



M.Sc. HOME SCIENCE

SYLLABUS

(1 year programme)

2026

DHANAMANJURI UNIVERSITY

Dean
School of Life Sciences
Dhanamanjuri University
Manipur

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DHANAMANJURI UNIVERSITY

SYLLABUS

M. Sc. Home Science

(i) Food Science and Nutrition

(ii) Human Development

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1. M.Sc. Programme in Home Science, which is of one year duration consisting of 2 semesters carrying maximum marks of 1000 equal to 40 credits.
 2. Semester I will have 3 theory papers and 2 practical papers carrying in total 500 marks with 20 credits.
 3. Semester II will have 3 theory papers, 1 practical paper and a Dissertation carrying in total 500 marks with 20 credits.
 4. The pass mark for each paper is 40% [i.e. 32 + 8 respectively of End Sem. (written/practical exam) & In Sem. (internal assessment)].
 5. The papers offered under the two specialization courses by the department is as follows:

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M. Sc. Home Science

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1. M.Sc. Programme in Home Science, which is of one year duration consisting of 2 semesters carrying maximum marks of 1000 equal to 40 credits.
 2. Semester I will have 3 theory papers and 2 practical papers carrying in total 500 marks with 20 credits.
 3. Semester II will have 3 theory papers, 1 practical paper and a Dissertation carrying in total 500 marks with 20 credits.
 4. The pass mark for each paper is 40% [i.e. 32 + 8 respectively of End Sem. (written/practical exam) & In Sem. (internal assessment)].
 5. The papers offered under the two specialization courses by the department is as follows:

CORE PAPERS:

(Food Science and Nutrition)

- Nutritional Biochemistry (Theory + Prac)
- Food Analysis (Theory + Prac)
- Food Product and Entrepreneurship (Theory + Prac)
- Advances in Human Nutrition (Theory + Prac)
- Food Microbiology and Food Safety (Theory)
- Research Methodology (Theory)
- Dissertation

(Human Development)

- Methods and techniques of assessment in human development (Theory + Prac)
- Mental health and Developmental Perspectives (Theory + Prac)
- Digital Media and Human Development (Theory + Prac)
- Children with Special Needs (Theory + Prac)
- Personality Development (Theory)
- Research Methodology (Theory)
- Dissertation

Syllabus

for

M.Sc. Home Science (Food Science & Nutrition)

COURSE STRUCTURE

1st Semester

Paper Code	Paper Type	Paper Title	Internal Assessment Marks	End-Semester Marks	Total Marks	No. of Credits
HSF-611	DSC	Nutritional Biochemistry	20	80	100	4
HSF-612	DSC	Practical based on HSF-611	-	100	100	4
HSF-621	DSE	Food Analysis	20	80	100	4
HSF-622	DSE	Food Product Development and Entrepreneurship	20	80	100	4
HSF-623	DSE	Practical based on HSF-621 and HSF-622	-	100	100	4
Total					500	20

2nd Semester

Paper Code	Paper Type	Paper Title	Internal Assessment Marks	End-Semester Marks	Total Marks	No. of Credits
HSF-613	DSC	Advances in Human Nutrition	20	80	100	4
HSF-614	DSC	Practical based on HSF-613	-	100	100	4
HSF-624	DSE	Food Microbiology and Food safety	20	80	100	4
HSF-615	DSC	Research Methodology	10	40	50	2
HSF-625	DSE	Research (Thesis/Dissertation/Project work/Field work/Patent)	-	150	150	6
Total					500	20

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COURSE CONTENT
SEMESTER- I
NUTRITIONAL BIOCHEMISTRY
(THEORY)

Code: HSF-611

Credits: 4

Total marks: 100

Objectives:

- To enable students to understand the role of nutrients in the body.
- To know the classification, functions and metabolism of carbohydrates, amino acids, proteins, vitamins, and minerals.
- To enable students to understand the mechanisms adopted by human body for regulation of metabolic pathways

Learning outcomes:

Students will be able to

- Understand the classification, functions and metabolism of carbohydrates, amino acids, proteins, vitamins, and minerals.
- Understand the inborn errors of macronutrients
- Understand the mechanisms adopted by human body for regulation of metabolic pathways

