



**BHAVAN'S VIVEKANANDA COLLEGE**  
OF SCIENCE, HUMANITIES & COMMERCE  
Sainikpuri, Secunderabad – 500094

(Reaccredited with 'A' grade by NAAC)  
Autonomous College - Affiliated to Osmania University

**Department of Biochemistry & Nutrition**  
Template for B.Sc. BIOCHEMISTRY, NUTRITION & DIETETICS, CHEMISTRY  
(BCNDC)  
Under Choice Based Credit System (CBCS)  
(Batch 2022-23 to 2024-25)

<b>FIRST YEAR – SEMESTER-I</b>				
Course Code	Course title	Course Type	HPW	CREDITS
	Environmental Science/Computer Skills	AECC-1	2	2
	English	CC-1A	4	4
	Second Language	CC-2A	4	4
	Optional 1	DSC-1A	4T+3P=7	4+1=5
<b>ND136</b>	<b>Introduction to Foods &amp; Nutrition</b>	<b>DSC-2A</b>	<b>4T+3P=7</b>	<b>4+1=5</b>
	Optional 3	DSC-3A	4T+3P=7	4+1=5
	<b>TOTAL</b>		<b>31</b>	<b>25</b>
<b>SEMESTER-II</b>				
	Environmental Science/Computer Skills	AECC-2	2	2
	English	CC-1B	4	4
	Second Language	CC-2B	4	4
	Optional 1	DSC-1B	4T+3P=7	4+1=5
<b>ND236</b>	<b>Nutritional Biochemistry And Human Physiology</b>	<b>DSC-2B</b>	<b>4T+3P=7</b>	<b>4+1=5</b>
	Optional 3	DSC-3B	4T+3P=7	4+1=5
	<b>TOTAL</b>		<b>31</b>	<b>25</b>
<b>SECOND YEAR –SEMESTER-III</b>				
	English	CC-1C	3	3
	Second Language	CC-2C	3	3
	Optional 1	DSC-1C	4T+3P=7	4+1=5
<b>ND336</b>	<b>Normal and Therapeutic Nutrition</b>	<b>DSC-2C</b>	<b>4T+3P=7</b>	<b>4+1=5</b>
	Optional 3	DSC-3C	4T+3P=7	4+1=5
	Communication Skills	SEC-1	2	2
<b>SE336</b>	<b>Nutraceuticals, Functional &amp; Novel foods</b>	<b>SEC-2</b>	<b>2</b>	<b>2</b>
	<b>TOTAL</b>		<b>31</b>	<b>25</b>

*A. Sai Jyoti*  
28/4/23

Head, Dept. of Biochemistry & Nutrition  
Bhavan's Vivekananda College,  
Sainikpuri, Secunderabad - 500 094.



Prof. Bhanoori Manjula, Ph.D.,  
Department of Biochemistry  
University College of Science  
Osmania University  
Hyderabad - 500 007, TS

<b>SEMESTER-IV</b>				
	English	CC-1D	3	3
	Second Language	CC-2D	3	3
	Optional 1	DSC-1D	4T+3P=7	4+1=5
<b>ND436</b>	<b>Diet in Disease</b>	<b>DSC-2D</b>	<b>4T+3P=7</b>	<b>4+1=5</b>
	Optional 3	DSC-3D	4T+3P=7	4+1=5
	Universal Human Value	SEC-1	2	2
<b>SE436</b>	<b>Strategies for weight management</b>	<b>SEC-4</b>	<b>2</b>	<b>2</b>
	<b>TOTAL</b>		<b>31</b>	<b>25</b>
<b>THIRD YEAR –SEMESTER-V</b>				
	English	CC-1E	3	3
	Second Language	CC-2E	3	3
	Optional 1	DSE-1E	4T+3P=7	4+1=5
<b>ND536/ ND536A</b>	<b>Clinical Dietetics/ Diet Therapy</b>	<b>DSE-2E</b>	<b>4T+3P=7</b>	<b>4+1=5</b>
	Optional 3	DSE-3E	4T+3P=7	4+1=5
<b>GE536</b>	<b>Nutrition and Health</b>	<b>GE</b>	<b>4T</b>	<b>4</b>
	<b>TOTAL</b>		<b>31</b>	<b>25</b>
<b>SEMESTER-VI</b>				
	English	CC-1F	3	3
	Second Language	CC-2F	3	3
	Optional 1	DSE-1F	4T+3P=7	4+1=5
<b>ND636/ ND636A</b>	<b>Public Health Nutrition/ Community Nutrition</b>	<b>DSE-2F</b>	<b>4T+3P=7</b>	<b>4+1=5</b>
	Optional 3	DSE-3F	4T+3P=7	4+1=5
<b>ND636_O ND636_PW</b>	<b>Optional Paper Theory – Food Sanitation and Hygiene / Project work</b>		<b>4</b>	<b>4</b>
	<b>TOTAL</b>		<b>31</b>	<b>25</b>
	<b>TOTAL CREDITS</b>			<b>150</b>





