Logic: Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables - Race free state assignment - Hazards.

UNIT-IV

Microprocessor and Micro-controller - 8051 Micro-controller hardware: 8051oscillator and clock - Program counter and data pointer - A and B CPU register -Flags and PSW - Internal memory - Internal RAM - Stack and stack pointer - Special function registers - Internal ROM.Input / output pin, ports and circuits - External memory.Counter and Timer: Counter / Timer interrupts - Timing - Timer modes of operation - Counting.Serial data input / Output: Serial data interrupt - Data transmission - Data reception - serial data transmission modes.Interrupts: Timer flag interrupt - Serial port interrupt - External interrupt - reset -Interrupt control - Interrupt priority - Interrupt destination - Software generated interrupts.

UNIT-V

Introduction - Addressing modes - Byte level logic operations - Bit level logic operations - Rotate and swap operations - Simple program.Arithmetic Operations: Introduction - Flags - Incrementing and Decrementing -Addition - Subtraction - Multiplication and Division - Simple Program.Introduction - External data move - code memory read only data move - PUSH and POP - Opcodes - Data exchange - Simple Programs.Jump and Call instructions: Introduction - Jump and call program range - Jumps -Calls and subroutine - Interrupt and returns - more detail on interrupts - Simple programs.Keyboard interfacing
- Display interface - 7 segment and LCD display - D/A conversion - A/D conversion - Stepper motor Interface.

Text Books

1) Digital Logic and Computer Design - M. Morris Mano, Prentice Hall of India Private Limited.
2) Analysis and Modeling of Digital Systems - Zain Allabedin Navabee, 2/e , McGraw Hill Publishing Co. Ltd., New Delhi.
3) Digital Fundamentals - T.L. Floyd, 8/e, Pearson Education.
4) 1. The 8051 Microcontroller and Architecture, Programming and Applications -Kenneth J. Ayala, 2/e, Penram International.
5) The 8051 Microcontroller and Embedded System - Mohamed Ali maszidi & Janice Gillespie Maszidi, Pearson Education.
6) The 8051 Microcontroller and Architecture - Predko Mic, 2/e, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
7) Electronic Instrumentation and Measurement Techniques - W.D. Cooper & A.D. Helfrick, Prentice Hall of India.
8) Electronic Instrumentation and Measurement - Kalasi.
9) A Course in Electrical and Electronic Measurement and Instrumentation - A.K. Sawhney, Dhanpat Rai and Sons.
10) Electronic Instrumentation and Measurements - P.B. Zbar, Mc Graw Hill International.
11) Measurement Systems Application and Design - Ernest O. Doebelin, 4/e, Tata McGraw Hill Publishing Co. Ltd.
12) Basic Electronics - A Text Lab Manual - Zbar, Malvino & Miller, Tata McGraw Hill Publishing Co. Ltd.
13) B.E.S. Practicals - R. Sugaraj Samuel & Horsley Solomon - Department of Electronic Science,C.T.M. College of Arts and Science, Chennai.
14) Fundamentals of Microprocessor 8085 - V. Vijayendran, S. Viswanathan

PRACTICAL-I year

1) adder, subtractor circuits and counters using logic gates.
2) pplication of microprocessor in basic mathematical function, code conversion and DAC.
3) Amplitude modulation and detection.
4) 2. Frequency modulation and detection.
5) 3. Pulse Amplitude modulation and detection.
6) Pulse Width modulation and detection.
7) Pulse Position modulation and detection.
8) Half, Full and BCD adders using simple logic gates.
9) Half, Full and BCD adders using NAND gates.
10) Half and Full subtractors using simple logic gates.
11) Half and Full subtractors using NAND gates.

12) Study of 7490 BCD counter, divided by (1 to 10) as scalar.
13) BCD to seven segment decoder using 7447/7448.
14) Microprocessor Practical Experiments
15) Addition, Subtraction, Multiplication and Division - 8 bit.
16) Picking up the largest/smallest in an array.
17) Ascending/Descending order.
18) Code conversions:
    a. Binary to BCD
    b. BCD to Binary
    c. Binary to ASCII
    d. ASCII to BinaryB.Sc. Electronics : Syllabus (CBCS)
    e. BCD to ASCII
    f. ASCII to BCD

