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**ST. TERESA'S COLLEGE, ERNAKULAM**  
**(AUTONOMOUS)**

**Affiliated to Mahatma Gandhi University, Kottayam**



**CURRICULUM FOR**  
**B.Sc NUTRITION AND DIETETICS**

Under Choice Based Credit & Semester System  
& Outcome Based Education  
(2018 Admissions)

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## **BND - B.Sc. NUTRITION AND DIETETICS**

### **PROGRAM SPECIFIC OUTCOMES**

**PSO1:** Review various cultures, regions, ethnicities and cuisines with respect to food and develop a culture to reduce leftovers

**PSO2:** Identify the fundamentals of nutrition, dietetics and food microbiology to promote health and administer healthy eating principles throughout the community and the nation

**PSO3:** Apply the principles and theoretical knowledge in nutrition, dietetics, biochemistry and physiology through practical courses and internships

**PSO4:** Paraphrase the physiology of the body and science of nutrients and its biochemical effect on the body

**PSO5:** Develop basic communication skills, entrepreneurial skills and research in the field of nutrition and dietetics

### **SEMESTER I**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Course Type</b>
EN1A01B18	Fine – Tune Your English	4	Common Course I
ND1C01B20	Fundamentals of Biochemistry	3	Complementary Course I
ND1C02B20	Human Anatomy and Physiology I	3	Complementary Course II
ND1B01B20	Principles of Nutrition	4	Core Course
ND1B02B20	Food Science	4	Core Course
ND1BP01B20	Food Science Practical	2	Core Course Practical

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**SEMESTER I**

**COMMON COURSE I**

**EN1A01B18– FINE-TUNE YOUR ENGLISH**

**Credits: 4**

**Total Lecture Hours: 90**

**Course Outcomes:**

**CO1.** Recognize the basics of English grammar

**CO2.** Choose the appropriate word classes

**CO3.** Identify common errors in the use of English language in various contexts

**CO4.** Apply the rules of grammar to comprehend, speak, and write grammatically correct English

**CO5.** Develop skill for business communication

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	2	1	2	2	2
<b>CO2</b>	.1	1	2	2	2
<b>CO3</b>	1	1	1	1	2
<b>CO4</b>	2	1	1	1	3
<b>CO5</b>	1	2	2	1	3

## **Syllabus Content**

### **Module I (18 Hours)**

#### **The Sentence and its Structure**

How to Write Effective Sentences – Phrases:What are They? – The Noun Clauses – The Adverb Clause – “If All the Trees Were Bread and Cheese” – The Relative Clause – How Clauses are Conjoined

### **Module II (18 Hours)**

#### **Word-Classes and Related Topics**

Understanding the Verb – Understanding Auxiliary Verbs – Understanding Adverbs – Understanding Pronouns – The Reflexive Pronoun – The Articles I – The Articles II – The Adjective – Phrasal Verbs – Mind your Prepositions

### **Module III (18 Hours)**

#### **To Err is Human**

Concord – Errors – Common and Uncommon

#### **Spelling and Pronunciation**

Pronunciation: Some Tips – More Tips on Pronunciation – An awesome Mess? – Spelling Part II

### **Module IV (18 Hours)**

#### **Tense and Related Topics**

‘Presentness’ and Present Tenses – The ‘Presentness’ of a Past Action – Futurity in English – Passivation

#### **Interrogatives and Negatives**

Negatives – How to Frame Questions – What’s What? – The Question Tag

### **Module V (18 Hours)**

#### **Conversational English**

Some time expressions – Is John There Please?

#### **Miscellaneous and General Topics**

Reading

Letter Writing **In addition there will be an essay question on a general topic.EMESTER I**

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**COMPLEMENTARY COURSE I**

**ND1CO1B20 - FUNDAMENTALS OF BIOCHEMISTRY**

**Credits: 3**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Discuss the basics of biochemistry and molecular aspects of transport

**CO2:** Identify the energy currency of the cell, the chemical messengers and its utilisation

**CO3:** Interpret various biomolecular compounds related to genetics

**CO4:** Explain on classification, biosynthesis and mechanism of action of prostaglandins and enzymes

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	1	2	3	1
<b>CO2</b>	1	2	1	3	1
<b>CO3</b>	1	1	2	3	1
<b>CO4</b>	1	2	1	3	1

**Syllabus Content:**

**Module I**

**(18 Hours)**

Introduction to Biochemistry: Definition, Scope of biochemistry, Concept of equilibrium - Acids and bases, buffers, molarity, molality, normality, equilibrium, viscosity, surface tension, adsorption, acidosis, alkalosis.

