



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Home Science Choice Based Credit System**  
**(CBCS) in Light of NEP-2020**  
**M. Sc Food and Nutrition Sem I (2022-2024)**

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		L	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
MFSN 101	CC	Advanced Food Science	60	20	20	0	0	3	0	0	3

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks

**Course Educational Objectives (CEOs): The Students will:**

CEO1: understand about composition and nutritive value of food.

CEO2: gain knowledge about food processing, shelf-life extension, reduction of toxins and enhancement in sensory quality of food.

**Course Outcomes (COs): Student should be able to:**

CO1: Increase food quality in day today's life by knowing various cooking methods heat effectivity on food and skill full in evaluation of food through senses.

CO2: developed profound understanding for nutrient storing and processing.

CO3: Familiarize with role of Food Additives in food preparation and food toxins.

CO4: acquainted with knowledge of food spoilage, food preservation and food adulteration.

**Syllabus**

**UNIT I**

Introduction to Food Science: Scope and development. Food preparation: Basic terminology of cooking methods, chemical, physico-chemical and microbiological effects of heat on food constituents. Sensory evaluation of food: introduction and methods.

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### UNIT II

Effects of cooking, processing, and storage on nutrients in: Cereals, pulses, fruits, Vegetables, Milk and milk products, meat, fish and poultry, sugars, beverages

### UNIT III

Role of Food Additives in food preparation: Anti-oxidants. Coloring agents, Curing agents, Emulsifiers. Flavoring agents, Leavening agents, Nutrient supplements, Sweeteners. pH controllers and preservatives.

### UNIT IV

Food toxins: Naturally occurring toxins- Trypsin inhibitors, hemagglutinins, lathyrins, aflatoxins, saponins, cyanogens, gossypol, glucosinolates etc.

### UNIT V

Food Preservation: Causes of food spoilage, principles of food preservation, and methods of food preservation. Food adulteration: Definition, common adulterants in different foods.

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**Reference Books:**

- P. Michael Davidson, T. (2021). **Antimicrobials in Food**. CRC Press. 4<sup>th</sup> Edition.
- Babasahab Desai, B. (2019). **Handbook of Nutrition and Diet**. CRC Press. 4<sup>th</sup> Edition.
- Haard, Norman F. (2019). **Seafood Enzymes**. CRC Press. 1<sup>st</sup> Edition.
- Singh, A. (2019). **Advances in Food Science and Nutrition**. Agrotech Press.
- Stewart Graham G. (2017). **Handbook of Brewing**. CRC Press. 3<sup>rd</sup> Edition.
- Srilakshmi, B. (2015). **Food Science**. New Age International (P) Limited, New Delhi. 4<sup>th</sup> Edition
- Manay, M. and Manay, S.N. (2014). **Food Facts and Principles**. New Age International (P) Limited, New Delhi.
- Potter, N.N. (2007). **Food Science**. C.B.S Publishing, New Delhi, India
- Meyer, L.H. (1987). **Food Chemistry**. CBS Publishers.
- Mudambi, S. (1997). **Food Science**. New Age International (P) Limited, New Delhi.

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**Course Educational Objectives (CEOs): The students will:**

CEO1: learn about the various important nutrients required for maintaining human health and leading an active lifestyle.

CEO2: know the types, functions and utilization of nutrients.

**Course Outcomes (COs): Student should be able to:**

CO1: gain knowledge of energy components with recommendations according to life scale.

CO2: develop profound understanding for Macro and Micronutrients.

CO3: utilize the gained knowledge of nutrients classification, functions, utilization and clinical implications in improving the quality of life.

**Syllabus**

**UNIT I**

Energy Metabolism

Components of energy expenditure – A review, Current methodology for determining energy requirements, Current recommendations for energy intake of different age, sex groups, Disorders of energy metabolism : Obesity and under nutrition, Short term and long term weight maintenance (Gut fill cues, Glucostat theory, Lipostat theory), Metabolic syndrome from Cardiology and endocrinology perspective.

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## UNIT II

### Carbohydrates

Classification, digestion, absorption and utilization : An appraisal, Simple and Complex carbohydrates, Non-starch polysaccharides and fibre constituents and their role in Nutrition, Newer functional role of carbohydrates in human nutrition, Disorders related to carbohydrate metabolism, Polyols , Glycemic Index , Glycemic load and Satiety index: Clinical implications.

