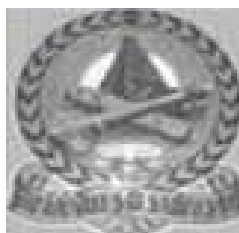


RAJAH SERFOJI GOVT COLLEGE,(AUTONOMOUS)

THANJAVUR –613 005

(Reaccredited with “A”Grade by NAAC)



AFFILIATED TO BHARATHIDASAN UNIVERSITY ,

TRICHIRAPPALLI –24



DEPARTMENT OF BIOCHEMISTRY

B.Sc BIOCHEMISTRY SYLLABUS

(For the students admitted from 2018–2019 onwards)

Credits	5	Hrs/week	6	Sub Code	S1BC1	Semester	I	Medium of Instruction	English
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Semester : I- CORE COURSE-1

(For the students admitted from 2018 onwards)

BIOMOLECULES

Objective

To learn about the major biomolecules and its functions

UNIT I: Carbohydrates: Classification, preparation, properties and structure. Interconversion of sugars. Properties, structure and biological functions of mono, di, oligo and polysaccharides. Homopolysaccharides – Starch, glycogen, cellulose. Heteropolysaccharides – Hyaluronic acid and chondroitin sulphate,

UNIT II -Amino acids: Structure, classification and chemical reactions. peptide bond. Proteins. Biological importance, Forces stabilizing the structure of proteins. classification, general properties, primary structure, Secondary , tertiary and quaternary structures. Denaturation.

UNIT III- Nucleic acids - Purine and Pyrimidines – structure and properties. Nucleosides. Nucleotides. DNA and RNA. Composition, structure, their biological importance, Comparison between DNA and RNA, Denaturation and Renaturation of nucleic acid .

UNIT IV- Lipids: Biological significance, classification. Structure , properties and functions- Fatty acids, triglycerides, waxes , terpenes, cholesterol and its derivatives. Compound lipids- Phosphoglycerides, sphingolipids and glycolipids. Reichert meissel Value, iodine number, saponification value , acid number.

UNIT V- Vitamins- Source, biological role, daily requirement and deficiency manifestation - fat soluble vitamins A,D,E & K. Water soluble vitamins- Ascorbic acid, thiamine, riboflavin, pyridoxine, niacin, folic acid and vitamin B12.

Text Books:

1. Biochemistry by N.Arumugam, Saras Publications, 3rd edition (2010)
2. Biochemistry by U.Sathyanarayana, Allied Books Publishers, 4th edition, 2007

Reference Books :

1. Biochemistry by Lubert Stryer, Free man Publishers Ltd, 5th edition (2002).
2. Biochemistry by Voet & Voet, Wiley Publications, 2nd Edition (2003)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	3	Sub Code	S2BCP1	Semester	I & II	Medium of Instruction	English
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Semester - I & II-CORE COURSE -3

(For the students admitted from 2018 onwards)

Major Practicals- I

Qualitative analysis:

- A. Qualitative analysis of carbohydrates (glucose, fructose, maltose, sucrose, lactose), Identification of mono ,disaccharides and starch in mixtures.
- B. Colour reactions of amino acids like tryptophan, tyrosine, arginine, proline and histidine.
- C. Qualitative analysis of Lipids.

Quantitative analysis.

- A. Estimation of reducing sugar by Benedicts quantative method.
- B. Estimation of amino acid by Ninhydrin method.
- C. Estimation of ascorbic acid by titrimetric method using 2,6 - dichlorophenol indophenol.
- D. Estimation of acid number of Edible oil.
- E. Determination of saponification number of edible oil.

Questions paper pattern

Internal – 40marks , External – 60marks

Major experiment – 30 marks, Minor experiments – 20 marks, Record – 10 marks

Signature of HOD

Credits	5	Hrs/week	6	Sub Code	S2BC2	Semester	II	Medium of Instruction	English
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Semester : II-CORE COURSE -2

(For the students admitted from 2018 onwards)

BIOCHEMICAL TECHNIQUES

Objective

To enlighten the laws of thermodynamics and techniques in biochemistry which help the students to work in clinical labs.

Unit I- Laws of thermodynamics- First, second, third and zero law. Law of mass action. Electrochemical techniques - Measurement of pH, Standard hydrogen electrode-, Henderson- Hessel balch equation. Types of buffer, role of Buffers in biological system. Colloids and their role in the living body, application of colloids.

Unit II- Chromatography: Principle, methods and applications of paper chromatography, Thin layer Chromatography, affinity chromatography, Gas-liquid chromatography, Gel filtration chromatography and Ion exchange chromatography. High performance liquid chromatography, (HPLC).

Unit III- Electrophoresis: Principle, instrumentation and applications - paper electrophoresis, Agarose gel electrophoresis, PAGE, Isoelectric focusing.

Principles of centrifugation. Preparative, Analytical ultra centrifuge- Instrumentation and applications. Basic principle and techniques of subcellular fractionation by differential centrifugation.

Unit IV- Spectroscopy: Colorimetry, Beer-Lambert's law. Principle, Components and applications of spectrophotometer. Principle, instrumentation and applications of flame photometer, atomic absorption, NMR, ESR and mass spectroscopy.

Unit V

Radioisotopes- Radioactive decay, units of radioactivity. Measurement of radioactivity- Geiger muller counter. Scintillation counter and Autoradiography. Applications of radioisotopes in Biology.

Text Books& Reference Books

1. Analytical Biochemistry by P.Asokan, Chinna Publications, 2nd edition, (2005)
2. Biophysical chemistry – Principles and Techniques by Upathayaye and Nath, Himalaya Publishers, 3rd edition, (2002)
3. Principles and techniques of practical Biochemistry by Wilson and Walker University Press, Cambridge, 5th editon (2000)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	5	Hrs/week	6	Sub Code	S3BC3	Semester	III	Medium of Instruction	English
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Semester : III-CORE COURSE -4

(For the students admitted from 2018 onwards)

HUMAN PHYSIOLOGY

Objective

To understand the various systems in human body and its functions .

Unit I– Digestive system - Anatomy of the digestive system, Salivary, gastric , biliary secretion - Composition and functions. Intestinal hormones, movements in gastro intestinal tract, secretion, digestion and absorption in the small intestine. Digestion and absorption of carbohydrates , lipids and proteins

Unit – II- Body fluids : Extra cellular fluid plasma, interstitial fluid , intra cellular fluid. Lymph & blood composition, functions, ionic composition , electrolytes, body buffers. Blood cells- RBC , WBC, hemoglobin , hemopoiesis, blood coagulation and blood groups.

Unit- III- Circulation : Structure of heart and blood vessels, cardiac cycles, cardiac factors, controlling blood pressure, Blood pressure and its measurement, electro cardiogram. Treatment for Blood pressure. Respiration: Anatomy and physiology of respiration, exchange of gases between lungs and blood and between blood and tissues.