Molecular aspect of transport: Passive diffusion, facilitated diffusion, active transport - sodium potassium pump. Endocytosis and exocytosis.

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**Module II**

**(18 Hours)**

Biological Oxidation: High energy compounds, Electron transport chain, ATP synthesis, ATP as currency of energy, substrate level phosphorylation, non-oxidative phosphorylation, oxidative phosphorylation - mechanism, inhibitors involved in oxidative phosphorylation, OR-potential.

**Module III**

**(18 Hours)**

Nucleic acids: Composition, functions, classification and structure of DNA and RNA. Nucleotide synthesis, DNA replication, Enzymes involved in DNA replication, DNA repair, Recombinant DNA technology, Protein synthesis, Genetic code, Gene mapping, Gene expression, operon concept, Lac, genotype and phenotype, epigenetics, Alleles, Epistasis.

**Module IV**

**(18 Hours)**

Prostaglandins: Introduction, chemical nature, classification, biosynthesis, biological effects, clinical significance and therapeutic uses of prostaglandins.

Enzymes - Definition, classification, Apoenzymes, Coenzymes, Holoenzymes, Isoenzymes. Mechanism of action, properties, enzyme activity, factors affecting enzyme activity, enzyme kinetics, ping-pong mechanism, Enzyme inhibition. Diagnostic value of serum enzymes.

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**SEMESTER I**

**COMPLEMENTARY COURSE II**

**ND1C02B20 - HUMAN ANATOMY AND PHYSIOLOGY I**

**Credits: 3**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Discuss the general structure and functions of various components of human body

**CO2:** Explain on homeostasis and acid base balance

**CO3:** Explain the digestive system and its mechanism in the body

**CO4:** Describe the basics in physiology and functioning of the excretory system and its byproduct

**Mapping of Course Outcomes with Program Specific Outcomes**

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	1	2	2	2	1
<b>CO2</b>	1	2	2	3	1
<b>CO3</b>	1	2	1	3	1
<b>CO4</b>	1	2	2	3	1

**Syllabus Content:**

**Module I**

**(18 Hours)**

Composition of the human body: Cell, cell organelles, tissues, organs, organ systems: digestive, excretory, respiratory, nervous, endocrine, circulatory, muscular, skeletal and reproductive systems. Cell junctions, Cell signaling, body fluids: ECF and ICF

**Module II**

**(18 Hours)**

Homeostasis and acid base balance: Organ systems in homeostasis, components, mechanism - feedback signals, regulation of acid-base balance. Disturbances of acid- base balance- acidosis and alkalosis.

**Module III**

**(18 Hours)**

Digestive System: Structure and function of mouth pharynx, esophagus, stomach, intestine and intestinal villi. Digestive glands- salivary glands, gastric glands, liver, pancreas, gall bladder and intestinal glands. Hunger and thirst mechanism. Mechanism of digestion and absorption, defecation, Movements of GI tract and Gastro-intestinal reflexes.

**Module IV**

**(18 Hours)**

Excretory system: structure and functions of kidney and nephron. Stages of urine formation, GFR, factors affecting GFR, composition of normal urine, abnormal constituents of urine, micturition. Factors affecting urine formation and urine volume, counter current mechanism.