UNIT	TOPIC	MARKS
I	CARBOHYDRATES AND THEIR METABOLISM Carbohydrates: Classification, functions, requirements, digestion, absorption, transport, utilization and storage. • Carbohydrate metabolism- – Glycolysis, Glycogenesis, Glycogenolysis, Gluconeogenesis, Citric Acid Cycle, Hexose Monophosphate Pathway and Their Regulation – Electron Transport Chain • Inborn errors of Carbohydrate Metabolism: Galactosemia, Hereditary Fructose Intolerance, Fructosuria and Glycogen Storage Disease.	25
II	PROTEIN, AMINO ACID AND THEIR METABOLISM Proteins: – Classification and functions – Digestion and absorption – Transport and storage Amino acids: – Classification and functions – Utilization of amino acids Protein and Amino acid metabolism: – Deamination, transamination, deamidation	25

	– Amino acid pool – Protein biosynthesis – Urea cycle • Amino acids: balance, imbalance and toxicity – Metabolism of tyrosine, tryptophan, phenylalanine – Metabolism of methionine, leucine and arginine ❖ Inborn errors of amino acid metabolism- Phenyl Ketonuria, Cystinuria, Albinism, Alkaptonuria, Maple Syrup Disease, Homocystinuria, Tyrosinemia.	
III	LIPIDS AND THEIR METABOLISM • Lipids: Classification and functions, Digestion and absorption, Deposition and storage • Lipid metabolism – Synthesis of fatty acids, phospholipids and cholesterol – β-oxidation of fatty acids – Ketogenesis. – Biosynthesis of triglycerides and phosphatides • Bile pigments, Ketosis, Fatty Liver • Ketone bodies, Prostaglandins – significance. • Plasma lipoproteins and Hyperlipidaemias • Inborn errors of Lipid Metabolism- Gaucher's disease, Niemann's picks disease, Tay-sach's, Fabry's disease	25
IV	VITAMINS AND MINERALS Vitamins • Fat Soluble Vitamins (Vitamin A, D, E and K): Physiological action, transport, utilization, storage, functions and deficiency. • Water Soluble Vitamins (Thiamin, Riboflavin, Vitamin B12, Pantothenic acid, Folic Acid, Pyridoxine, Niacin): Physiological action, transport, utilization, storage, functions and deficiency. Minerals • Functions, absorption, utilization and deficiency of Calcium, Phosphorous – Role of calcium in ossification and bone growth – Inter-relationship between parathormone and vitamin D in the regulation of calcium and phosphorous metabolism • Iron: Functions, absorption, transport, utilization and storage. – Role of iron in prevention of anemia • Iodine: Physiology of iodine, Role of iodine in human nutrition • Physiology, functions and deficiency of Zinc, Selenium and Manganese.	25

Suggested readings

1. D M Vasudevan, Sreekumari S, Kannan Vaidyanathan. Sixth Edition, (2011). Text Book of Biochemistry for Medical students. Jaypee Brothers Medical Publishers (P) Ltd.
2. Haney Elsayy (2010), Nutritional Biochemistry, LAP Lambert Academic Publishing
3. Urvashinandal (2013), Handbook of Food and Nutritional Biochemistry, Agrobios India.

4. Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, Text Book of Human Nutrition , 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd.
5. Robert K Murray, Daryl K Granner, Peter A, Mayes, Victor W Rodwell., Harper's Illustrated Biochemistry, 26th edition, McGraw Hills
6. Lehninger A L., Principles of Biochemistry , CBS Publishers and Distributors.
7. A V S S Rama Rao, A Textbook of Biochemistry, 9th edition, UBS Publisher's Distribution Pvt. Ltd.
8. Tom Brody, Nutritional Biochemistry, 2nd edition, Academic Press

Practical based on HSF-611

Code: HSF-612

Credits: 4

Total marks: 100

BLOOD ANALYSIS

- 1.Methods of blood collection
- 2.Estimation of haemoglobin
- 3.Estimation of serum creatinine
- 4.Estimation of bilirubin
- 5.Estimation of cholesterol

