

THIRUVALLUVAR UNIVERSITY

BACHELOR OF SCIENCE B.Sc. NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS UNDER CBCS

(With effect from 2020 - 2021)

Programme Specific Outcomes

1. Understand the importance of foods and nutrition in promotion of health and prevention of diseases
2. Learn the skill based education to apply in food industries
3. Gain knowledge to pursue higher education and research in academic and research institutions
4. Promote career opportunities in personal and corporate life
5. Enable to become Entrepreneurs in the field of Food and Nutrition

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3	III	Core Theory	Paper-1	6	4	Food Microbiology	25	75	100
4	III	Core Practical	Practical-1	4	0	Food Microbiology	0	0	0
5	III	Allied -1	Paper-1	4	3	Chemistry I	25	75	100
6	III	Allied- 1	Practical-1	2	0	Chemistry	0	0	0
7	III	PE	Paper 1	6	3	Professional English I	25	75	100
8	IV	Environmental Studies		2	2	Environmental studies	25	75	100
Sem. Total				36	20		150	450	600
SEMESTER II									
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10	III	Core Theory	Paper-2	5	4	Human Physiology	25	75	100
11	III	Core Practical	Practical-1	3	2	A. Food Microbiology B. Human Physiology	25	75	100
12	III	Allied-1	Paper-2	4	3	Chemistry II	25	75	100
13	III	Allied Practical - 1	Practical-1	2	2	Chemistry Practical	25	75	100
14	III	PE	Paper 1	6	3	Professional English II	25	75	100
15	IV	Value Education		2	2	Value Education	25	75	100
16	IV	Soft Skill		2	1	Soft Skill	25	75	100
Sem. Total				36	25		225	675	900

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BACHELOR OF SCIENCE
B.Sc. NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS
DEGREE COURSE-CBCS PATTERN
(With effect from 2020-2021)

SEMESTER I
CORE PAPER 1
FOOD MICROBIOLOGY

OBJECTIVES

To enable the students to:

- Understand the role of microorganisms in human welfare.
- Learn the principles of food preservation.
- Gain knowledge to destruct the various micro-organisms.
- Obtain knowledge on morphology of the micro-organisms
- Compare and contrast the micro biology of food poisoning, food infection and food borne diseases.

UNIT-I

1. Introduction to Microbiology and its relevance to everyday life
2. General Characteristics, Morphology, Reproduction and function of Bacteria, Viruses, Yeast, Molds, Protozoa and Algae.
3. Economic importance of Molds, Yeast and Bacteria.

UNIT-II

1. Use of high and low temperature. Canning of fruits and vegetables.
2. Preservation by drying, use of chemicals in food preservation. Part played by antibiotics in the preservation of fleshy foods.
3. Application of Dry heat, burning, flaming and hot air oven.
4. Application of moist heat, boiling, pasteurization -Advantages involved in
5. Pasteurization, methods – holder, flash. Steam sterilizers and autoclave.
6. Sterilization with the use of filters.

UNIT-III

1. Importance of microbes in food biotechnology, genetically engineered organisms, probiotics and single cell proteins.
2. Fermentation: Aerobic and Anaerobic respiration. Products of Fermentation- brief knowledge on the preparation of Bread, Malt beverages, Wine, Distil liquor, Vinegar, Fermented Vegetables and Dairy products.

UNIT-IV

1. Principles of food spoilage by microbiological, physical and biological factors - Causes of spoilage – Classification of foods based on spoilage ,chemical changes caused by microorganisms.
2. Contamination, preservation and spoilage of cereal and cereal products, baked products, Fruits and vegetables and their products, Fleshy foods, Milk and Milk products, Egg and Egg Products and Fats and oils.

UNIT-V

1. Microbial food poisoning by Staphylococci, Salmonella and clostridium botulinum (Botulism). Measures to prevent microbial food poisoning.
2. Public health hazards due to contaminated foods - Food borne Infections and Food intoxication symptoms, mode of transmission and methods of prevention of Dysentery diarrhea, Typhoid, Cholera.

COURSE OUTCOME

1. Know the different types and morphology of microorganisms
2. Understand various specialized techniques in food processing and preservation
3. Acquainted with various sterilization techniques
4. Able to preserve the non-perishable foods from microbial contamination and spoilage
5. Able to differentiate food poisoning and food borne infections

REFERENCES

1. Adams, MR and Moss, MO (2005) Food Microbiology, New Age International (P) Ltd., New Delhi.
2. Jay M.J (2005) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi.
3. Tamine, A (2005) Probiotic Dairy Products, Blackwell Publishing, USA.
4. Cappuccino G.J and Sherman, N (2008) Microbiology – A Laboratory Manual, Pearson Education Publishers, USA,.
5. Ramesh, K.V (2007) Food Microbiology, MJP Publishers, Chennai.
6. Frazier, W.C, Food Microbiology, McGraw Hill Publications, New York, 4th Edition, 1998.
7. Pelczar, H.J. And Rober. D, Microbiology, McGraw Hill Publication, New York, 10th Edition, 1998.