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**PROGRAM NAME: BCNDC (BIOCHEMISTRY, NUTRITION & DIETETICS,  
CHEMISTRY)**  
**(Academic year 2023-24)**

**COURSE NAME: INTRODUCTION TO FOODS & NUTRITION**

**PAPER CODE: ND136**  
**YEAR/SEMESTER: I/I**

**PPW: 4**  
**NO. OF CREDITS: 4**

**COURSE OBJECTIVE:** To familiarize the students with various food groups and their nutritive value and to learn about food preservation and adulteration.

**UNIT-WISE COURSE OBJECTIVES:**

- COb1** To describe the balanced diet and different food groups with their nutritive values.  
**COb2** To explain the composition and nutritive value of pulses, cereals, legumes and fats.  
**COb3** To discuss the nutritive value of vegetables and fruits and methods of food preservation.  
**COb4** To explain the nutritive value of animal foods and food adulteration.

**UNIT I: INTRODUCTION TO FOOD GROUPS, CEREALS & MILLETS & PURE CARBOHYDRATES** **15 hours**

1. Definition- Food, nutrition, nutrients; food groups based on functions, origin and nutritive value. Food guide pyramid, balanced diet.
2. Cereals and Millets - Composition, nutritive value and nutrient losses during processing; breakfast cereals
3. Sugars - Types of sugars and stages of sugar cookery
4. Jaggery - Manufacture and stages of jaggery cookery

**UNIT II: PULSES & LEGUMES, NUTS & OIL SEEDS AND FATS & OILS** **15 hours**

1. Pulses & Legumes - Composition, nutritive value, nutrient losses during processing, importance of germination and malting; anti nutritional factors
2. Nuts & Oilseeds – Nutritive value, toxins and role in cookery
3. Fats & Oils – Composition, nutritive value, properties- physical and chemical, functions of oils and fat in foods
4. Rancidity of Oils- Types and prevention

*A. Sai Jade*  
28/4/23

*Prof. Bhanoori Manjula*

Head, Dept. of Biochemistry & Nutrition  
Bhavan's Vivekananda College,  
Sainikpuri, Secunderabad - 500 094.



Prof. Bhanoori Manjula, Ph.D.,  
Department of Biochemistry  
University College of Science  
Osmania University  
Hyderabad - 500 007, TS

### **UNIT III: VEGETABLES, FRUITS & FOOD PRESERVATION**

**15 hours**

1. Vegetables - Classification, composition and nutritive value, changes during cooking, loss of nutrients during cooking, storage, factors affecting storage.
2. Fruits - Classification, composition, nutritive value, storage and ripening.
3. Enzymatic browning and its prevention.
4. Food preservation – principles, traditional methods- curing, freezing, canning, boiling, pickling; modern techniques- pasteurization, freeze drying, vacuum packing, irradiation, pascalization. Bio preservatives and chemical preservatives.

### **UNIT IV: ANIMAL FOODS AND FOOD ADULTERATION**

**15 hours**

1. Milk- Composition, nutritive value, fermented and non-fermented milk products
2. Egg - Composition, nutritive value and quality; poultry- Classification, composition and nutritive value
3. Meat -Nutritive Value and changes during cooking; fish - classification, composition and nutritive value
4. Food Adulteration- intentional and incidental

### **REFERENCES:**

1. Srilakshmi B- Food Science, 5th Edition, New Age International Publishers, New Delhi – 110002, 2011.
2. Shakuntala Manay N - Food Facts and Principles, New Age International Publishers, New Delhi – 110002, 2005.
3. Norman Potter N -Food Science, CBS Publishers and Distributors, New Delhi – 110002, 2007.