**SEMESTER I**

**CORE COURSE**

**ND1B01B20 - PRINCIPLES OF NUTRITION**

**Credits: 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Discuss on nutritional science, food groups and RDA

**CO2:** Explain the concepts of energy, energy balance, total energy expenditure, BMR and factors affecting

**CO3:** Describe about the major nutrient carbohydrate and its physiological role in the body

**CO4:** Identify the key nutrient protein and indicate the importance of dietary sources and protein quality of food.

**CO5:** Recall the role of fat and list the importance of dietary sources relevant to human health.

**CO6:** Discuss on vitamins and minerals with regard to functions, deficiency and toxicity and the importance of water as a nutrient in maintaining homeostasis and its role in human body

**Mapping of Course Outcomes with Program Specific Outcomes**

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	1	3	1	1	2
<b>CO2</b>	1	3	2	1	2
<b>CO3</b>	1	3	2	3	1
<b>CO4</b>	1	3	2	3	1
<b>CO5</b>	1	2	2	2	1
<b>CO6</b>	1	3	2	3	1

**Syllabus Content:**

**Module -I (12 Hours)**

**Introduction to Nutrition science:** Basic concepts in food and nutrition, Basic terms used in study of food and nutrition Understanding relationship between food, nutrition and health, Functions of food-Physiological, psychological and social

**Food guide – Basic five food groups:** Cereals and grains, pulses and legumes, milk and meat products, Fruits and vegetables, Fats and sugars. Definition of RDA and DRA, factors affecting RDA and uses of RDA. Principles and need of menu planning

**Module-II (10 Hours)**

**Energy:** Concept of energy and its balance, basal metabolism, BMR affecting factors, Requirement determination, Energy sources. Total energy expenditure determination and the components

**Module -III (10 Hours)**

**Carbohydrate:** Introduction, functions, classification, sources, RDA, Types of Fibres – crude fibre and dietary fibres – soluble and insoluble, Functions of dietary fibre, recommended intake for different age groups

**Module -IV (10 Hours)**

**Proteins:** Introduction, composition, classification, RDA, functions, food sources, essential and non-essential amino acids, protein deficiency and excess, protein quality

**Module - V (10 Hours)**

**Fat:** Introduction- Lipids, Fats and oils, Composition, Classification, RDA, food sources, essential and non-essential fatty acids- deficiency.

**Module-VI (10 Hours)**

**Water:** Water as nutrient, components of body fluids, function. Dehydration, requirements, structure, water balance, moisture in food: hydrogen bonding, bound water, free water, water activity and food stability.

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**Module -VII**

**(10 Hours)**

**Vitamins:** Introduction of vitamins. Classification, water soluble vitamins (Vit-B1, B2, B3, B5, B6, B7, B9, B12 & Vitamin -C). Fat soluble vitamins (Vitamin -A,D,E and K).Function, RDA, food sources. Deficiency and toxicity of vitamins.

**Minerals:** Macro minerals – Calcium, Phosphorus, Magnesium, Sodium, Potassium and Chloride. Microminerals – Iron, Zinc, Iodine, Fluorine. Functions of macro and micro minerals, food sources, RDA, deficiency and toxicity.

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**SEMESTER I**  
**CORE COURSE**  
**ND1B02B20 - FOOD SCIENCE**

**Credits: 4**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Summarise on food, food groups and various cooking methods

**CO2:** Explain the nutritive value and properties of cereals and pulses

**CO3:** Discuss on composition and nutritive value of milk and various milk products

**CO4:** Describe composition, nutritive value, changes during storage and role in cookery of egg, fish and flesh foods

**CO5:** Distinguish between fruits and vegetables, its composition, nutritive value and effect of cooking

**CO6:** Discuss the types, properties, nutritive value, properties and changes in cooking of sugars, fats, oils and beverages including processing of coffee, cocoa

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	3	2	1	2
<b>CO2</b>	1	3	2	1	2
<b>CO3</b>	1	3	2	1	1
<b>CO4</b>	1	3	2	1	1
<b>CO5</b>	1	3	2	2	1
<b>CO6U</b>	2	3	2	3	1

**Syllabus Content:**

**Module -I (10 Hours)**

**Introduction to foods-** Definition, functions, food guide pyramid, Eat well plate. Introduction to cooking: preliminary preparation and cooking. Mechanism of cooking, different cooking methods, merits and demerits, Pressure cooking, Solar cooking and Microwave cooking.

**Module-II (10 Hours)**

**Cereals and millets-** structure, composition, nutritive value. Effect of cooking. Types of cereals: breakfast cereals, ready to eat, ready to cook forms.