**ALLIED 1
PAPER - 1**

CHEMISTRY – I

OBJECTIVE:

- Basic knowledge on Metallurgy, Cycloalkanes, Polarising Effects, Stereochemistry, Chemical Kinetics, Catalysis, Photochemistry, VSEPR Theory, Fuels, Osmosis, Nuclear Chemistry, Petroleum Chemistry, Chemistry of Naphthalene, Conductors and Applications wherever necessary are to be taught for I- Semester.

UNIT – I

1.1 General Metallurgy - Extraction of Metals - Minerals and Ores- Difference between Minerals and Ores – Minerals of Iron, Aluminum and Copper - Ore Dressing or Concentration of Ores - Types of Ore Dressing- Froth Floatation process, Gravity separation and Magnetic separation.

1.2 Calcination, Smelting, Roasting, Flux, Slag - Definition - Reduction methods - Goldschmidt Aluminothermic process and Carbon Reduction method - Refining of Metals - Electrolytic, Van Arkel and Zone Refining.

1.3 Ores of Titanium and Cobalt - Extraction of Titanium and Cobalt.

UNIT – II

1. Cycloalkanes - Preparation – Wurtz reaction and Dieckmann's condensation - Properties of Cycloalkanes – Substitution and Ring opening reactions.

2.2 Polarisation - Inductive effect, Mesomeric effect and Steric effect (Acid and Base Strength).

2.3 Stereoisomerism – Types - Cause of Optical Activity – Enantiomers - Diastereomers - Meso form - Optical Activity of Lactic acid and Tartaric acid - Racemisation and Resolution – Definition and Methods - Geometrical isomerism – Definition and example - Maleic and Fumaric acid – Differences.

UNIT – III

3.1 Chemical Kinetics – Rate of a reaction – Definition of Order and Molecularity – Distinction between Order and Molecularity - Derivation of First order rate equation - Half Life Period of first order reaction.

3.2 Catalysis - Catalyst - Autocatalyst - Enzyme catalyst - Promoters - Catalytic poisons – Active Centre - Differences between Homogeneous and Heterogeneous Catalysis - Industrial Applications of Catalysts.

3.3 Photochemistry – Grothus-Draper's law – Stark-Einstein's law - Quantum yield – Photosynthesis - Phosphorescence – Fluorescence.

UNIT – IV

4.1 VSEPR Theory – Hybridisation and Shapes of simple molecules BF_3 , PCl_5 , SF_6 and XeF_6 .

4.2 Fuels – Classification of Fuels - Calorific value of Fuels – Water gas, Carbureted Water gas and Producer gas – Composition and Uses - Non-Conventional fuels - Need of Solar Energy - Applications - Biofuels – Oil gas, Natural gas and LPG – Uses.

4.3 Osmosis - Osmotic pressure - Reverse osmosis – Definition - Desalination of Sea water.

UNIT – V

5.1 Nuclear Chemistry – Atomic number, Mass number - Isotopes, Isobars and Isotones – Definition and Examples - Definition of Half life period - Nuclear Binding Energy, Mass Defect and N/P ratio - Nuclear Fission and Nuclear Fusion (Elementary idea) - Applications of Radioisotopes in Medicine, Agriculture and Industries – Carbon Dating.

5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking

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Naphthalene – Preparation – Haworth’s method – Properties – Oxidation, Reduction and Uses of Naphthalene - Structure of Naphthalene (Structural elucidation not necessary).

5.3 Conductors, Insulators, Semiconductors, N- and P- Type Semiconductors – Definitions and Examples.

SEMESTER II
CORE PAPER 2
HUMAN PHYSIOLOGY

OBJECTIVES

To enable the students to

- Understand the structure and basic physiology of various organs of the body
- Identify the blood grouping.
- Gain the skill to record blood pressure and ECG.
- Understand the Anatomy and Physiology of various systems
- Determine the Heart beat and Cardiac Cycle.

UNIT-I

1. Introduction to the cell – Structure and function of a typical cell, cell division - Mitosis and Meiosis.
2. Tissues - classification, structure and function of epithelial, muscular, connective and nervous tissues.

UNIT-II

1. Blood: Blood composition and function, plasma proteins, distribution functions. Cell components: RBC and WBC -, function, normal count; Blood coagulation, Erythropoiesis, blood grouping. ABO system and RH system
2. Heart and circulation: Structure of the heart and blood vessels, origin and conduction of heart beat, cardiac cycle, ECG, blood pressure – definition and factors affecting it.