Practicals II year

1) Construction of dual power supply using Zener diodes.
2) Construction of dual power supply using IC.
3) Op-amp - Inverting and Non-inverting modes, unity follower.
4) Op-amp - Summing amplifier - Inverting and Non-inverting modes.
5) Op-amp - Integrator and Differentiator.
6) Op-amp - Square wave generator.
7) Op-amp - Sine wave generator.
8) Instrumentation Amplifier.
9) Universality of NAND gate.
10) Universality of NOR gate.
11) Verification of basic Boolean identities using NAND gates.
12) Verification of basic Boolean identities using NOR gates.
13) Sum of Products and Product of Sums - NAND gates.
14) Sum of Products and Product of Sums - NOR gates.
15) Astable, Monostable multivibrators and Schmitt trigger using NAND gates.
16) Monostable multivibrators and Schmitt trigger using 555 timer.
17) Astable multivibrator using 555 timer.
18) Study of RS, D and JK flip flops.
19) AM, FM and PM modulation and detection techniques.
20) Characteristics of Zener diode.
21) Transistor characteristics in CE mode.
22) Regulated power supply using Zener diode.
23) Uses of CRO - Measurement of voltage, current, frequency and phase - Displaying
24) waveforms and Lissajou's figures - Study Experiment.
25) Transistor single stage amplifier - Frequency response.
26) Construction of low range power supply using rectifying diodes (6 V to 9 V).
27) Basic logic gates (AND, OR) using diodes.

28) Basic logic gates (AND, OR, NOT) using transistor.
29) characteristics of semiconductor devices such as UJT, JFET and SCR,
30) power control by SCR, audio wave generation and pulse shaping using Schmitt triggers.
31) Characteristics of UJT.
32) Characteristics of SCR.
33) SCR power control.
34) Characteristics of TRIAC.
35) Characteristics of JFET.
36) FET as an amplifier.
37) JFET multivibrator.
38) Emitter follower.
39) Darlington pair amplifier.
40) Transistor Hartley oscillator.
41) Transistor Colpitts oscillator.
42) Transistor phase shift oscillator.
43) Transistor Wien bridge audio oscillator.
44) Transistor monostable multivibrator.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

Branch	Subject title	Subject code
B.Sc (Mathematics)	**Programming Language with "C" Theory**	**BMM-161**

Course outcome:

1. Understand and apply the programming concepts of C++ which is important for mathematical investigation and problem solving.
2. Use mathematical libraries for computational objectives.
3. Represent the outputs of programs visually in terms of well formatted text and plots.

UNIT:-I

C constants, Variables, Data-types, Declaration of variables, Assigning values to variables.
Operators: Arithmetic, Relational, Logical, Increment and Decrement Conditional Operators. Arithmetic Expressions, Evaluation of Expressions, Precedence of arithmetic operators, Formatted Input and Output, Decision making and branching, If, Simple-If, If- Else, Nesting of If-ElseElse-IF Ladder, Switch Statement, The ?: Operator, Go to Statement
Decision making with looping: While, Do, For Statement, Jumps in loops Arrays: 1-dimensional, 2-dimensional array, Initiatising 2-D arrays, Multi-Dimensional arrays

UNIT:-II

User-Defined Function: Need for user-defined function, Multi-Function Progarm, The form of C-Function return value and their types, Calling a function, Category of functions, No arguments and no return values, arguments but no return values, arguments with return values. Handling of non-integer functions, Nesting of functions, Recursion, Function with Arrays, Scope and lifetime of variables in functions Structure and Unions: Structure definition, Giving values to numbers, Structure initialisation, Comparison of structure variables, Arrays of structure, Arrays within Structures, Structure within Structures, Structures and functions.

UNIT:-III

Pointers: Understanding pointers, accessing the address of a variable, Declaring and initialising of pointers, accessing a variablethrough its pointer, Pointer expression, Pointer increments and scale factor, Pointers and arrays, Pointers and functions, Pointers and structures Files: Defining and opening a file, closing a file.

UNIT:-IV

Boolean Function, Disjunction and Conjunction Normal Forms, Bools Expansion, Theorem. Binary Relations, Equivalence Relations, Partitions and Partial Order Relation.

UNIT:-V

Graphs, Multigraphs, Weighted Graphs, Paths and Circuits, Shortest Paths: Dijkstra's Algorithm, Matrix Representation of Graph: Incidence and Adjacency Matrix, Trees and its simple properties.