Unit- IV- Excretory systems: Structure of nephron, composition and formation of urine. Muscle-Types of muscle structure, mechanism of muscle contraction. Nervous system- Structure of brain, neuron, nerve impulse, synapse, Cerebrospinal fluid- composition and biological functions, blood brain barrier.

Unit- V- Reproductive systems: General anatomy of male and female reproductive organs, Endocrine system: Functions and deficiency diseases of the pituitary , thyroid, adrenal, parathyroid and pancreatic hormones

Text Books:

1. Human Physiology by Chatterjee, Medical Allied Publications, 3rd edition, 2004
2. Animal Physiology by N.Arumugam, Saras Publications, 2nd edition, 2008

Reference Books:

1. Human Physiology by Guyton, Saunders Publishing Ltd, 9th edition (2004).
2. Physiology and Biochemistry by R.A .Agarwal, S.Chand Company Publishers, 3rd edition (1986)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	3	Sub Code	S4BCP2	Semester	III	Medium of Instruction	English
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SEMESTER – III- MAJOR PRACTICALS- II
(For students admitted from 2018 onwards)

1. Preparation of buffers and measurement of pH.
2. Extraction of nucleic acids.
3. Estimation of RNA by orcinol method.
4. Estimation of DNA by Diphenylamine method.
5. Estimation of chlorophyll.
6. Estimation of lactose
7. Estimation of lecithin from egg yolk
8. Estimation of fructose.

Demonstration experiments:

9. Circular paper chromatography for separation of amino acids.
10. Ascending and descending chromatography for separation of amino acids.
11. Separation of plant pigments by column chromatography.
12. Thin layer chromatography of amino acids.
13. PAGE – electrophoresis.
14. Preparations of normal and molar solutions.

Questions paper pattern

Internal – 40marks , External – 60marks

Major experiment – 30 marks, Minor experiments – 20 marks, Record – 10 marks

Signature of HOD

Credits	2	Hrs/week	2	Sub Code	S3SB1C	Semester	III	Medium of Instruction	English
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SEMESTER – III- SKILL BASED
(For the students admitted from 2018 onwards)

APICULTURE

Objective

To introduce the basics of apiculture and its commercial use which help the students for self employment.

UNIT I

History and scope of Bee keeping. Present status of Apiculture in India. Honeybee –Systematic position – Species of Honey bees – Morphology and Life history. Stinging apparatus and bee poisoning.

UNIT II

Bee colony – Castes – natural colonies and their yield. Bee foraging: Pollen and nectar yielding plants. Honey bee – behaviour – swarming – Pheromones.

UNIT III

Apiary Management – Artificial bee hives – types – construction of space frames – Selection of sites – Handling – Maintenance – Instruments employed in Apiary

UNIT IV

Honey – Composition – Honey extraction, seasonal maintenance- uses. Bee wax and its uses National and International markets for Honey and Wax. Natural enemies and diseases of honey bees and their control measures

UNIT V

Apiculture as Self - employment venture –financial assistance and funding agencies Economics of Apiculture and Management

Text Books:

1. Abrol, D. P. 1997. Bees and Beekeeping in India. Kalyani Publishers, Ludhiana.
2. . Sharma, P. and Singh L. 1987 – Hand book of bee keeping, Controller Printing and Stationery

Reference Books:

1. Cherian, R. & K.R. Ramanathan, 1992 – Bee keeping in India
2. Shukla, G.S. and Upadhyay, V.B. 1997. Economic Zoology. Rastogi Publications

Question paper pattern

Max Marks: 50

Exam duration : 3 hours

Part A 5x4 = 20 Answer any five questions (out of seven)

Part B 3x10 = 30 Answer any three questions (out of five)

Signature of HO

Credits	5	Hrs/week	6	Sub Code	S4BC4	Semester	IV	Medium of Instruction	English
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SEMESTER –IV-CORE COURSE 5

(For the students admitted from 2018 onwards)

CELL AND MOLECULAR BIOLOGY

Objective:

To learn the nature of cell and its molecular biology in DNA and RNA level.

UNIT – I -An Overview of cells – Origin and evolution of cells. Cell theory, Classification of cells – Prokaryotic cells and Eukaryotic cells. Comparison of prokaryotic and eukaryotic cells. Cell Membrane – Fluid mosaic model of membrane structure and its composition. Cell cycle.

UNIT – II- Cell organelles: Endoplasmic reticulum, Ribosomes, Mitochondria, Chloroplast, lysosomes, Golgi apparatus- structure and their functions.

UNIT III- Identification of DNA as genetic materials, Griffith, Harshey –chase experiment. DNA replication- types, semi conservative mechanism, requirement for DNA replication, topoisomerases. Inhibitors of DNA replication.

UNIT IV- Genetic code and their salient features, Transcription in prokaryotes - initiation , elongation and termination, inhibitors of transcription. Post transcriptional modification. Mutation – types and causative agents.

UNIT –V- Protein synthesis in prokaryotic and eukaryotes- activation, initiation, elongation and termination of protein synthesis. Inhibitors of protein synthesis, Post translational modification.

Text Books & Reference Books:

1. Cell Biology by S.C.Rastogi , New Age International Publishers, 3rd edition (2007)
2. Molecular Biology by Freifelder, Narosa Publishing House, 4th edition, (1999)
3. Biochemistry and Molecular Biology by William .H.Elliot, Oxford University Press, 3rd edition (2007)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	2	Hrs/week	2	Sub Code	S4SB2B	Semester	IV	Medium of Instruction	English
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SEMESTER IV-SKILL BASED
(Applicable to the students admitted from 2018 onwards)

BIOFERTILIZER

Objective

To introduce the types of biofertilizer , its production and mass cultivation.

Unit I

Types and benefits of biofertilizers. Nitrogen biofertilizers, Phosphate biofertilizer, compost biofertilizers, organic farming – introduction, methods , advantages and disadvantages .

Unit - II

Importance of Nitrogen and Phosphorus cycles. Benefits of Biofertilizers -strain selection - seed pelleting - Inoculant and inoculant carriers - Nitrogen fixing Bacteria (Azotobacter, Beijerinckia, Clostridium, Cyanobacter).

Unit III

Mass cultivation of Cyanobacteria (Anabaena, Cylandrospermum) - Mass cultivation of Azolla, Azolla - Anabaena complex - Algal inoculants - methods of production (Trough method, Pit method, Field scale,) application.

Unit IV

Rhizobium - Taxonomy, physiology, Host-Rhizobium interaction, mass cultivation, carrier and base inoculants. Vermiculture - Earth worms and micro organisms - Microbial enzymes.

Unit V

Types of mycorrhizal associations, VAM mycorrhizal association: taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield, collection of VAM, isolation, stock plants and inoculums, production of VAM.