## UNIT III

### Lipids

Classification, digestion, absorption, transport, A review Functions of essential fatty acids, and Long chain PUFA in human metabolism, Role of n3 and n6 fatty acids in health and disease, Hyperlipidemia and nutritional aspect, Phytochemicals & Plant sterols in human nutrition, Visible and invisible fats in diets, Human requirements of essential fatty acids, Assessment of Lipid status, Recommendations for heart friendly diets.

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#### UNIT IV

##### Proteins

Classification, digestion, absorption and transport – Review, non protein compounds and their biological functions, Metabolism of proteins – Role of liver and muscles, The concept of nitrogen balance, the concept of obligatory nitrogen losses and their relevance to protein requirement, Human requirements for proteins, Current methodology for determining protein requirements and essential amino acid requirements, The concept of quality of protein and method for measuring it.

#### UNIT V

##### Vitamins and Minerals

Fat Soluble Vitamins – A, D, E, K and Water-Soluble Vitamins (Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Ascorbic acid, Biotin) Minerals (Calcium, Phosphorous, Iron, Copper, Zinc, Iodine) and Trace Minerals and electrolytes (Selenium, Chromium, sodium, Potassium). Structures of vitamins and minerals, Digestion, absorption, transport and metabolism, Bioavailability: Modulators, Biochemical function, Assessment of vitamin and mineral status, Interaction with other nutrients, Toxicity and deficiency, RDA.

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### Reference Books

- Bamji, M. S. (2021). **Textbook of Human Nutrition**. 4th Edition. CBS Publishers.
- Agarwal A., Udipi, S. **Textbook of Human Nutrition**. 1<sup>st</sup> Edition. Jaypee Publisher.
- Jatana, A, Daphnee D. K, Haritha, S., Rohatgi, R. Pandya Yephtho, K. (2022). **Apollo Clinical Nutrition Handbook**. 1<sup>st</sup> Edition. Jaypee Publisher.
- Denis, M. M., and Robert E.C. (2018). **Advanced Human Nutrition**. 4th Edition. Jones & Bartlett Learning.
- Venkatraman, S. and Dandekar, P. S. (2021). **Nutrition and Biochemistry for Nurses**. 3e, 3rd Edition. Elsevier India
- Shils ME, Olson JA, Shike M, Ross AC, Cabellaro B and Cousins RJ (2006). **Modern Nutrition in Health and Disease (10th ed.)**. Lippincott, Williams and Wilkins publications.
- **Protein and Amino Acid requirements in Human Nutrition (2007)**. Joint WHO/FAO/UNU Consultation Technical Report Series No. 035, WHO Geneva.
- Indian Council of Medical Research. **Nutrient requirements and Recommended Dietary Allowances for Indians**. Report of Expert Group, 1978 and 1989 and 2009.

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- Zeigler EE and Filer Jr LJ (1996). **Present Knowledge in Nutrition** (7th ed.). ILSI Press, Washington DC

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**Course Educational Objectives (CEOs): The Student will-**

CEO1: acquired knowledge about the various physiological structures of the body.

CEO2: understand the functions and roles of various systems and organs in the body.

**Course Outcomes (COs): Student should be able to -**

CO1: expand knowledge about cellular science.

CO2: develop profound knowledge about various systems and their responsibility in the body.

CO3: gain knowledge about vaccination, immunity and respiratory system.

**Syllabus**

**UNIT I**

Physiological principles: Cell structure and function, body fluid compartments, transport mechanisms, homeostasis and feedback control systems

**UNIT II**

General organization of the Nervous system: Sensory and motor nerves, major levels of nervous system function, Central and autonomic nervous systems, transmission of nerve impulse, synapse, neurotransmitters.

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### UNIT III

Digestion and absorption in the gastrointestinal tract: Digestion and absorption of carbohydrates, fats and proteins, gastrointestinal hormones. Blood: composition of blood, functions of blood constituents, homeostasis, blood transfusion and tissue transplant. Circulatory system: Pumping of heart, cardiac cycle, ECG and blood pressure.

### UNIT IV

The immune response: humoral and cell-mediated. vaccination. Transport and exchange of respiratory gases (carbon-dioxide, oxygen and ammonia) and respiratory control.

