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Shri Vaishnav Institute of Home Science
DUAL DEGREE PROGRAM (B.Sc-M.Sc Food and Nutrition)
M. Sc Food and Nutrition Sem I (2020-2021)

Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
MFSN 101	I	Advanced Food Science	60	20	20	0	0	4	0	0	4

Abbreviation		Teacher Assessment (Theory) based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall exceed 10 Marks).
Th	Theory	
T	Tutorial	Teacher Assessment (Practical) based on following components: Viva/ File/ Participation in Lab work (Given that no component shall exceed 50% of Marks).
P	Practical	

Course Objective

- To provide understanding about composition and nutritive value of food.
- To provide knowledge relevant to processing, shelf life extension, reduction of toxins and enhancement in sensory quality of food.

Course Outcome

- To build an understanding of the nutritional implications of structure of food matrix, food quality and processing treatments.

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MFSN 101: Advanced Food Science

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.

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. Preservatives and other additives.

UNIT IV

Food toxins: Naturally occurring toxins- Trypsin inhibitors, hemagglutinins, lathyrogens, aflatoxins, saponins, cyanogens, gossypol, glucosinolates etc., toxicants due to processing. Methods of improving nutritional quality of foods: Germination, Fermentation, Supplementation, Fortification.

UNIT V

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

Reference Books:

- Manay, M. and Manay, S.N. (2014). Food Facts and Principles. New Age International (P) Limited, New Delhi.
- Meyer, .L.H (1987). Food Chemistry. CBS Publishers.
- Mudambi S. (1997). Food Science. New Age International (P) Limited, New Delhi.
- Potter, N.N. (2007). Food Science. C.B.S Publishing, New Delhi, India
- Srilakshmi, B. (2015). Food Science. New Age International (P) Limited, New Delhi

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			Theory			Practical		Th	T	P	CREDITS
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MFSN 102	I	Advanced Human Nutrition	60	20	20	0	0	4	0	0	4

Abbreviation		Teacher Assessment (Theory) based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall exceed 10 Marks).
Th	Theory	
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P	Practical	

Course Objective

- To acquaint students with functions, importance and requirements of various nutrients in humans and their deficiency diseases.
- To learn to critically evaluate the methodology and derivation of requirements for specific macronutrients.
- To appreciate importance of nutrition immunity interactions and their implications.

Course Outcome

- To develop knowledge of the nutritional significance of macro and micronutrients.
- To learn various measures for enhancing nutritional quality of diets.

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MFSN: 102 Advanced Human Nutrition

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.

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.

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 Fat Soluble Vitamins – A, D, E, K and Water Soluble Vitamins (Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Ascorbic acid, Biotin)

Structures of vitamins, Digestion, absorption, transport and metabolism, Bioavailability : Modulators, Biochemical function, Assessment of vitamin status, Interaction with other nutrients, Toxicity and deficiency, RDA.

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UNIT VI Minerals (Calcium, Phosphorous, Iron, Copper, Zinc, Iodine) and Trace Minerals and electrolytes (Selenium, Chromium, sodium, Potassium)
Sources, Digestion, absorption, transport, metabolism, Bioavailability, Biochemical function, Requirements, Deficiency and toxicity, Interaction with other nutrients, RDA.

Reference Books:

- Shils ME, Olson JA, Shike M, Ross AC, Cabellaro B and Cousins RJ (2006). Modern Nutrition in Health and Disease (10thed.). Lippincott, Williams and Wilkins publications.
- Zeigler EE and Filer Jr LJ (1996). Present Knowledge in Nutrition (7thed.). ILSI Press, Washington DC
- Human energy requirement (2004). Report of a joint FAO/WHO/UNU Expert consultation, Rome, 17-24 October 2001. FAO, Food & Nutrition technical Report series 1.
- 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
- Human Vitamin and Mineral requirements (2002). Report of a Joint FAO/WHO expert consultations, Bangkok, Thailand, WHO & FAO UN, Rome.
- Mukherjee KL (1988). Medical Laboratory Techniques. A procedure manual for routine diagnostic tests (Vol. I, II & III). Tata McGraw Hill Publishing Company Ltd., New Delhi
- Sharma S (1993). Practical Biochemistry. Classic Publishing House, Jaipur
- Varley H (1988). Practical Clinical Biochemistry. GulabVazirani Publishers Pvt.Ltd. , New Delhi

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			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
MFSN 103	I	Human Physiology	60	20	20	0	0	4	0	0	4

Abbreviation		Teacher Assessment (Theory) based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall exceed 10 Marks).
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P	Practical	

Course Objective

- To enable students to understand the anatomy and functions of human body.

Course Outcome

- To develop vivid understanding of the various human physiological systems.

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MFSN 103: Human Physiology

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.

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, blood pressure.

UNIT IV

The immune response: Humoral and Cell-mediated. Principles and factors affecting vaccination. Regulation of acid-base balance: Role of buffers in blood, respiratory control, renal control. Transport and exchange of respiratory gases: carbon-dioxide, oxygen and ammonia. Urine formation: Principles. Effect on body fluids.

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.