URINE ANALYSIS

- 6.Estimation of urine sugar
- 7.Estimation of urine albumin
- 8.Estimation of bile salt
- 9.Estimation urine calcium
- 10.Estimation of urine creatinine
- 11.Estimation of urine urea
- 12.Analysis and interpretation of the above blood and urine analysis
- 13.Determination of acid value of fats and oil sample
- 14.Assessment of Iodine content in iodized salt (Iometric Titration Method)
- 15.Case study and Interpretation of biochemical indicators related to vitamin and mineral deficiencies
- 16.Laboratory Record
- 17.Viva voce

FOOD ANALYSIS

(THEORY)

Code: HSF-621

Credits: 4

Marks: 100

Objectives

1. To provide knowledge of principles and methods used in food analysis.
2. To develop understanding of sampling and analytical techniques for foods.
3. To familiarize students with proximate, instrumental and quality analysis of foods.
4. To impart knowledge on food safety, adulteration and quality assessment.

Learning Outcomes

After completion of the course, students will be able to:

1. Apply analytical methods for food quality evaluation.
2. Perform proximate, mineral and vitamin analysis of foods.
3. Operate basic analytical instruments used in food laboratories.
4. Evaluate food safety, adulteration and quality parameters.
5. Interpret analytical data and laboratory results scientifically.

UNIT	TOPICS	MARKS
I	Principles of Food Analysis & Sampling Nature and scope of food analysis: quality control, safety, labeling, regulatory compliance (FSSAI, Codex). Steps in analysis: selection, preparation, assay, calculation, interpretation. Sampling techniques: random, stratified, systematic, composite; sampling plans for solid, liquid, and heterogeneous foods. Sample preparation: homogenization, drying, fat extraction, deproteinization, filtration, storage. Preparation of standard solutions: molarity, normality, percent solutions, dilution factors, buffer preparation. Method validation parameters: accuracy, precision, LOD, LOQ, linearity, robustness. Quality assurance (QA) and quality control (QC) in food analysis.	25
II	Instrumental Techniques in Food Analysis Colorimetry & UV-Vis Spectrophotometry – principles, Beer-Lambert law, application for pigments, additives. Atomic Absorption Spectrophotometry (AAS) – for minerals (Ca, Fe, Zn, Pb, Cd). Flame Photometry – Na, K estimation. Fluorimetry – vitamins (riboflavin, thiamine), aflatoxins. Electrophoresis – protein separation, food authenticity (e.g., species identification). Refractometry – soluble solids, sugar content, oil adulteration. Chromatography – Paper, TLC, GLC (fatty acids), HPLC (vitamins, preservatives, mycotoxins). Introduction to LC-MS/MS and GC-MS – for pesticide residues and	25

	contaminants. NIR spectroscopy – rapid quality analysis.	
III	Proximate, Minerals, and Vitamins Analysis Moisture – oven drying, distillation, Karl Fischer (for low-moisture foods). Ash – total ash, water-soluble/insoluble ash, acid-insoluble ash (for adulteration). Carbohydrates – reducing sugars (Lane-Eynon, DNSA), total sugars, starch, dietary fiber. Crude fiber – acid-alkali digestion. Fat – Soxhlet, Mojonnier, Gerber (milk), acid hydrolysis (for processed foods). Protein – Kjeldahl (total N), Dumas, Biuret, Lowry. Tannins and phytates – titrimetric and colorimetric methods (anti-nutrients). Minerals – Calcium (permanganometry/EDTA), Iron (colorimetry/phenanthroline), Phosphorus (molybdovanadate method). Vitamins – Ascorbic acid (2,6-dichlorophenol indophenol titrimetry/HPLC). Comparison of AOAC, FSSAI, and ISO methods.	25
IV	Rheological Analysis & Advanced Applications Rheological parameters – Viscosity, Shear Stress, Shear Rate, Modulus, Creep, Relaxation. Types of fluid behavior – Newtonian, pseudoplastic, dilatant, thixotropic. Rheological instruments – Capillary Viscometer, Rotational Viscometer (Brookfield), Dynamic Oscillatory Rheometer. Texture Profile Analysis (TPA) – Hardness, Cohesiveness, Springiness, Chewiness, Gumminess (With Texture Analyzer). Applications – Quality Of Sauces, Gels, Dough, Dairy Products, Fruits. Recent Advances – Texture In 3d-Printed Foods, Rheology Of Plant-Based Meat Analogues. Regulatory Relevance – Texture as a Quality Parameter (E.g., Ice Cream, Bread, Cheese). Integration with sensory analysis .	25