### UNIT V

Elements of Reproductive physiology: Sex hormones. Breast milk production and its role in contraception. Principles of Endocrinology: Chemical control of metabolism, adrenaline, thyroid hormones. Control of water and electrolyte metabolism, calcium metabolism. Prostaglandins, endorphins and enkephalins. Renin-angiotensin system.

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- Hall, J. (2020). **Textbook of Medical Physiology, International Edition**. 14<sup>th</sup> Edition. Elsevier.
- Pal, G.K. (2021). **Textbook of Medical Physiology**. 4th edition. Elsevier.
- Silverthorn, D. (2018). **Human Physiology: An Integrated Approach**. 8<sup>th</sup> Edition. Pearson.
- Stuart I. F., Rompolski, K. (2018). **Human Physiology**. 15<sup>th</sup> Edition. McGraw Hill.
- Jain, A. K. (2008). **Human Physiology in a nutshell**. Arichal Publishing Company, Sirmour (H.P).
- Chaudhury, K.C (2004). **Concise Medical Physiology**. New Central Book Publishing, Calcutta.
- Ganong, W.F. (2001). **Review of Medical Physiology**. Tata McGraw-Hill publishing company. New Delhi.

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**Course Educational Objectives (CEOs): The students will -**

CEO1: understand the process of planning, organizing and controlling the management of food and other resources in institutions.

CEO2: Impart necessary expertise to function as food plant manager.

CEO3: Plan suitable strategies for the marketing of a specific food product.

CEO4: Develop critical abilities necessary to start their own food service unit leading to entrepreneurship.

**Course Outcomes (COs): Student should be able to -**

CO1: understand the basics and types of food service units.

CO2: develop managerial skills in food service industries.

CO3: update the skills and techniques in starting up a food service unit successfully.

CO4: develop skills of food safety, quality control and laws affecting Food Service Operations.

**Syllabus**

**UNIT I**

Food Service systems: Introductory concepts and development. Types of food services: Hospital, hostel, cafeteria, community kitchens.

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Planning for food services in hospitals: physical plant, its location, floor plans, space allowance, kitchen units, storage unit, baking, dishwashing and servicing unit. Equipment requirement: For food preparation, storage, distribution and serving. Manpower requirement: Personnel management, selection, training and supervision.

## UNIT III

Food service management: menu planning, receipt of food and its storage, principles and techniques in quantity food production. Food Service. Time and energy management. Financial Management: Principles of accounting, pricing and cost control.

## UNIT IV

Food Safety and Quality Control: Introduction to quality assurance and food safety assurance, Current concepts of quality control, Quality assurance programme; Quality plan, documentation of records, products standards, Product and purchase specifications, process control and HACCP, hygiene and housekeeping, corrective action, quality and programme and total quality process.

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### UNIT V

Laws affecting Food Service Operations: Consumer Protection Laws, Consumer concerns. Personnel laws.

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- Sethi, M. (2016). **Institutional Food Management**. 2<sup>nd</sup> edition. New Age International Private Limited.
- Raske, L.(2017). **Food service Management Fundamentals**. Scitus Academics.
- Bansal, T. (2011). Hotel facility and planning. Oxford publishing, New Delhi.
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- Treat, N. & Richards (1997). **Quantity Cookery**. Little Brown & Co.
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			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
MFSN 105	CC	Applied Nutrition	60	20	20	0	0	3	0	0	3

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks

**Course Educational Objectives (CEOs): The students will -**

CEO1: apply the knowledge of prescribing individualized dietary regimen for Health and fitness.

CEO2: discuss the significance of food and drug interactions in the present clinical scenario.

CEO3: explain the importance of nutritional genomics in improving health outcomes.

CEO4: compile knowledge of pharmacology, gene- nutrient and drug- nutrient interactions into the nutrition care process.

**Course Outcomes (COs): Student should be able to-**

CO1 – comprehend intricacies of nutrition support in applied aspects with importance of nutrition for health and fitness in especial condition and its disorder

CO2: inculcate concept of immunity and immunity in varying nutritional state.

CO3: acquainted with food and drug interrelationship and effect of drugs on nutrition absorption and utilization

CO4: Understand food fads and food efficacy in alternative medicines.