Reference Books:

- Guyton, A.C. & Hall, J.E. (2001). Text Book of Medical Physiology. Harcourt Publishings International Company, New Delhi.
- 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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			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
MFSN 104	I	Research Methodology	60	20	20	0	0	4	0	0	4

Abbreviation		Teacher Assessment (Theory) based on following components: Quiz / Assignment / Project / Participation in class (Given that no component shall exceed 10 Marks).
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T	Tutorial	Teacher Assessment (Practical) based on following components: Viva/ File/ Participation in Lab work (Given that no component shall exceed 50% of Marks).
P	Practical	

Course Objective

- To understand the scientific approaches to research.
- To understand the significance of research methods in food and nutrition.
- To identify the sources of variability and uncertainty in research.
- To appreciate the importance of scientific writing and develop competence in writing skills.

Course Outcome

- Knowledge of scientific approaches in research.
- Students should be able to draft a research proposal and write a scientific paper.

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MFSN 104: Research Methodology

UNIT I Objectives of Research
Definition, objectives, types of research, quantitative and qualitative research in food and nutrition.

UNIT II Basic Principles of Research Design
Meaning and need, Types of research designs – exploratory, descriptive, experimental, survey and case study, cross-sectional and longitudinal, Study design issues, sampling methods and sample size.

UNIT III Instruments of Data Collection
Observation, questionnaire, interview: reliability and validity of measuring instruments, Data management and quality control

UNIT IV Research Strategies in Food and Nutrition
Issues in design, conduct, analysis and interpretation, descriptive studies (correlation, case studies, cross-sectional surveys)analytical studies (observational, case-control, cohort studies – prospective and retrospective), experimental studies (clinical / intervention trials including randomized controlled trials, rapid assessment procedures in food and nutrition research : use of rapid assessment procedures for nutrition program planning and evaluation

UNIT V

- Ethics in nutrition research
- Formulation of research design / proposal
- Scientific writing as a means of communication
- Different forms – research articles / notes, review articles, monographs,
- dissertations and reports
- Components of dissertation / research report / article
- Importance of illustrations
- Methods of presenting research findings – oral / poster
- Seminar: Preparation of Seminar and presentation

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Reference books:

- Best, JW and Kahn, JV (1992) Research in Education.6th ed. New Delhi, Prentice Hall of India Pvt. Ltd,.
- Kothari, CR (2004) Research Methodology, Methods & Techniques, 2nd ed. New Age International Publishers.
- Goode, WJ and Hatt, PK (1981) Methods in Social Research, McGraw Hill International Editions, Sociology Series.
- Kerlinger, FN (1983) Foundations of Educational Research. 2nd ed.
- Marjory L. Joseph, William D Joseph (1996) Research Fundamentals in Home Economics / Human Ecology. Plycon Press.
- WHO (2001) Health Research Methodology – A Guide for Training in Research Methods.
- Stennberg, R J (1991) The Psychologist's Companion: A Guide to Scientific Writing for students and Researchers. Cambridge: CUP.
- Scrimhshaw NS and Gleason GR: Rapid Assessment Procedures, Qualitative Methodologies for Planning and Evaluation of Health Related Programmes. International Nutrition Foundation for Developing Countries, Boston.
- Cresswell J : Research Design : Qualitative and quantitative Approaches
- Thousand Oaks CA, Sage Publications.

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MFNL 105	I	Food and Nutrition Lab	0	0	0	90	60	0	0	12	6

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P	Practical	

Course Objective

- To build a practical understanding of the nutritional implications of structure of food matrix, food quality and processing treatments.

Course Outcome

- Experimental knowledge relevant to processing, shelf life extension, reduction of toxins and enhancement in sensory quality of food.

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MFNL 105: Food and Nutrition Lab

List of Practicals:

a)

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.
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 different cooking methods.
7. To study the gelatinization properties of food starches.
8. To study various factors affecting the gelatinization properties of food starches.
9. To determine the best method of preparing a stable emulsion like mayonnaise.
10. To demonstrate the process of sugar recrystallization through the preparation of fondant, shakkarpara and fudge.
11. To study the effect of temperature on solubility of sugar and determine the concentration at which the solutions become saturated.
12. To study the effects of different environmental conditions on the process of fermentation.
13. To study the time, temperature and water required for soaking whole pulses and legumes and the effect of cooking on the same.
14. To study and detect various adulterants in food stuffs.

b)

1. Blood pressure measurement by Sphygmomanometer Energy requirements of self-calculation of BMR and activity increments.
2. Identification of the deficiency diseases on the basis of clinical signs and symptoms.
3. RDA calculation.
4. Rank /order of foodstuffs on the basis of their nutrient content.
5. Enlisting of the content of low sodium, low potassium, high sodium and high potassium containing foods.
6. Qualitative estimation of carbohydrates.
7. Quantitative estimation of carbohydrates.

8. Qualitative estimation of protein.
9. Quantitative estimation of protein.
10. Blood Haemoglobin assay and blood parameters count

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MFNP 106	I	Presentation	0	0	0	30	20	0	0	0	2

Note: Power point presentation based on any topic of the theory papers of current sem syllabus.

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			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
MFNV 107	I	Comprehensive Viva	0	0	0	60	40	0	0	0	4

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