Suggested Readings:

1. Official Methods of Analysis (2023), Association of Official Analytical Chemists - Officially recognized methods of analysis for many food components.
2. C.S. James (2013). Analytical Chemistry of Foods. Blackie Academic and Professional - General overview of food analysis techniques.
3. S.S. Nielsen, (1998). Introduction to Food Analysis. Aspen Publishers - The best general overview of food analysis techniques currently available.

FOOD PRODUCT DEVELOPMENT AND ENTREPRENEURSHIP (THEORY)

Code: HSF-622

Credits: 4

Marks:100

Objectives:

1. Provide advanced knowledge on food product development and commercialization.
2. Develop skills in formulation, standardization and evaluation of innovative food products.
3. Enable students to understand entrepreneurship opportunities in the food sector.
4. Familiarize students with packaging, labelling, regulatory and marketing aspects of food products.
5. Encourage innovation using indigenous and functional foods for sustainable food enterprises.

Learning Outcomes:

Students will be able to –

- Develop nutritionally balanced and marketable food products.
- Apply principles of sensory evaluation, shelf-life studies and quality assurance.
- Understand product commercialization and food regulations.
- Prepare business plans and feasibility reports for food enterprises.
- Analyze market trends and entrepreneurial opportunities in the food industry.
- Develop entrepreneurial and managerial skills for establishing food-based ventures.

UNIT	TOPICS	MARKS
I	Food Product Development and Innovation Concept, scope and importance of food product development; stages involved in development of new food products; product development cycle; idea generation and screening; factors influencing consumer preferences and market trends; market survey and identification of consumer needs; formulation and standardization of food products; development of functional foods, nutraceuticals, convenience foods and indigenous food products; factors affecting success and failure of food products.	25
II	Product Evaluation, Shelf-Life and Packaging Sensory evaluation of foods: subjective and objective methods; selection and training of sensory panel members; development of score cards and hedonic rating scales; consumer acceptability studies; shelf-life evaluation and food deterioration; chemical, physical and microbiological evaluation of food products; quality control in food products; packaging materials and packaging systems; eco-friendly and bio-based packaging; vacuum packaging and modified atmosphere packaging; food labelling and nutritional labelling according to FSSAI guidelines.	25

III	Entrepreneurship Development in Food Industry Concept and characteristics of entrepreneurship; entrepreneurial competencies and skill development; entrepreneurship opportunities in food processing industries; small-scale food industries and start-ups; business idea generation and feasibility analysis; SWOT analysis; preparation of business plans and project reports; financial institutions, MSME schemes and government support for entrepreneurs; incubation centres and support systems for food entrepreneurs; role of entrepreneurship in sustainable food enterprises.	25
IV	Commercialization, Marketing and Food Business Management Commercialization of food products; scale-up production and product launch; product costing and pricing strategies; branding, advertising and promotion techniques; test marketing and consumer feedback; food laws and licensing procedures; FSSAI regulations and food safety standards; Intellectual Property Rights, patents and trademarks; supply chain and distribution management; e-commerce and digital marketing in food industries; sustainability and waste management in food enterprises.	25