CO5: Develop profound understanding for food biotechnology

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MFSN 105	CC	Applied Nutrition	60	20	20	0	0	3	0	0	3

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### **Syllabus**

#### **UNIT I**

Nutrition for Health and Fitness: Nutrition in eating disorders. Anorexia Nervosa, Bulimia. Nutrition for exercise and sports performance. Nutritional requirements for optimum performance. Ergogenic aids. Carbohydrate loading. Nutrition for bone health. Role of nutrition in skin and hair care: Cosmetic effects of diet. Cellulite. Allergies. Anti aging foods. Foods as cosmetic agents

#### **UNIT II**

Nutrition and immunity: Basics of immunity. Nutrition in infections. Immunity in varying nutritional states.

#### **UNIT III**

Drug-nutrient interrelationships: Effects of drugs on nutrient absorption and utilization, effects of foods and nutrients on drug utilization. Food toxins: Chemical toxins, pesticides, insecticides, metallic, their residual and harmful effects, methods of removal.

#### **UNIT IV**

Scientific evaluation of food-related beliefs: Fads. Application of research methodology to test claims of efficacy of foods used in alternative systems of medicines: ayurvedic, herbal and home remedies.

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### UNIT V

Application of Biotechnology in food: GM foods and their health implications, functional foods, organic foods, impact of WTO in food regulation

### Reference Books:

- Sohi, D. and Randhawa. (2022). **Textbook of Applied Nutrition & Dietetics**. S Vikas and Company.
- Rajalakshmi, R. (2012). **Applied Nutrition**. 4<sup>th</sup> Edition. Oxibh.
- Wardlaw, G. (2010). **Contemporary Nutrition and Diet Therapy**. Benchmark publications.
- D Souza. and Pradhan, S.B.S. (2010). **Handbook Of Applied Nutrition, Dietotherapy & Diet Management**. D Publishers and Distributors Pvt Ltd.
- Reddy D.V. **Applied Nutrition**. Oxford & IBH Publishing Co Pvt. Ltd.
- Shils. M.E. (2006). **Modern Nutrition in Health and Disease**. Lippincot, Williams & Williams, USA.
- Mahan, L.K. & Escott Stump, S. (2000). **Krause's Food Nutrition and Diet Therapy**. 10<sup>th</sup> Ed WB Saunders & Co. London.
- Whitney, E.R and Rodney Roltes, S. (1996). **Under Standing Nutrition**. West Publishing Company, New York, USA.
- Bamji, M.S, Rao, N.P & Reddy, V. (1996). **Textbook of Human Nutrition**. Oxford & IBHPublishing Co. (P) Ltd. Delhi.

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MFNL 106	SEC	Food and Nutrition Lab	0	0	0	90	60	0	0	4	2

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**Course Educational Objectives (CEOs): The Students will –**

CEO1: acquired particle knowledge for food weight, BMR and Qualitative analysis of nutrients.

CEO2: practice to use senses to do sensory evaluation and measurements of biochemical marker.

**Course Outcomes (COs): Students should be able to-**

CO1: skillful in distinguish raw and cooked weight of Food.

CO2: develop profound knowledge of sensory evaluation of various food groups' samples.

CO3: learn methods for taking biochemical markers with the help of medical equipments.

CO4: understand qualitative analysis for Carbohydrates and Proteins.

**List of Practical's:**

**a) Food Science**

1. Raw weights and cooked weights of servings, nutritive value and cost of common Indian recipes, such as chapatti, dal, rice, vegetables, etc. Relationship between nutritive value, volume and weight.
2. To conduct sensory evaluation of the given samples using descriptive method.
3. To conduct sensory evaluation of sugar sample with the help of 'Duo trio test' and prepare evaluation card for the same.
4. To conduct sensory evaluation of sugar samples using 'Triangle Test' and prepare an evaluation card for the same.

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MFNL 106	SEC	Food and Nutrition Lab	0	0	0	90	60	0	0	4	2

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks

5. To study and conduct sensory evaluation of different pairs of sugar with lemon samples using 'paired test' and prepare score card for the same.
6. To study and detect various adulterants in food stuffs.

**b) Human Physiology**

1. Blood pressure measurement by Sphygmomanometer
2. Energy requirements of self- calculation of BMR and activity increments.
3. Identification of deficiency diseases on the basis of clinical signs and symptoms.
4. Qualitative estimation of carbohydrates.
5. Qualitative estimation of protein.
6. Blood Sugar measurement by Glucometer.

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MFNV 107	CV	Comprehensive Viva	0	0	0	60	40	0	0	0	2

**Note: Comprehensive Viva of the candidates in presence of subject expert and faculty members.**

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