Text Books

1. S. G. Borkar, 2015. Microbes as Bio-fertilizers and their Production Technology, Woodhead Publishing India in Agriculture, India.
2. R Shankara Reddy, 2012. Biofertilizer Technology, Adhyayan Publishers, India

Reference Books

1. Moshrafuddin Ahmed and Basumatary, S.K. 2006. Applied Microbiology, M.J.P. Publishers, Chennai.
2. Dubey, R.C. 2003. A text book of Biotechnology. S.mChand & company, New Delhi.

Question paper pattern

Max Marks: 50

Exam duration : 3 hours

Part A 5x4 = 20 Answer any five questions (out of seven)

Part B 3x10 = 30 Answer any three questions (out of five)

Signature of HOD

Credits	5	Hrs/week	5	Sub Code	S5BC5	Semester	V	Medium of Instruction	English
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SEMESTER : V- CORE COURSE 7

(For the students admitted from 2018 onwards)

ENZYMES

Objective

To learn the classification , source and purification of enzymes along with its properties and clinical significance.

Unit I- Enzymes – Definition, Nomenclature and classification of enzymes, properties, enzymes as biological catalysts, specificity of enzymes. Active site – Salient features, Structure and functions of coenzymes- FAD, TPP, NAD, Biotin, Pyridoxal phosphate. Units of enzyme activity . Turnover number

Unit II- Isolation and purification of enzymes : Classical methods of isolation and purification-affinity chromatography, ion exchange chromatography, gel filtration chromatography. Purification of Bulk enzymes and therapeutic enzymes.

Unit III- Enzyme kinetics – Factors affecting enzyme activity. Derivation of Michaelis Menten equation, Line weaver burk plot, Enzyme Inhibition – Competitive , non competitive , and uncompetitive enzyme inhibition.

Unit IV- Mechanism of enzyme action – Lock and Key model, induced fit hypothesis, Mechanism of enzyme action – covalent catalysis (Chymotrypsin) and acid base catalysis (Lysozyme) , Mechanism of bisubstrate reactions, Allosteric enzymes with examples.

Unit V- Multienzyme complex, pyruvate dehydrogenase, isoenzyme of lactate dehydrogenase. Enzymes of clinical importance . Immobilized enzymes – Definition, types of immobilization and applications of immobilized enzymes. Industrial applications of enzymes. Biosensors – Types and applications.

Text Book & Reference Book:

1. Understanding enzymes by Trevor Palmer, Prentice Hall Publishers, 4th edition (1997)
2. Enzymes by P.Asokan, Chinna publications , 2nd edition, (2005)
3. Enzymes by Dixon and webb, Academic Press, New York (1982)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	5	Sub Code	S5BC6	Semester	V	Medium of Instruction	English
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SEMESTER –V-CORE COURSE -8

(For the students admitted from 2018 onwards)

BIOCHEMISTRY OF PLANTS AND MICROBES

Objective

To understand the biochemistry of plants and microbes, photosynthesis, nitrogen fixation .

Unit I- Photosynthesis- Photosynthesis, pigments, and photosynthetic apparatus, Light and dark reactions. Hill reaction, Emerson Effect, Photosystems, Photophosphorylation. Dark reactions-carbon dioxide fixation in C3, C4 and CAM Plants. Factors affecting photosynthesis and photorespiration.

Unit II- Nitrogen fixation – Symbiotic and non symbiotic N₂ fixation, nitrogenase, nitrate assimilation, nitrate reductase, sulphur and carbon cycles, Plant growth hormones - Auxin, gibberellins, cytokinins, abscisic acid and ethylene . Plant growth inhibitors and retardants.

Unit III - Prokaryotes – Bacteria - Structure and Physiology of E.Coli, Conjugation and transformation in bacteria. Blue green algae – morphology – economic importance of higher algae. Yeast and fungi – morphology, important stages in the life cycle of an yeast – spores of fungi.

Unit IV- Soil and water microbiology – Soil formation, Rhizosphere, Purification of drinking water, test for purity of water. Food and water borne diseases. Typhoid , cholera, bacillary dysentery, hepatitis, amoebiosis, Air borne pathogens – tuberculosis, small pox, diphtheria and poliomyelitis.

Unit V- Viruses – Structure and replication of animal and plant viruses . Oncogenic viruses, retroviruses, HIV, T even phages, Lambda phages – Lytic and Lysogeny cycles.

Text Book:

1. Plant physiology by M.Devlin, John Wiley Publications, 3rd Edition (1996)
2. Plant Physiology by S.N .Pandey, Vikas publishing House, 4th Edition (2008)
3. Microbiology by N.Arumugam, Saras Publications , (2005)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	5	Sub Code	S5BCP3	Semester	V	Medium of Instruction	English
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SEMESTER : V- CORE COURSE 9
(For the students admitted from 2018 onwards)

Major Practicals- III

Food & Microbiology Practicals

1. Moisture content of food materials
2. Ash Content of food materials.
3. Estimation of carbohydrate by anthrone method in food samples.
4. Estimation of protein by Lowrys method in food samples.
5. Estimation of phosphorus in food sample
6. Estimation of calcium.
7. Estimation of fat content in food samples (wheat, rice flour, gram flour)

Microbiology:

1. Cleaning of glasswares.
2. Preparation of nutrient media.
3. Streak plate technique.
4. Grams staining.
5. Estimation of fat in milk
6. Estimation of acidity in milk and curd
7. Estimation of lactose in milk by benedicts method.
8. Microbial quality of milk by methylene blue dye reduction test.
9. Spotters.

Questions paper pattern

Internal – 40marks , External – 60marks

Major experiment – 30 marks, Minor experiments – 20 marks, Record – 10 marks

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S5BCEL1A	Semester	V	Medium of Instruction	English
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SEMESTER V- MAJOR ELECTIVE COURSE 1 (A)

(For the students admitted from 2018 onwards)

FOOD AND NUTRITION

Objectives :

To learn about the Types of Food and its chemistry

To learn about the importance of nutrition

Unit I- Sources, food consumption, properties and storage of common foods. Functions of food in relation to health – classification of food groups. New Proteins, new fat foods. Food groups to provide nutritive requirement for normal health classification of foods based on nutrition – body building foods, energy foods and protective foods.

Unit II- Essential nutrients- Fats , carbohydrates and proteins , energy value of foods, energy needs. Definition of unit of energy – Kcal , RQ, SDA , NPU, Basal metabolism – measurement-factors influencing BMR , Role of fibre in diet.

Unit III- Micro and macro mineral nutrients – Distribution, sources, metabolic functions and deficiency manifestation . Vitamins – classification, distribution, sources , functions , hyper and hypovitaminosis , water distribution – maintenance of water and electrolyte balance.

Unit IV- Nutrition through life cycle - infants, children, adolescents, pregnant, lactating women, old aged person and sports persons. Food additives, Food adulteration and labeling of food. Guide lines for good health.

Unit V - Principles of diet therapy. Marasmus, Kwashiorkor, Diet during stressed conditions and therapeutic diets for anemia, malnutrition, obesity, diabetes mellitus and ulcer. Formulation of therapeutic diet.