Suggested Readings

1. Desai, V. (2019). *Fundamentals of entrepreneurship and small business management* (3rd ed.). Himalaya Publishing House.
2. Fuller, G. W. (2011). *New food product development: From concept to marketplace* (3rd ed.). CRC Press.
3. Lawless, H. T., & Heymann, H. (2010). *Sensory evaluation of food: Principles and practices* (2nd ed.). Springer.
4. Manay, N. S., & Shadaksharaswamy, M. (2015). *Foods: Facts and principles* (3rd ed.). New Age International Publishers.
5. Moskowitz, H. R., Saguy, I. S., & Straus, T. (2009). *An integrated approach to new food product development*. CRC Press.
6. Potter, N. N., & Hotchkiss, J. H. (2012). *Food science* (5th ed.). CBS Publishers & Distributors.
7. Robertson, G. L. (2016). *Food packaging: Principles and practice* (3rd ed.). CRC Press.
8. Smith, J., & Charter, E. (2010). *Functional food product development*. Wiley-Blackwell.
9. Stone, H., Bleibaum, R., & Thomas, H. A. (2020). *Sensory evaluation practices* (5th ed.). Academic Press.
10. Subbulakshmi, G., Udipi, S. A., & Rao, A. (2021). *Food processing and preservation*. New Age International Publishers.

References:

- Food Safety and Standards Authority of India. (2023). *Food safety and standards regulations manual*. FSSAI.
- Ministry of Micro, Small and Medium Enterprises. (2022). *Entrepreneurship and MSME development schemes*. Government of India.
- National Institute of Food Technology Entrepreneurship and Management. (2021). *Food business incubation and entrepreneurship handbook*. NIFTEM.

Journals

- Food Quality and Preference*. Elsevier.
- Journal of Food Science and Technology*. Springer.
- LWT – Food Science and Technology*. Elsevier.
- International Journal of Food Science and Nutrition*. Taylor & Francis.

PRACTICAL BASED ON HSF-621 and HSF-622

Code: HSF-623

Credits: 4

Marks: 100

FOOD ANALYSIS

1. Laboratory safety practices, Good Laboratory Practices (GLP) and handling of laboratory chemicals.
2. Familiarization, operation and maintenance of analytical instruments: Analytical balance, pH meter, Spectrophotometer, Centrifuge, Hot air oven, Muffle furnace, Refractometer, Viscometer
3. Sampling techniques and preparation of food samples for analysis.
4. Preparation of standard solutions, buffers and reagents.
5. Proximate Analysis: Moisture, fats, carbohydrates, proteins, crude fiber, total ash, mineral
6. Field visit to food testing laboratory or food quality control laboratory.
7. Report.
8. Laboratory record.
9. Viva-Voce.

FOOD PRODUCT DEVELOPMENT AND ENTREPRENEURSHIP

1. Market survey and identification of consumer preferences for innovative food products.
2. Development and standardization of value-added food products.
3. Food fair of the developed food products.
4. Preparation of business plan and feasibility report for food enterprise.
5. SWOT analysis of selected food business.
6. Field visit to food industries, incubation centres or entrepreneurial units.
7. Project report.
8. Field visit report.
9. Note book/Record.
10. Viva-Voce.

SEMESTER II
ADVANCES IN HUMAN NUTRITION
(THEORY)

Code: HSF-613

Credits: 4

Total Marks:100

Objectives:

1. To understand how nutrient requirements changes in special conditions.
2. To familiarize students with changes occurring in the physiology and metabolism of human body as a result of change in altitude, gravity and exercise.
3. To understand how optimal nutrition is important for immunity
4. To learn various measures for enhancing nutritional quality of diets.
5. To learn about the management strategies for different sports and physical activities
6. To explore the application of nutrigenomics in the food and nutrition industry.

Learning outcomes:

The students would be able to

- Understand nutritional management in special conditions.
- Apply the knowledge of nutrition immunity interactions and their operational implications.
- Explain the importance of every nutrient and sensitive methods for assessment of nutrient needs
- Track emerging concepts in the field of nutrition