UNIT-III

1. Respiratory system: Structure of pharynx, larynx, trachea, bronchi, lung and lung cavities. Physiology of respiration- Mechanism of respiration, gaseous exchange in the lungs.
2. Excretory system: Structure and function of kidney and Nephron, urine formation, micturition.

UNIT-IV

1. Structure and function – Secretory Digestive and absorptive functions. Role of Liver, Pancreas and Gall bladder.
2. Neuron structure and functions, Structure of Brain and Spinal cord

UNIT-V

1. Autonomic nervous system – sympathetic and parasympathetic.
2. Structure, Functions and Disorders of Endocrine Glands – Pituitary, Thyroid,

Parathyroid, Adrenal and Islets of Langerhans.

COURSE OUTCOME

1. Able to analyze hematological parameters and blood pressure
2. Understand the relationship between a cell's structure and its function
3. Relate the structure with functions of the tissues and organs
4. Comprehend the structure and functions of the various organ systems of the body
5. Recognize the clinical symptoms of nutritional deficiencies based on anatomical considerations

REFERENCES

1. Gary.A Thibodeau and Kelvin. T.Patlon, Anthony's Text Book of Anatomy And Physiology, Seventeenth edition, Mosby Publications, Indiana Print, 2004.
2. Anne Waugh and Allison Grant Ross and Wilson Anatomy And Physiology In Health and Illness Elsevier Publication, Ninth Edition, 2005.
3. Guyton, A.C, Text Book of Medical Physiology, 4th Edition, W.B. Saunders Co. Philadelphia, 1996.
4. Chaudhri, S.K. Concise Medical physiology, New Central Book Agency, Calcutta, 1988.
5. Best, C.H & Taylor, N.B. The Living Body, Asia publishing House, B. Mumbai, 1964.
6. Vander, A.J; Sherman, J.H and Luciano, D.S. Human physiology - The Mechanisms of Body functions, TMH Publishing Co. Ltd., Delhi, 1990.

CORE PRACTICAL -I

FOOD MICROBIOLOGY & HUMAN PHYSIOLOGY

Objectives

Enable to gain knowledge related to

- Microscope and its uses
- Identify the yeast, molds, protozoa and bacteria.
- Identify the tissues and Endocrine glands
- Outline the anatomy of major organs

A. FOOD MICROBIOLOGY

1. Microscope and its use.
2. Examination of Yeast, molds, Protozoa and Bacteria.
3. Examination of wet methods and hanging drop preparations.
4. Examination of stained organisms- Simple Staining and gram staining method.

B. HUMAN PHYSIOLOGY

1. Microscopic study of
 - a. Tissues - Epithelial, connective, muscular and nervous tissue
 - b. Endocrine Glands – Thyroid, Pituitary, Adrenal and Pancreas.
2. Study of anatomy of Heart, Brain, Kidney

Course Outcomes

After having this Practical, students are enabling to have knowledge in

- Understand the structure and functions of various Organ systems
- Comprehend the mechanisms of action of organs
- Relate the physiology of the human body with food and nutrition requirements

REFERENCES

1. Guyton, A.C, Text Book of Medical Physiology, 4th Edition, W.B. Saunders Co. Philadelphia, 1996.
2. Chaudhri, S.K. Concise Medical physiology, New Central Book Agency, Calcutta, 1988.
3. Best, C.H & Taylor, N.B. The Living Body, Asia publishing House, B. Mumbai, 1964.
4. Vander, A.J; Sherman, J.H and Luciano, D.S. Human physiology - The Mechanisms of Body functions, TMH Publishing Co. Ltd., Delhi, 1990.

**ALLIED 1
PAPER – 2
CHEMISTRY – II**

OBJECTIVE:

- Basic knowledge on Coordination Chemistry, Industrial Chemistry, Carbohydrates, Aminoacids, Proteins, Electrochemistry, Paints and Pigments, dyes, Vitamins, Medicinal Chemistry, Corrosion and Applications wherever necessary are to be taught for II- semester.

UNIT – I

1.1 Coordination Chemistry - Nomenclature of Coordination Compounds - Ligands, Central Metal Ion and Complex Ion – Definition and Examples – Coordination Number - Werner’s Theory of Coordination Compounds - Chelates - Functions and Structure of Haemoglobin and Chlorophyll.

1.2 Industrial Chemistry - Fertilisers and Manures – Biofertilisers - Organic Manures and their importance - Role of NPK in plants - Preparation and Uses of Urea, Ammonium Nitrate, Potassium Nitrite and Super Phosphate of Lime.