Text books & Reference Book

1. Nutrition and Dietetics by Shubhagini, Tata Mc Graw Publishers, 3rd edition, (2010).
2. Human Nutrition by B.Srilakshmi, New Age Publishers, 2nd edition (2008) .
3. Food Science by B.Srilakshmi, New Age Publishers, 5th edition (2010).

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S5BCEL1B	Semester	V	Medium of Instruction	English
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Semester – V- MAJOR ELECTIVE COURSE 1 (B)
(For the students admitted from 2018 onwards)

HOSPITAL MANAGEMENT

Objective :

To learn about the principle of management in hospitals.

To learn about the hospital communications.

Unit I- Principles of Management – Introduction Definition – Organizational Development – Types of Organizations .Motivation in Hospitals – Meaning – Types – Motivational theories – Their impact on Hospital Management – Motivating the employees hospitals – Financial Management – Basic Concepts and application of Operation Research Techniques.

Unit II

Hospital Organization- Short introduction with reference to American Hospital System – Historical Development – Types of Hospital Organization with reference to types of Service, Demography, Bed strength and Types of ownership – Organization flowchart (Governmental and Non – Governmental Chart)

Unit III

Direction – Meaning and significance – Principles of effective direction – Supervision – Leadership in hospital – Meaning – Scope importance - Styles – Qualities of successful leader – Span of control – Authority and responsibility – Delegation of authority – Obstacles – Effective delegation – centralization and decentralization – Memories and Limitations.

Unit IV

Medical Audit and Research Methodologies – Quality assurance in Hospitals - Methods of Quality assessment – Studies of Structure – Studies of process – Studies of outcome – Studies combining process and outcome (Trajectories and Tractors) –n Evaluation of strategies (Criteria Maps, Molding and Clinical trials).

Unit V

Hospital communications – Types – Barriers – Methods to overcome barriers – Principles of effective communication – coordination – Importance of Coordination in hospital – Techniques of coordination. Recent development in Management: Business process – Outsourcing – Enterprise Resource Planning – Supply Chain Management – Corporate Principles – Health Tourism – Medical transcription .

Text books & Reference Books:

1. Essentials of Management - Koontz and O'Donnel
2. Management - Griffin
- 3 Material Management in Hospital – Johnson.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S5BCEL1C	Semester	V	Medium of Instruction	English
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Semester – V- MAJOR ELECTIVE COURSE 1 (C)
(For the students admitted from 2018 onwards)

FOOD PROCESSING

Objectives:

To learn about food processing unit and its operations

To understand the food preservation methods .

UNIT I- Magnitude, Division and Interdependent activities of the food industry, unit operations of the food industry. Food processing sector –vision and mission, opportunities, strategies and constraints in the Indian food processing sector. Post harvest priority requirements, Strengths, weakness, opportunities and threats (SWOT) of food sector.

UNIT II - Rice Technology - Production, processing, milling of rice, parboiling, processes, by products of rice milling and their utilization. Nutrient loss during processing. Wheat Technology - Production, processing, manufacture of breakfast cereals Millets - Production, processing.

UNIT III - Mushroom - Production, processing, utilization. Meat - Production, processing, smoking and curing of meat, grading. Poultry - Production, preparing poultry for consumption, packaging. Fish - Production, effect of handling practices, storage of eggs, manufacturing and packaging of egg products.

UNIT IV - Vegetables - Drying and dehydration techniques –drum drying, vacuum puffing, foam mat drying, freeze drying, accelerated freeze drying. Processing of Vegetables and fruits .Canning -steps, spoilage of canned foods,advantages,disadvantages. Bottling –steps ,advantages,disadvantages.

UNIT V-Preservation using high sugar and salt concentrates - Processing of jam,jellies,marmalades,preserves,squash. Pickling – processing of sauerkraut,dill pickles. Latest technologies in food preservation –principles, advantages and disadvantages

Text Books & Reference Books

1. Saiauel, A. Matz., The Chemistry and Technology of cereals of Foods and Feed”, CBS Publishers and Distributors, 1996.
2. G.C. Banerjee, Poultiy, Oxford and IBH Publishing CODUB Ltd., New Delhi.
3. Giridhari Lal,G.S.Sidhappa and G.L.Tandon-Preservation of fruits and vegetables,ICAR,New Delhi,1998

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S5BCEL2A	Semester	V	Medium of Instruction	English
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SEMESTER : V- MAJOR ELECTIVE COURSE 2 (A)

(For the students admitted from 2018 onwards)

BIOENERGETICS AND METABOLISM

Objective :

To understand the metabolic pathways in human system and its significance.

Unit- I- Bioenergetics: Free energy and entropy changes in biological system, coupling of endergonic and exergonic processes. High energy phosphates. An overview of intermediary metabolism .

Unit II- Biological Oxidation- Enzymes and coenzymes involved in oxidation and reduction reactions, electron transport chain, inhibitors of ETC. Oxidative phosphorylation. Inhibitors and uncouplers of oxidative phosphorylation.

Unit III-Carbohydrate metabolism: Glycolysis and its energetic. gluconeogenesis, oxidation of pyruvate to acetyl CoA, TCA cycle and its energetic, anaplerotic reactions, Hexose monophosphate pathway, glycogenesis and glycogenolysis.

Unit IV- Lipid metabolism: Biosynthesis of fatty acids- biosynthesis and catabolism of triglycerides, phospholipids and glycolipids. Oxidation of fatty acids α , β and γ oxidation; Cholesterol-synthesis and degradation. Ketogenesis.

Unit V-Protein and nucleic acid metabolism: Deamination, decarboxylation, transamination of amino acids, glucogenic and ketogenic amino acids, urea cycle, biosynthesis and catabolism of amino acids- Glycine, phenylalanine, tyrosine, serine and methionine. Metabolism of purine and pyrimidine nucleotides.

Text Books & Reference Books

1. Biochemistry by Harper , Mc Graw Hill publishers, 25th edition (2003)
2. Biochemistry by U.Satyanarayana, Allied Book Publishers, 3rd edition (2006)
3. Fundamentals of Biochemistry by J.L.Jain, S.Chand & Company Ltd, 4th edition (2005).
4. Biochemistry by S.Nagini, Scitech Publications (2007)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S5BCEL2B	Semester	V	Medium of Instruction	English
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**SEMESTER –V- MAJOR ELECTIVE COURSE 2 (B)
(For the students admitted from 2018 onwards)**

PERSONAL HYGIENE

Objectives:

To learn about personal health, mental health and environmental health

Unit I

Health Education: Definition – Importance - Principles of Health education – content of health education. Health education – planning – methods of teaching - recognition of opportunity for teaching – preparation of low cost aids for teaching - audiovisual aids.