PRACTICAL LIST OF PROGRAMME:-

1.The Factorial of an Integer
2.Binomial coefficient nCr, where n and r are Positive Integers
3.Matrix addition and subtraction.
4.Matrix multiplication.
5.Transpose of a Matrix.
6.Insertion sort
7.Bisection method
8.Solve a System of Linear Simultaneous equations by Gauss-Elimination method 9.To evaluate a definite integral using Simpson's one-third rule.
10.To solve an Ordinary Differential equation of first order by Runge-Kutta method of fourth order

Text Books :

1. R.R Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
2. G.F. Simmons. Introduction to Topology and Modem Analysis. McGraw-Hill, 1963.
3. T.M Apostol, Mathematical Analysis. Norosa Publishing House. New Delhi, 1
4. C.L. Liu,Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science scries 1986.

Reference Books:

1 Programming in ANSI C 2nd edition, E.Balaguruswamy, Tata-Mcgraw Hill Publishing company.
2. T.M Apostol, Mathematical Analysis. Norosa Publishing House. New Delhi, 1985.
3. S. Lang. Undergraduate Analysis, Springer-Veriag, New York, 1983.
4. D. Somasundaram and B. Choudhary, A first Course in Mathematical Analysis. Narosa Publishing House, New Delhi 1997.
5. Shanti Narayan, A Course of Mathematical Analysis. S. Chand & Co. Delhi.
6. RK. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi 2000.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Microbiology)	ANALYTICAL MICROBIOLOGY & APPLIED MICROBIOLOGY	BMB 161

Course outcome:

1. To understand the bioassay and quality control.
2. To study the classification of different microorganisms.
3. To learn about the different morphology of agriculture microbiology and its effects.
4. To know the different types of colorimetry , spectrophotometry and saparation techniques.

Unit I

Bioassays

Bioassay of growth supporting substances- Amino acids and Vitamins, Bioassay of growth inhibiting substances- Antibiotics, Automation of bioassay.

Quality Control

Quality control tests- Sterility testing, Microbial Limit Test (MLT), Pyrogen testing (LAL test), Minimum Inhibitory Concentration(MIC), FDA and Good Manufacturing Practices, Quantitative and qualitative analysis of food, milk, water and sewage.

Unit II

Colorimetry and Spectrophotometry

Lambert – Beer's Law, Ultraviolet, Visible, Infra red and Fluorescence spectroscopy, Atomic absorption, Raman spectrum, X-ray Crystallography and NMR.

Separation Techniques- I

Chromatography- Principle, Types of chromatography- Paper, Thin layer, Column, Ion exchange and Gas chromatography.

Unit III

Separation Techniques -II

Electrophoresis- Principle and working, Agarose gel, native PAGE and SDS-PAGE, Principle, working and applications of centrifuge.

Unit IV

Microorganisms in Agriculture

Bacteria and fungi as biopestcides**,** Genetically modified crops containing insecticidal genes, Biofertilizers- Nitrogen fixers, PSB and Mycorrhiza, Fuel from microorganisms- Biogas technology, Microbial hydrogen production, Concept of gasohol.

Unit V

Pharmaceutical Biotechnology

Genetically engineered microorganisms, Production of heterologous proteins- Insulin, Growth hormones, Interleukins and t plasminogen activator, Recombinant vaccines.

Food from Microbes
Dairy products- Cheese, Butter, Yogurt, Microorganisms as food- SCP, *Spirullina* and Mushroom, Indian and Oriental fermented foods.

Recommended Books (Semester-VI)
1. Textbook of Industrial Microbiology, Author- A. H. Patel.
2. Industrial Microbiology, Author- L. E. Cassida
3. Industrial Microbiology, Author- G. Reed.
4. Industrial Microbiology, Author- Agarwal And Parihar.
5. Biology of Industrial Microorganisms. A.L. Demain.
6. Principles of Fermentation Technology, Authors- Standbary, Whitaker and Hall.
7. Principles of Physical Biochemistry, Authors- Van Holde *et.al*.
8. Biochemistry of Nucleic Acids, Authors- Adams et. al.
9. Bioseparation: Principles and Techniques, Author- B. Sivasankar.
10. Protein Analysis and Purification, Authors- I.M. Rosenberg.

YEAR-III SEMESTER-VI
LIST OF EXPERIMENTS

1. Isolation of antibiotic producer from soil sample.
2. Isolation of amylase producer from soil sample.
3. Estimation of soil microflora.
4. Qualitative and quantitative examination of Food.
5. Qualitative and quantitative examination of Milk.
6. Qualitative and quantitative examination of Water.
7. Qualitative and quantitative examination of Sewage.
8. Bioassay of penicillin.
9. Bioassay of vitamin.
10. Sugar estimation by Cole's Method.
11. Estimation of MIC.
12. Sterility testing of pharmaceutical products- injectibles, eye and ear drops.
13. Microbial Limit Test- Tablets and syrups.
14. Determination of Phenol coefficient.
15. Separation of amino acids by TLC.
16. Separation of sugars by Paper chromatography.