**Pulses and legumes-** structure, composition and nutritive value, anti-nutritional factors and effects.

**Module- III (10Hours)**

**Milk and milk products-** Composition, nutritive value, types of milk, processing, effect of heating on milk. Milk products: fermented and non-fermented products.

**Module -IV (12 Hours)**

**Egg, fish-** structure (egg), classification of sea foods, composition, nutritive value, selection, role in cookery.

**Poultry and meat-** types, composition, nutritive value, cuts of meat. Post mortem changes, tenderization.

**Module – V (10 Hours)**

**Vegetables and fruits-** classification, composition, nutritive value. Pigments: water soluble and water insoluble. Effects of cooking on colour, texture, flavor, appearance and nutritive value, ripening.

**Module -VI (10Hours)**

**Sugar and sugar cookery -**Properties of sugar, different forms of sugar (sugar, jaggery, honey syrup), composition, nutritive value. Stages of sugar cooking. Crystallisation : factors affecting

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crystallisation. Crystalline and non-crystalline candy.

**Fats and oils-** Types of fats and oils (animal and vegetable), processing and changes (hydrogenation, rancidity, smoking point, emulsification), uses and nutritive value. Nuts and oilseeds: Nutritive value and toxins.

**Module -VII**

**(10 Hours)**

**Tea, coffee & cocoa-** Classification of beverages, structure of coffee beans, cocoa, types, processing and nutritive value.

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**SEMESTER I**

**CORE COURSE**

**ND1BP01B20 - FOOD SCIENCE PRACTICAL**

**Credits: 2**

**Total Lecture Hours: 72**

**Course Outcomes:**

**CO1:** Estimate the weights and volumes using standards and its importance in food preparation

**CO2:** Apply the fundamentals of food science to observe the changes in foods during and after cooking of cereals and pulses

**CO3:** Prepare recipes using milk and milk products, egg and also determine the the changes during cooking

**CO4:** Identify the chemical changes due to cooking on pigments and nutrients in vegetables and fruits and changes in fats and sugars in various controlled conditions

**Mapping of Course Outcomes with Program Specific Outcomes**

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	1	2	1	2
<b>CO2</b>	1	2	3	1	2
<b>CO3</b>	1	2	3	1	2
<b>CO4</b>	1	2	2	1	1

**Syllabus Content:**

**Module -I (10Hours)**

1. Measurement of weights and volumes for each food group both raw and cooked (using standard measuring cups, spoons and weighing scale.)
2. Different cooking methods with examples

**Module II (13Hours)**

**Cereals and Pulses:**

1. Effect of temperature, time of heating, concentration, addition of sugar and acid on gelatinization of starch.
2. Prepare recipes using the following processes- Gelatinization, gluten formation and gel formation. Preparation of white sauce
3. Demonstrate the effect of soaking, hard water, sodium bi carbonate and papaya on cooking quality of pulses.
4. Prepare a recipe using cereal pulse combination.

**Module –III (10 Hours)**

**Milk**

1. Demonstrate the factors affecting coagulation of milk protein.
2. Prepare recipes using milk and its products.

**Module -IV (15 Hours)**

**Egg**

1. Demonstrate the formation of ferrous sulphide in boiling egg and its preventive measures.
2. Demonstrate the effect of addition of acid, fat, salt, water and sugar on the stability of egg white.
3. Prepare recipes where egg acts as – thickening agent, binding agent, emulsifying agent and enriching agent.

**Module - V (14 Hours)**

**Fruits and Vegetables**

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1. Demonstrate the effect of acid, alkali and over cooking on vegetables containing different pigments.
  2. Demonstrate the effects of different amounts of water added to vegetables during cooking on flavour and appearance.
  3. Demonstrate enzymatic browning in vegetables and fruits and any four methods of preventing it.
  4. Prepare soups, salads and sauces.

**Module - VI**

**(10 Hours)**

**Fats and Sugar**

1. Determine the smoking point of any 4 cooking oils.
2. Prepare recipes using shallow fat and deep fat frying methods observe the fat turnover
3. Demonstrate the stages of sugar cookery including syrups.