Unit II

Personal health – Factors contributing to relationship between health and disease – healthy habits, Oral Hygiene

Unit III

Physical health – Care of skin, ear, eyes, teeth, hands and feet, recreation and posture, menstrual hygiene, care of the sick and disabled, care of old people (geriatrics)

Unit IV

Mental health – Definition – Causes and Types - Characteristics of a mentally healthy person – Factors contributing to mental health.

Unit V

Environmental health – Relation of environment to health - health hazards – purification of water - efficient disposal (different methods like bore - hole latrine) - Solid waste disposal and control - food and milk sanitation – pest and rodent control

Reference

1. J.H. Helberg :Community Health
2. David morley and others:Practicing health for all
3. Gill Watt :Health Policy
4. W.B. Saunders :Epidemiology, Biostatistics and Preventive medicine, 1996 5. J.E.Park & K. Park:Preventive And Social MedicineBrown And Io.1978

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S5BCEL2C	Semester	V	Medium of Instruction	English
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Semester – V- MAJOR ELECTIVE COURSE 2 (C)
(For the students admitted from 2018 onwards)

COMMUNICATION AND PERSONALITY DEVELOPMENT

Objective:

To understand the types of communication, types of interview which help the students to improve their personality and communication skills.

UNIT I

Personality Development: concept of personality development, the self: selfawareness, self-actualization, self-esteem and self-development.

UNIT II

Communication: Importance of communication in personality development, Communication skills, Language skills, listening skills, interpretive skills, feedback in communication.

UNIT III

Groupcommunications: Dynamics of group communication, process and methods, role of individuals in group communication.

UNIT IV

Interview: Types of interviews, preparing for an interview, answering in an interview, importance of body language in an interview.

UNIT V

Communication activities for students: Role play, one to one communication, use of body language, expressions, group communication, public speaking. Methodology: The students will have a theoretical and practical orientation on using communication as a tool for personality development.

Text Books & Reference Books

1. Kaulacharya Jagdish Sharma (2010). Body Language, Fusion Books.
2. Rajeev Sethi (2004). Building a Successful Career, Infinity books.
3. Worchel & Cooper (1976). Understanding social Psychology, The Dorsey Press.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	3	Hrs/week	4	Sub Code	S5SELO1	Semester	V	Medium of Instruction	English
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SEMESTER – V – NON MAJOR ELECTIVE
(For students admitted from 2018 onwards)
STATISTICAL DATA ANALYSIS

Objectives

To know about the basic statistics and its applications .

To understand the types of data and its impact.

Unit-I: Collection of Statistical data - Primary and Secondary – Methods -Preparation of Questionnaire and Schedules.

Unit -II: Classification and tabulation - Bar diagrams - Pie diagram – Histogram - Frequency polygon - Frequency Curve - Merits and Demerits.

Unit -III: Measures of central tendency-mean, median, mode-measures of dispersion-range, mean deviation, standard deviation and coefficient of variation.

Unit -IV: Measures of Skewness – Definition – types – methods – Karl Pearson’s Skewness, Bowley’s Skewness - Merits and Demerits. (Simple problems only)

Unit -V: Correlation analysis – Karl Pearson’s Coefficient of Correlation – Spearman’s Rank Correlation Coefficient. (Simple problems only)

Text Books and Reference

S.P.Gupta: Statistical Methods, Sultan chand and Sons, New Delhi.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	2	Hrs/week	1	Sub Code	S5SB3C	Semester	V	Medium of Instruction	English
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SEMESTER – V- SKILL BASED
(For the students admitted from 2018 onwards)

MUSHROOM CULTIVATION AND VALUE ADDITION

Objective

To know the types of mushroom , mushroom cultivation and nutritional value which help the students for self employment.

Unit I

Mushroom – Introduction-Taxonomical rank -History and Scope of mushroom cultivation - Edible and Poisonous Mushrooms-Vegetative characters.

Unit II

Structure and key for identification of edible mushrooms, Button mushroom (*Agaricus bisporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajorcaju*) and paddy straw mushroom (*Volvariella volvcea*).

Unit III

Structure and key for identification of poisonous mushrooms– Truffles (*Tuber elanosporum*), *Ammanita* sp , *Galerina marginata*, and *Chlorophyllum molybdites*.

Unit IV

Principles of mushroom cultivation- Sterilization and disinfections of substrates. -Pasteurization of different substrates –spore printing, pure culture, spawn production and their maintenance.

Unit V

Nutritional and medicinal values of mushrooms-value added products of mushrooms soup, cutlet, vegetable curry, samosa, omelette, pickle etc. Research Centres – National level and Regional Level Cost benefit ratio –Marketing in India and abroad – Export value

Text book and Reference Book

1. Nita Bhal. (2000). Handbook on Mushrooms. 2nd ed. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. V.N. Pathak, Nagendra Yadav and Maneesha Gaur, Mushroom Production and Processing Technology/ Vedams Ebooks Pvt Ltd., New Delhi (2000)

Question paper pattern

Max Marks: 50

Exam duration : 3 hours

Part A 5x4 = 20 Answer any five questions (out of seven)

Part B 3x10 = 30 Answer any three questions (out of five)

Signature of HOD

Credits	5	Hrs/week	6	Sub Code	S6BC6	Semester	VI	Medium of Instruction	English
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SEMESTER- VI- CORE COURSE – 10
(For the students admitted from 2018 onwards)
IMMUNOLOGY

Objectives :

To enlighten the students to know the immune systems and its response in human systems.

Unit I- The immune systems- Introduction, Lymphocytes, their origin and differentiation, Antigen presenting cells – Macrophages, dendritic cells, Langerhans cells , their origin and function. Mechanism of phagocytes, Antigens- their structure and classification, compliments and their biological functions- Types of immune responses.

Unit II- Immunoglobulins – Structure of immunoglobulins, antibody specificity, biological functions of immunoglobins, generation of diversity, antigen – antibody interactions, antitoxins, agglutination, opsonin, bacteriolysin and precipitation.

Unit III- Techniques, production of antigens – the precipitation reaction, immunodiffusion, immunoelectrophoresis, radio immuno assay, immunofluorescence, compliment fixation and ELISA techniques.

Unit IV-Immuno haematology- Blood group antigens, Rhesus – incompatibility- maternal response to fetal antigens – other blood group systems. Major histocompatibility complex.(HLA).Autoimmune diseases- types and mechanism.

Unit V- Immunity to infection – hypersensitivity reactions, types of hypersensitivity, mechanism of T cell activation, macrophage activation and granuloma formation, transplantation – immunologic response, graft rejection, mechanism and prevention of graft rejection, immune suppressive drugs

Text Books & Reference Books

1. Immunology by N.Arumugam, Saras Publications (2009)
2. Immunology by Kuby , Freeman Publishers, 6th edition (2008)
3. Immunology by Tizard, Elsevier Publishers, 8th edition (2010).