RKDF UNIVERSITY, BHOPAL

B.Sc.(Courses)

BRANCH	SUBJECT TITLE	SUBJECT CODE
B.Sc (Food Science & Tech.)	BIOPROCESS ENGINEERING AND TECHNOLOGY	BFS 161

Course outcome:

1. To know the about the industrial microorganism.
2. To understand the types of fermentation processes.
3. To get a brief knowledge about food technology.

UNIT-I

Isolation, preservation and maintenance of industrial microorganisms, kinetics of microbial growth and death, media formulation for industrial fermentation, Air and media sterilization.Designing of a fermenter/Bioreactor.

UNIT-II

Types of fermentation process, analysis of batch fed batch and continuous bioreactions, biotransformation, stability of microbial reactors, analysis of mixed microbial populations, specialized bioreactors (pulsed, fluidized, photo bioreactors etc.)

UNIT-III

Downstream processing: introduction, removal of microbial cells and solid matters, foam separation, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction, chromatography, drying and crystallization,

UNIT-IV

Industrial production of chemicals: alcohols, acids (citric, acetic and gluconic), solvents (glycerols, acetone, butanol), antibiotics (penicillin, streptomycine, tetracycline) amino acids (lysine, glutamic acid), single cell proteins.

UNIT-V

Food Biotechnology: Food spoilage and preservation process, dairy products, wine, beer and other alcoholic Beverages and formulated plant products, petro crops, food from water, fungal protein food from yeast, hybrid seeds, conventional breeding of plant for food production. Transformation of steroids and non steroid compounds. Mushroom -types, isolation and culture.

BOOKS :

1. Sullia S. B& Shantharam S: (1998) General Microbiology, Oxford & IBH Publishing Co. Pvt.Ltd.
2. Glaser A.N & Nilaido.H (1995) Microbial Biotechnology,W.H Freeman & Co.
3. Prescott & Dunn (1987) Industrial Microbiology 4th Edition, CBS Publishers & Distributors.
4. Prescott & Dunn (2002) Industrial Microbiology, Agrobios (India) Publishers.
5. Crueger W. & Crueger A. (2000) A text of Industrial Microbiology, 2nd Edition, PanimaPublishing Corp.
6. Stanbury P.F, Ehitaker H, Hall S.J (1997) Priciples of Fermentation Technology., Aditya BOOKS (P) Ltd.
7. S.N.Jogdan (2006) Industrial Biotechnology, Himalaya Publishing House

BFS (P) - FOOD MICROBIOLOGY PRACTICALS

1. Microbiology laboratory basic rules and requirements:

a. Laboratory rules- basic rules of a microbiology lab

b. Basic requirements of a microbiological lab- common glass ware; test tube, culture tube and screw capped tubes, Petri dish, pipette, Pasteur pipette, glass spreader, inoculation needle, busen burner, water bath, autoclave, laminar air flow, incubator, hot air oven, quebec colony counter, centrifuge, microscope.

c. Disposal of laboratory waste and culture.

2. Staining of microorganisms

a. Methods for detection of specific bacteria:

- wet mount preparation for motile bacteria,
- hanging drop mount method,
- Petri dish culture method for detection bacteria.

b. Methods for staining of micro organism:

- Simple staining (Monochrome staining)

- Gram staining for differentiation of bacteria
- Negative staining of bacteria
- Endospore staining

Composition, preparation and sterilization of media: **15 Hrs**

PDA media

Nutrient agar media

Mc-Conkey agar media

Demonstration of techniques for pure culture of microorganisms: **15 Hrs**

Streak plate method

Pour plate method
Serial dilution agar plate method

20 Hrs

Microbiology of:

a. Milk:

- standard plate count method,
- enzymatic test of milk by methylene blue reductase test,
- quality testing of milk by resazurin test,
- determination of phosphates activity of milk,
- detection of mastitis through milk test

b. Meat, Fish, Egg

c. Water: (MPN test)

- Presumptive test
- Confirmed test
- Completed test

REFERENCE:

- Dubey, R.C. and Maheshwari, D.K. Practical microbiology. S.Chand and Company Limited, Ramnagar. New Delhi 2002.