### **COURSE OUTCOMES:**

At the end of the course students will be able to:

**ND136.CO1** Elaborate various food groups and importance of balanced diet.

**ND136.CO2** Formulate the diet based on composition and nutritive value of pulses, legumes and fats.

**ND136.CO3** Select types of vegetables and fruits for healthy diet and apply the methods of food preservation in food industry.

**ND136.CO4** Compare the nutritive values of milk, egg and meat and discuss about food adulterants.





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**(Academic year 2023-24)**

**COURSE NAME: INTRODUCTION TO FOODS AND NUTRITION**

**PAPER CODE: ND136P**  
**YEAR/SEMESTER: I/I**

**PPW: 3**  
**NO.OFCREDITS: 1**

**COURSE OBJECTIVE:**

**COB1** To describe standardization of recipes and nutritive calculations.

**COB2** To explain food preservation methods and detection of food adulterants.

**I. Standardization, Preparation and Nutritive value calculation of the recipes based on the following food group and combination.**

1. Cereal, millet and malting of grains
2. Pulse, germination of grains.
3. Cereal-pulse combination
4. Stages of sugar cookery, preparation with jaggery

**II. Methods of Preservation of**

5. Fruits- Squashes and jams
6. Vegetables by Pickling

**III. 7. Determination of quality of an egg**

**IV. Detection of Adulterants**

8. Water, urea and starch in milk
9. Hydrogenated fat in ghee and butter
10. Identification of food colours and textile colours

**REFERENCES:**

1. Srilakshmi B- Food Science, 5th Edition, New Age International Publishers, New Delhi – 110002, 2011.
2. Longvah T., Ananthan R., Bhaskarachary K. and Venkaiah K. Indian Food Composition Table, NIN

**COURSE OUTCOMES:**

At the end of the course students will be able to:

**ND136P.CO1** Compare the nutritive values of various food groups and standardize the recipes.

**ND136P.CO2** Implement food preservation methods and identify food adulterants.

*A. Sai Jody*  
28/4/23

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**PROGRAM NAME: BCNDC (BIOCHEMISTRY, NUTRITION & DIETETICS,  
CHEMISTRY)**  
**(Academic year 2023-24)**

**COURSE NAME: NUTRITIONAL BIOCHEMISTRY AND HUMAN PHYSIOLOGY**

**PAPER CODE: ND236**  
**YEAR/SEMESTER: I/II**

**PPW: 4**  
**NO. OF CREDITS: 4**

**COURSE OBJECTIVE:** To familiarize the students with role of micronutrients and macronutrients in the body and to understand the role of different organ systems.

**UNIT-WISE COURSE OBJECTIVES:**

- COb1** To explain the structural and functional importance of macronutrients.  
**COb2** To compare the significance, functions and deficiencies of micronutrients.  
**COb3** To explain the significance of water, its components, enzymes and hormones.  
**COb4** To discuss the cell structure, immunity, blood and its components, respiratory, nervous system and skin.

**UNIT 1: MACRONUTRIENTS**

**15 hours**

1. Carbohydrates - Composition, classification, sources, functions, deficiency and excess, glycolysis, citric acid cycle, and gluconeogenesis,
2. Lipids - Composition, classification, sources and functions; deficiency and excess of fats, essential fatty acids.
3. Amino acids- Classification - Chemical and nutritional; deamination, transamination, decarboxylation and amino acid pool, supplementary value of aminoacids.
4. Proteins- Composition, classification, sources, functions, biological value of proteins, PDCASS (Protein digestibility-corrected amino acid score), DIAAS (Digestible Indispensible amino acid score), deficiency and excess.

**UNIT II: MICRONUTRIENTS**

**15 hours**

1. Vitamins- Introduction, Classification, fat soluble vitamins A, D, E, K – chemistry, sources, functions, deficiency symptoms, RDA.
2. Water soluble vitamins – (thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, biotin, folic acid, cyanocobalamine, and ascorbic acid) chemistry, sources, functions, deficiency symptoms, RDA.