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	5	Hrs/week	6	Sub Code	S6BC7	Semester	VI	Medium of Instruction	English
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SEMESTER- VI- CORE COURSE – 11
(For the students admitted from 2018 onwards)

CLINICAL BIOCHEMISTRY

Objectives :

To understand the disorders of carbohydrate , lipid , nucleic acid and protein metabolism

Unit I- Disorders of fluids, electrolyte balance and gastrointestinal system, disorder involving change in hydrogen ion concentration, Metabolism of bilirubin. Liver function tests, jaundice, haemolytic , hepatic and obstructive jaundice. Renal function tests, normal and abnormal constituents of urine.

Unit II- Disorders of carbohydrate metabolism – Sugar level in normal blood, maintenance of blood sugar concentration – endocrine influence on carbohydrate metabolism, hypoglycemia, glycosuria, renal threshold value, diabetes mellitus – classification, complications, glucose tolerance test (GTT), diabetic coma, diabetic ketoacidosis, glycogen storage diseases, fructosuria, galactosemia, and hypoglycemic agents.

Unit III- Disorders of lipid metabolism – lipid metabolism in liver and adipose tissue, plasma lipoproteins, cholesterol triglycerides and phospholipids in health and diseases, fatty liver, atherosclerosis, lipid storage diseases, hypolipoproteinemia and hyperlipoproteinemia.

Unit IV- Disorders of protein, amino acid and nucleic acid metabolism – plasma proteins, their origin, significance and variation in diseases. Nitrogen balance, proteinuria, multiple myeloma, Wilsons disease. Phenyl ketonuria, alkaptonuria, tyrosinosis, albinism, Hartnups disease. Fanconic syndrome, cystinuria, Gout.

Unit V- Disorders of endocrine systems – Disorders and laboratory investigations associated with thyroid, pituitary, adrenal medulla and sex hormones. Disturbances in blood clotting mechanisms, hemophilia, anemia , porphyria and anticoagulants.

Text Books & Reference Books

1. Medical Biochemistry by N.V.Bhagavan, Elsevier Publishers (2002) (For Unit 1 &2)
2. Text Book of Biochemistry by M.N.Chatterjee, Jaypee Publishers (2006) (For Unit 3, 4 & 5).
3. Fundamentals of Biochemistry by Ambika shanmugam, S.Chand Publishers (1986)
4. Medical Laboratory Technology by Mukherjee, Tata Mc Graw Publishers (1988)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	5	Hrs/week	6	Sub Code	S6BC8	Semester	VI	Medium of Instruction	English
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SEMESTER- VI- CORE COURSE – 12
(For the students admitted from 2018 onwards)

PHARMACEUTICAL CHEMISTRY

Objectives :

To expose the students on drug classification , drug metabolism.
To learn the types of preservatives, drug addiction, drug allergy.

Unit I-Classification of drugs based on source- mode of administration, site of action, absorption of drugs, drugs distribution and elimination, Role of kidney in elimination.

Unit II-Drugs metabolism – chemical pathways of drug metabolism . Phase I and Phase II reactions, role of cytochrome P450 , non- microsomal reactions of drug metabolism, drug metabolizing enzymes.

Unit-III- Chemotherapy- Biochemical mode of action of antibiotics- penicillin , streptomycin, tetracyclins and chloramphenicol. Action of alkaloids, antiviral and antimalarial substances. Biochemical mechanism of drug resistance.

Unit IV- Adverse response and side effects of drugs, allergy, Drug intolerance, Drug addiction, drug abuses and their biological effects. Rational therapy. Drugs prescribed in old age, infants and pregnancy. Treatment of myasthenia gravis.

Unit V- Anaesthetics -General and local anaesthetics, ether and vinyl ether, halogenated hydrocarbons like chloroform, intravenous anaesthetics-thiopentane sodium and cocaine. Antiseptics and disinfectants–phenols and related compounds, Preservatives and food additives.

Text Books & Reference Books

1. Text Book of pharmaceutical chemistry by Jayashree Ghosh , S.Chand publishers (2010)
2. Pharmaceutical chemistry by Tripathi, Jaypee Publishers, 6th edition (2008)
3. Pharmacology by satoskar, Elsevier Publications (2008).
4. Principles of medicinal chemistry by W.O.Foye, Lippincott Publications (2007)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	6	Sub Code	S6BCP4	Semester	VI	Medium of Instruction	English
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SEMESTER- VI- CORE COURSE -13
MAJOR PRACTICAL- IV
(For the students admitted from 2018 onwards)

Objectives :

To demonstrate the experiments both qualitative and quantitative in clinical samples.

1. Qualitative tests of urine, abnormal constituents – sugar, albumin, acetone, bile salts & bile pigments.
2. Quantitative estimations in urine:
 - a. Sugar.
 - b. Chloride.
 - c. Urea
 - d. Uric acid
 - e. Creatinine
 - f. Creatine.
3. Qualitative estimation in blood
 - a. Glucose
 - b. Cholesterol
 - c. Calcium
 - d. Urea.
 - e. Iron
 - f. Protein
 - g. Uric acid
 - h. Bilirubin
 - i. Determination of SGOT & SGPT.
4. ESR, PVC, TC/DC Count, haemoglobin, content and blood grouping.

Industrial Visit to Various pharmaceutical / food industry/ Educational /Research Institutions.

Signature of HOD

Credits	4	Hrs/week	6	Sub Code	S6BCEL3A	Semester	VI	Medium of Instruction	English
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SEMESTER- VI- MAJOR ELECTIVE- 3 (A)
(For the students admitted from 2018 onwards)

BASIC BIOTECHNOLOGY

Objectives

To understand the history and scope of biotechnology

To learn the plant tissue culture and its applications.

Unit I- History of biotechnology and scope of biotechnology, Recombinant DNA- Construction, restriction endonucleases, cloning vectors, plasmids, phage, cosmid, Ligases, Methods of gene transfer, Isolation & insertion of desired gene, Introduction to host, selection and screening of recombinants, cDNA cloning, southern blotting, western blotting and PCR.

Unit II- Culture of microorganism- solid state fermentation, types of bioreactors, Media preparation, Batch culture, continuous culture, Fed batch culture, stages of downstream processing, Fermentation process- commercial production of amylase, ethanol, citric acid, glutamic acid, riboflavin, fermented foods- cheese, yoghurt.

Unit III- Plant tissue culture, cell culture, callus culture, media preparation . Protoplast culture- isolation , culture, and regeneration of protoplast, Agrobacterium mediated gene transfer,

Applications of plant biotechnology- insect resistant plants, herbicide resistant plants, improvement of crop yield and quality, genetically engineered plants as protein factories.

Unit IV- Animal cell culture, culture media, cell lines, cell and animal cloning, production of peptide hormones, vaccines, antibodies. Human genome project.

Transgenic animals- importance of transgenic animals, gene transfer- retroviral method, microinjection method, Embryonic stem cell method, gene knockout, Dolly. Application of transgenic animals in human welfare and animal husbandary.