1.3 Contents in Match Sticks and Match Box - Industrial making of Safety Matches – Preparation and Uses of Chloroform, DDT, Gammexane and Freons.

UNIT – II

2.1 Carbohydrates - Definition and Examples - Classification – Oxidation and Reduction Reactions of Glucose - Structure of Glucose (Structural elucidation not necessary) - Uses of Starch - Uses of Cellulose Nitrate and Cellulose Acetate.

2.2 Amino Acids – Definition and Examples - Classification of Amino Acids - Preparation - Gabriel Phthalimide Synthesis – Properties – zwitterion and Isoelectric point - Structure of Glycine.

2.3 Proteins – Definition - Classification of Proteins based on Physical properties and Biological functions - Primary and Secondary Structure of Proteins (Elementary Treatment only) – Composition of RNA and DNA and their Biological role - Tanning of Leather - Alum (Aluminum chloride tanning) - Vegetable tanning – Chrome Tanning.

UNIT – III

3.1 Electrochemistry - Electrolytes – Definition and Examples – Classification - Specific and Equivalent Conductance - their determination – Variation of Specific and Equivalent conductance with Dilution – Ostwald’s Dilution Law and its Limitations.

3.2 Kohlrausch's Law - Determination of Dissociation Constant of weak Electrolytes using Conductance measurement - Conductometric titrations.

3.3 pH – Definition and pH determination by indicator method - Buffer solutions - Buffer action - Importance of buffers in the living systems.

UNIT – IV

4.1 Paints - Components of Paint – Requisites of a Good Paint - Pigments – Classification of Pigments on the basis of Colour – Examples - Dyes – Definition – Chromophores and Auxochromes – Examples - Colour and Dyes - Classification based on Constitution and Application – Examples.

4.2 Vitamins – Definition – Classification – Water Soluble and Fat Soluble – Occurrence - Biological Activities and Deficiency Diseases caused by Vitamin A, B, C, D, E and K - Hormones – Definition and Examples – Biological Functions of Insulin and Adrenaline.

4.3 Chromatography - Principles and Applications of Column and Paper chromatography- R_f value.

UNIT – V

5.1 Drugs - Sulpha Drugs – Preparation and Uses of Sulphapyridine and Sulphadiazine - Mode of Action of Sulpha Drugs - Antibiotics - Uses of Penicillin, Chloramphenicol and Streptomycin - Drug Abuse and Their Implication - Alcohol – LSD.

5.2 Anaesthetics - General and Local Anaesthetics - Antiseptics - Examples and their Applications - Definition and One Example each for Analgesics, Antipyretics, Tranquilizers, Sedatives - Causes, Symptoms and Treatment of Diabetes, Cancer and AIDS.

5.2 Electrochemical Corrosion and its Prevention – Electroplating – Applications.

ALLIED PRACTICAL

CHEMISTRY

VOLUMETRIC ANALYSIS

1. Estimation of HCl – Standard sulphuric acid.
2. Estimation of Borax - Standard Sodium Carbonate.
3. Estimation of NaOH – Standard Oxalic Acid.
4. Estimation of FeSO₄ – Standard FAS.
5. Estimation of Oxalic acid – Standard FeSO₄.
6. Estimation of FAS – Standard Oxalic Acid.
7. Estimation of Oxalic acid – Standard Oxalic Acid.
8. Estimation of Fe²⁺ using Diphenylamine / N- Phenyl Anthranilic acid as indicator.

ORGANIC ANALYSIS

Systematic Analysis of Organic Compounds containing One Functional Group and Characterisation by Confirmatory Tests.

Reactions of Aromatic Aldehyde, Carbohydrates, Mono and Dicarboxylic acids,
Phenol, Aromatic Primary Amine, Amide and Diamide.

REFERENCE BOOKS

- ❖ Inorganic Chemistry - P. L. Soni - Sultan Chand (2006).
- ❖ Inorganic Chemistry - B. R. Puri, L. R. Sharma and K. C. Kallia – Milestone Publications (2013).
- ❖ Selected Topics in Inorganic Chemistry - W. U. Malik, G. D. Tuli and R. D. Madan - S. Chand Publications (2008).
- ❖ Text Book of Inorganic Chemistry – R. Gopalan, Universities Press – 2012.
- ❖ Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
- ❖ Advanced Organic Chemistry - Bahl and Arun Bahl - Sultan Chand and Co. Ltd – 2012.
- ❖ Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.
- ❖ A Text Book of Organic Chemistry K. S. Tewari, N. K. Vishol, S. N. Mehrotra-Vikas Publishing House – 2011.
- ❖ Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishal Publishing Company – 2013.
- ❖ Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N. Dash - Sultan Chand & Co – 2006.
- ❖ Understanding Chemistry – C. N. R. Rao, Universities Press – 2011.