3. Minerals-Classification, sources, functions and deficiency symptoms of macrominerals (calcium, phosphorus, sodium, potassium and chlorine).
4. Microminerals: Sources, functions and deficiency symptoms (iron, iodine, fluorine, zinc, selenium)

**UNIT III: WATER, ELECTROLYTES, ENZYMES AND HORMONES 15 hours**

1. Water - Functions, distribution, intake and elimination, water balance
2. Electrolytes - Concentrations in intracellular and extra cellular fluids and osmotic pressure; acid base balance.
3. Enzymes - Definition, classification (IUBMB), properties, mechanism of enzyme action, inhibitors of enzyme action.
4. Hormones- Endocrine glands their secretion and functions, classification of hormones.

**UNIT IV: CELL, IMMUNE SYSTEM, BLOOD, RESPIRATORY SYSTEM, NERVOUS SYSTEM AND SKIN 15 hours**

1. Cell- Structure & functions, Overview of the Immune system and key features of the immune response.
2. Blood- Composition, coagulation and blood groups.
3. Respiratory system- Parts and functions, mechanism of respiration; oxygen and carbon dioxide transport
4. Nervous system – Classification and functions.
5. Skin: functions and its role in the regulation of body temperature.

**REFERENCES:**

1. Ferrier, D.R., Lippincott's Illustrated Reviews: Biochemistry, 5th or 6th Edition, Lippincott Williams & Wilkins, Baltimore,
2. Chatterjee C.C., Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta (1987). AVSS Rama Rao - A Text Book of Bio Chemistry, 9th edition, UBS Publishers distribution Pvt.Ltd, 2002.
3. Swaminathan N - A Handbook of Food and Nutrition, 5th edition volume 1, Bangalore printing and publishing Co.Ltd, 1986.
4. Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy -Text book of Human Nutrition, 2nd edition, Oxford and IBH publishing Co. Pvt. Ltd 2004.
5. Swaminathan M, Advanced Textbook on Food and Nutrition, Vol. I, Bappco.

**COURSE OUTCOMES:**

At the end of the course students will be able to:

**ND236.CO1** Interpret the significance of relation between macronutrient metabolism and health.

**ND236.CO2** Choose various sources of vitamins and minerals in planning healthy diet menu.

**ND236.CO3** Compile the importance of water, electrolytes, enzymes and hormones.

**ND236.CO4** Relate the various organ systems and their functions.

*A. Lai Jade*  
28/4/23

*Pand*

Head, Dept. of Biochemistry & Nutrition  
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**(Academic year 2023-24)**

**COURSE NAME: NUTRITIONAL BIOCHEMISTRY AND HUMAN PHYSIOLOGY**

**COURSE OBJECTIVE:**

- COb1** To describe methods of analysis for biomolecules and other nutrients.  
**COb2** To explain quantitative analysis of clinical parameters in blood.

**PAPER CODE: ND236P**  
**YEAR/SEMESTER: I/II**

**PPW: 3**  
**NO. OF CREDITS: 1**

1. Qualitative tests of proteins.
2. Qualitative tests of Minerals.
3. Quantitative analysis of calcium by titrimetry.
4. Quantitative analysis of vitamin C 2,6dichlorophenolindophenol dye method.
5. Determination of phosphorus by Fiske Subbarao method.
6. Determination of rancidity parameter: Acid value.
7. Determination of rancidity parameter: Peroxide value.
8. Determination of saponification value.
9. Estimation of blood glucose.
10. Determination of clotting time.

**REFERENCES**

1. Experimental Biochemistry: A Student companion- Sashidhar Rao, B and Deshpande, V. IK International (P) Ltd
2. Raghuramulu, Madhavannair, Kalyansundram, A manual of laboratory techniques, NIN. Hyderabad (2003).
3. Sawhney SK, Randhir Singh, Introductory practical biochemistry, Nasora Publishers, New Delhi (2000).

**COURSE OUTCOMES:**

At the end of the course students will be able to:

- ND236P.CO1** Identify and differentiate the biomolecules and nutrients in food samples.  
**ND236P.CO1** Analyze the changes in clinical parameters in health and disease.