Unit V- Waste water and sewage treatment, Biofuels, Biodegradation, bioremediation, microbial mining biomass production and conservation, Biofertilizers. Patent and intellectual property rights, Green house effect and global warming

Text Books & Reference Books

1. Biotechnology by U.Sathyanarayana, Allied Book publications, 2nd edition (2006)
2. Animal Biotechnology by V.Kumaresan, Saras Publications, (2009)
3. Biotechnology by R.C.Dubey, S.Chand Publications (2009)
4. Biotechnology by S.S.Purohit, Saraswati Publishers (2005)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	6	Sub Code	S6BCEL3B	Semester	VI	Medium of Instruction	English
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SEMESTER- VI- MAJOR ELECTIVE COURSE 3 (B)
(For the students admitted from 2018 onwards)

BIOTECHNOLOGY FOR HUMAN WELFARE

Objective:

To understand the biotechnology and its applications for diagnosis of various diseases.

Unit I - Agricultural Biotechnology. Organic farming. Integrated farming, Vermicompost, Crop Improvement.

Unit II

Food & Dairy Biotechnology. Microbes as food, feed. Prebiotics. Probiotics. Algae - SCP, Beta carotene, Fungi as food – Mushroom. Fermented food products.

Unit III

Biotechnology for disease diagnosis. Clinical diagnosis. Lab diagnosis – Microscopy, Macroscopy, Biochemical, serological & Molecular diagnosis of diseases – PCR, RT –PCR, RAPD, RFLP, Karyotyping.

Unit IV

Biotechnology for treatment & prevention of diseases. Treatment – Symptomatic therapy, specific therapy, antimicrobials Prevention – Active immunization, passive immunization, combined immunization, herd immunity.

Unit V

Environmental Biotechnology. Waste management – Solid, liquid, sewage, municipal waste Bioremediation. Bioleaching. Biodegradation.

Text Books & Reference Books

1. D. Balasubramanian, C. F. A. Bryce, K. Dharmalingham, J. Green and K. Jayaraman. 1996. Concepts in Biotechnology. Universities Press.
2. Ashok K. Chauhan. 2009. A Textbook of Molecular Biotechnology. I.K. International Publishing house Pvt. Ltd.
3. Chandrakant Kokate, SS Jalalpure, Pramod H.J. 2011. Textbook of Pharmaceutical Biotechnology. A division of Reed Elsevier India Pvt. Ltd.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	6	Sub Code	S6BCEL3C	Semester	VI	Medium of Instruction	English
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**SEMESTER- VI- MAJOR ELECTIVE COURSE 3 (C)
(For the students admitted from 2018 onwards)**

PUBLIC HEALTH AND HYGIENE

Objective

To understand the public health and health hazards which expose health awareness.

UNIT I

Scope of Public health and Hygiene – nutrition and health – classification of foods – Nutritional deficiency diseases- Vitamin deficiency diseases.

UNIT II

Environment and Health hazards: Environmental degradation – Pollution – Air, Water, Land and Noise-associated health hazards.

UNIT III

Communicable diseases and their preventive and control measures. Measles, Malaria, Hepatitis, Cholera, Filariasis, HIV /AIDS.

UNIT IV

Non-Communicable diseases and their preventive measures. Genetic diseases, Cancer, Cardio vascular diseases, Chronic respiratory disease, Diabetes, Epilepsy,

UNIT V

Health Education in India – WHO Programmes – Government and Voluntary Organizations and their health services – Precautions, First Aid and awareness on epidemic/sporadic diseases.

Text Books & Reference Books

1. Park and Park, 1995: Text Book of Preventive and Social Medicine – Banarsidas Bhanot Publ. Jodhpur – India. Reference
2. Verma, S. 1998 : Medical Zoology, Rastogi publ. – Meerut – India
3. Singh, H.S. and Rastogi, P. 2009 : Parasitology, Rastogi Publ. India.
4. Dubey, R.C and Maheswari, D.K. 2007 : Text Book of Microbiology- S. Chand & Co. Publ. New Delhi – India.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	3	Hrs/week	4	Sub Code	S6BTELO2	Semester	VI	Medium of Instruction	English
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**SEMESTER- VI- NON MAJOR ELECTIVE
(For the students admitted from 2018 onwards)**

PHARMACEUTICAL BIOTECHNOLOGY

Objective

To understand the concept of pharmaceutical biotechnology with its applications

Unit – I – Brief introduction to biotechnology with reference to pharmaceutical science, Enzyme biotechnology- methods of enzyme immobilization and applications, Biosensors- working and applications of biosensors in pharma industry.

Unit II – Study of cloning vectors, Restriction endonuclease and ligase. Recombinant DNA technology, applications of genetic engineering in medicine- interferons production, vaccines- hepatitis B, Hormone – insulin.

Unit – III – Types of Immunity, humoral and cellular , immunoglobulin structure and functions. Hybridoma technology- production of maps, purification and applications .

Unit – IV- Mutation- types of mutation, DNA repair mechanism, Gene therapy- introduction, types , introduction to drug designs, evaluation of drugs.

Unit –V – Fermentation methods – fermentor design and control, study of production of penicillin, vitamin B12, griseofulvin, advantages and disadvantages of pharmaceutical biotechnology

Text book & Reference Books

1. Immunology , Nandhini shetty (2013), An introductory text book, Newage int. publishers
2. Brown TA (2010), Gene cloning and DNA analysis – an introduction , Wiley Blackwell publishers.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

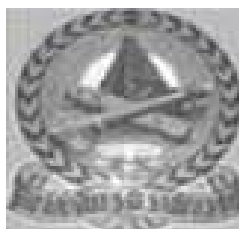
Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

RAJAH SERFOJI GOVT COLLEGE,(AUTONOMOUS)

THANJAVUR –613 005

(Reaccredited with “A”Grade by NAAC)



AFFILIATED TO BHARATHIDASAN UNIVERSITY ,

TRICHIRAPPALLI –24



DEPARTMENT OF BIOCHEMISTRY

SYLLABUS (NON MAJOR ELECTIVES & ALLIED PAPERS)

(For the students admitted from 2018–2019 onwards)

Credits	4	Hrs/week	4	Sub Code	S3ABC1	Semester	III	Medium of Instruction	English
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Allied I – GENERAL BIOCHEMISTRY

Objective

To know about the basic biomolecules and its functions in our body.

UNIT – I : CARBOHYDRATES

Definition, classification of carbohydrates, sources, chemistry and biological functions of monosaccharides, disaccharides and polysaccharides.

UNIT –II PROTEINS

Definition, biological functions of proteins, classification of amino acids, chemical reactions of amino acids, classification and properties of proteins.

UNIT –III- LIPIDS

Classification of lipids, properties of lipids and fatty acids, saturated and unsaturated fatty acids, structure and functions of phospholipids, cholesterol and bile acids.

UNIT – IV – NUCLEIC ACIDS

Purines and pyrimidines, structure and biological functions of DNA and RNA. Properties of DNA and RNA.

UNIT – V – VITAMINS

Definition, chemistry, sources, daily allowances, functions and deficiency diseases of fat soluble vitamins (Vitamin A, D, K and E) and Water soluble vitamins (Vitamin B & C)

Text books & Reference Books :

1. Text Book of Biochemistry – A.C.Deb.
2. Text Book of Biochemistry – Lehinger.
3. Text Book of Biochemistry – Ambika shanmugam.

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	4	Sub Code	S4ABC2	Semester	IV	Medium of Instruction	English
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Allied 2 – BIOCHEMISTRY II

Objective

To know about the basic biochemical techniques and its applications.

UNIT – I

pH meter- pH scale, Henderson- Hasslbath equation, Buffer solutions, Buffer systems of blood – Hb, Protein and Phosphate Buffer systems.

UNIT – II

Chromatography- Principle, materials, methods & Applications of paper chromatography, TLC ion exchange , affinity chromatography and Gel filtration chromatography.

UNIT – III

Electrophoresis- Principles, instrumentation and applications of paper electrophoresis, agar gel, starch gel, SDS PAGE , immuno electrophoresis.

UNIT IV

Principle, instrumentation and application of colorimetry, Spectrophotometry, Fluorimetry and Flame photometry.

UNIT V

Tracer and other techniques – radioactive decay, unit of radioactivity , GM Counter, scintillation counter, applications of radio isotopes in biological and medical sciences

Text books and Reference books

1. Instrumental methods of chemical analysis by Sharma B.K
2. Instrumental method of chemical analysis by Kudesia V.P, Sawhaney H
3. An introduction to practical biochemistry by David T.Palmer.

\Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	4	Hrs/week	3	Sub Code	S4ABCP	Semester	IV	Medium of Instruction	English
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ALLIED PRACTICAL

BIOCHEMISTRY PRACTICAL

QUALITATIVE ANALYSIS

1. Qualitative analysis of monosaccharides (Glucose, Fructose, galactose)
2. Qualitative analysis of disaccharides (Lactose and Sucrose)
3. Qualitative analysis of polysaccharides (Starch)
4. Qualitative analysis of amino acids.

DEMONSTRATION EXPERIMENTS

1. Preparation of buffers and its pH measurements using pH meter.
2. Separation of amino acids by Circular paper chromatography

Text Books and Reference books

1. Practical Biochemistry By Varley.
2. Practical Manual by Jeyaraman,
3. Biochemical methods by Sadasivam

Question paper pattern

Internal – 40 marks, external – 60 marks

Major Experiment – 30, Minor experiment 20, Record -10

Signature of HOD

Credits	3	Hrs/week	4	Sub Code	S5BCELO1	Semester	V	Medium of Instruction	English
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SEMESTER – V-NON MAJOR ELECTIVE
(For the students admitted from 2018 onwards)

HEALTH SCIENCE & HEALTH EDUCATION
(For B.Sc Statistics)

Objective

To understand the basics in nutrition and health education

UNIT – I- Introduction to Nutrition –Definition, General introduction, Classification of nutrients, Functions of food, social function of food, psychological functions of food. Fruits and vegetables for good health. Energy - Definition of Kilocalories, Joule, energy value of foods, basal metabolic rate (BMR).

UNIT II- Definition , Source, and biological functions of carbohydrates, proteins, and lipids. Vitamins - Source , functions and deficiency diseases of vitamin A, D, C , folic acid. Recommended Dietary allowance (RDA)- Protein energy malnutrition- Marasmus, Kwashiorkor.

UNIT III- Food preservation-general principles and methods. Preservation by addition of sugar. General principles and methods of preparation of jams, jellies , theory of gel formation. Preservation by addition of salt- Pickling. Preparation of Indian Pickles, Food adulteration. Guide lines for good health.

UNIT IV- Life Style Changes - Urbanization, Westernization, Work style, Food habits and Food behavior changes, drug addiction and harmful effects .Weight related disorders - Underweight-Etiology, assessment, dietary management, Role of dietary fibre and health.

UNIT V- Health education – Definition, importance of health education, Personal hygiene. Physical education – Meaning & scope, role of exercises and yoga in improving health. Health insurance scheme (Government & Non Government) – Mediclaim Policy, Employee State Insurance Scheme, Specialised Insurance Scheme. National Nutrition Policy and Progress- World health Organization (WHO), UNICEF and its functions,

Text books & Reference Books

1. Nutrition and Dietetics by Shubhagini, Tata Mc Graw Publishers, 3rd edition, (2010)
2. Human Nutrition by B.Srilakshmi, New Age Publishers, 2nd edition (2008)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD

Credits	3	Hrs/week	4	Sub Code	S6BCELO2	Semester	VI	Medium of Instruction	English
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**SEMESTER – VI-NON MAJOR ELECTIVE
(For the students admitted from 2018 onwards)**

**NUTRITION & HEALTH SCIENCE
(For B.Sc Biotechnology)**

Objective

To understand the basics in nutrition and health education

UNIT – I- Introduction to Nutrition –Definition, General introduction, Classification of nutrients, Functions of food, social function of food, psychological functions of food. Fruits and vegetables for good health. Energy - Definition of Kilocalories, Joule, energy value of foods, basal metabolic rate (BMR).

UNIT II- Definition , Source, and biological functions of carbohydrates, proteins, and lipids. Vitamins - Source , functions and deficiency diseases of vitamin A, D, C , folic acid. Recommended Dietary allowance (RDA)- Protein energy malnutrition- Marasmus, Kwashiorkor.

UNIT III- Food preservation-general principles and methods. Preservation by addition of sugar. General principles and methods of preparation of jams, jellies , theory of gel formation. Preservation by addition of salt- Pickling. Preparation of Indian Pickles, Food adulteration. Guide lines for good health.

UNIT IV- Life Style Changes - Urbanization, Westernization, Work style, Food habits and Food behavior changes, drug addiction and harmful effects .Weight related disorders - Underweight-Etiology, assessment, dietary management, Role of dietary fibre and health.

UNIT V- Health education – Definition, importance of health education, Personal hygiene. Physical education – Meaning & scope, role of exercises and yoga in improving health. Health insurance scheme (Government & non Government) – Medclaim Policy, Employee State Insurance Scheme, Specialised Insurance Scheme.National Nutrition Policy and Progress- World health Organization (WHO),UNICEF and its functions,

Text books & Reference Books

- Nutrition and Dietetics by Shubhagini, Tata Mc Graw Publishers, 3rd edition, (2010)
- Human Nutrition by B.Srilakshmi, New Age Publishers, 2nd edition (2008)

Question paper pattern

Max Marks: 75

Exam duration : 3 hours

Part A 10 x 2 = 20 Answer all questions (Two Questions from each unit)

Part B 5 x 5 = 25 Answer all questions (either or type two questions from each unit)

Part C 3 x 10 = 30 Answer any Three questions (one question from each unit)

Signature of HOD