UNIT	TOPIC	MARKS
I	Macronutrients and Micronutrients Energy expenditure components: basal and resting metabolic rate; Factors influencing energy expenditure; Dietary fibre - Physiological role and health benefits of dietary fibre, sources; Resistant starch, its physiological benefits and food sources. Factors influencing protein quality, amino acid composition and digestibility, Protein quality evaluation methods: Protein Digestibility Corrected Amino Acid Score (PDCAAS) Fatty acid types: Saturated and unsaturated; Essential Fatty Acids (EFA): definition and functions. Fat- and Water-soluble vitamins: dietary sources, hypervitaminosis and antivitaminosis. Macro and micro minerals: dietary sources, factors affecting absorption of calcium and iron, toxicity.	25
II	Nutrition in Special Condition: <i>High Altitude and air travel:</i> Physiological changes due to high altitude and air travel; Acclimatization process; Health and nutritional problems at high altitude and air travel; Nutrient requirements and dietary management at high altitude and air travel <i>Space Nutrition:</i> Need and scope for space travel; History of space travel; Physiological changes in astronauts; Nutrient requirement and dietary management during space travel. Space food systems <i>Sea Travel Nutrition:</i> Physiological changes in human body during sea travel; Psychological preparedness for sea travel; Health and nutritional problems encountered during sea travel; Nutrient requirements and dietary management during sea travel.	25

III	Nutrition Resilience in Health and Emergencies <i>Nutrition and Immunity:</i> Host defense mechanisms and nutrients essential in the development of immune system. Effect of infections on the nutritional status of an individual. Effect of malnutrition on immunity. Nutrient deficiencies and excesses affecting the immuno-competence and susceptibility to infections with respect to carbohydrate, fat, protein, vitamins and minerals <i>Enhancing Nutritional Quality:</i> Methods in improving nutritional quality of diets, bioavailability of nutrients, nutrient losses during cooking and processing. Food security, technologies for food and nutrition security. <i>Nutrition in emergencies:</i> Need and importance; Types of emergency situations such as natural and manmade; Nutritional and health problems in emergencies; Nutrient requirement and dietary management during emergencies.	25
IV	Sports nutrition and Emerging Concepts in Human Nutrition: <i>Sports Nutrition:</i> Need and scope of sports nutrition; Requirement of nutrients for specific sports events; Nutrition support before, during and after sports event; Concept of carbohydrate loading and the methods of carbohydrate loading; Water and electrolyte requirement during exercise and their role in performance. Nutrition management during sports/game. <i>Ergogenic aids:</i> Definition, types and dosage; Doping: Definition, types and consequences; Muscle physiology for performance and fitness; Biomechanics; Physiological testing for fitness and performance; Strength, flexibility, anaerobic power and cardio respiratory fitness. <i>Nutrigenomics:</i> Scope and importance to human health; genetics and disease; bringing nutrigenomics to food industry.	25

Suggested readings:

1. ICMR (2010). Nutrient Requirements and Recommended Dietary Allowances for Indians.
2. Bamji M.S., Rao N.P., Reddy V. Eds. (2009). Textbook of Human Nutrition. 3rd Edition. Oxford and IBH Publishing Co. Pvt. Ltd.
3. Mahan, L.K. and Ecott-Stump, S. (2000). Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
- 4.Sizer, F. and Whitney, E. (2000). Nutrition – Concepts and Controversies, 8th Edition, West Wadsworth, An International Thomson Publishing Co.
5. Whitney, E.N. and Rolfes, S.R. (2003). Understanding Nutrition, 8th Edition, West Wadsworth, An International Thomson Publishing Co.
6. Ira Wolinsky (Ed) (2003): Nutrition in Exercise and Sports, 3rd Edition, CRC Press
7. Goyet Fish, V., Seaman, J. and Geijer, U. (2008): The Management of Nutritional Emergencies in Large Populations, World Health Organisation, Geneva
8. Shills, M.E., Olson, J., Shike, M. and Roos, C. (1998). Modern Nutrition in Health and Disease. 9th Edition, Williams and Williams. A. Beverly Co. London.
9. Srilakshmi B, Suganthi V and Kalaivani C Ashok. 2017. Exercise Physiology Fitness and Sports Nutrition. New Age International Publishers.
10. Benardot D. 2005. Advanced Sports Nutrition. 2nd Edition, Human Kinetics Publishers, Champaign, IL.
11. Chopra S, Singh SN and Mathur P, Nutritional Fuelling for Microgravity Environment of

Code: HSF-614

Credits: 4

Total Marks:100

PRACTICALS:

1. Measurement of energy expenditure: Factorial Approach and Heart Rate Monitoring Method
2. Calculate the energy expenditure and plan a one-day menu for mountaineer.
3. Management of motion sickness in special condition through diet.
4. Prepare a low- cost nutrient-rich recipes to support immune function using locally available food.
5. Evaluation of nutritional status and immune function using case studies.
6. Determination of vitamin-C losses during processing- Cutting, Boiling, Steaming, Pressure cooking.
7. Preparation of emergency feeding plans for disaster situations-Flood/Conflict situations.
8. Preparation of pre-event, during-event, and post-event meal plans for sports persons.
9. Market survey on sports supplements and ergogenic aids available in the local market.
10. Visit to a sports academy / established fitness centres.
11. Workshop/Seminar on sports nutrition.
12. Note book/Record.
13. Report.
14. Viva-voce

FOOD MICROBIOLOGY AND FOOD SAFETY
(THEORY)

Code: HSF-624

Credits: 4

Marks:100

Objectives:

1. To study the microbial flora associated with food.
2. To acquire knowledge and understand the importance of microbiology and its applications in food industry and in health.

Learning outcomes :

Student will be able to -

- Understand the nature of microorganisms involved in food spoilage, food infections and intoxications
- Comprehend the various factors responsible for food spoilage.
- Understand the specifications of various contamination sources and disease developed in certain processed products.
- Understand the importance of food safety, sanitation and quality control during food processing.

UNIT	TOPIC	MARKS
I	Fundamentals of microbiology- Bacteria, Yeasts, Molds and Viruses History and Development of Microbiology Bacteria: Morphology and cultural characteristics Yeasts : Morphology , Industrial importance of yeasts Molds: Morphology, Significance of molds, Common household molds in relation to food Viruses: Viruses and Bacteriophages, Morphology Factors affecting microbial growth, Beneficial uses of microorganisms in food	25
II	Contamination, spoilage, preservation and microbes of fruits, vegetables and cereals, fleshy foods, poultry, fish • Food Contamination and Spoilage- Definition, sources of contamination, principles underlying food spoilage • Principle of food preservation, methods of food preservation • Microbiological Spoilage of Fresh Whole Fruits and Vegetables - Contamination and Spoilage of fruits and vegetables • Microbiology of cereals and cereal products - Contamination and Spoilage of cereals, Mycotoxin, Prevention of mold and mycotoxin , • Microbiology of fleshy foods, poultry, fish- Contamination and Spoilage of meat and its products, poultry, fish	25

III	Microbial Food Borne Diseases- Food borne diseases - Definition, Characteristics, habitat, toxins disease and symptoms, food association, prevention of : • Food borne intoxications- Staphylococcal intoxication, Botulism, • Food borne infections- Salmonellosis, Listeria monocytogenes, Escherichia coli, Gastroenteritis • Foodborne Toxicoinfections- Clostridium perfringens, Bacillus cereus • New and emerging food borne pathogen • Indicators of bacterial pathogens	25
IV	Food Safety • Indicators of food quality and food safety - Coliforms, Enterococci, Bifidobacteria, coliphages. • Concept of Food safety Management systems, Good Hygienic Practices (GHP), Good Manufacturing Practices (GMP), HACCP, ISO2200, level. Food laws and Regulations.	25

Suggested readings:

1. Frazier W.C and Westhoff D.C.(2017), Food Microbiology, 5th Edition, Tata McGraw Hill Publishing Co., Ltd. New Delhi.
2. Bibek Ray, Fundamental Food Microbiology (2007) Fourth Edition, CRC Press
3. M.P. Doyle, L.R. Beuchat and Thoma J. Montville, (2001) Food Microbiology: Fundamentals and frontiers , 2nd edition, ASM press, USA
4. Annak.Joshua, (2001). Microbiology, Popular Book Depot.Chennai-15.
5. Modern Food Micro-Biology by James M. Jay, (2000), 6th edition, An Aspen Publication, Maryland, USA.
5. Modern Food Micro-Biology by James M. Jay, (2000), 6th edition, An Aspen Publication, Maryland, USA.

**RESEARCH METHODOLOGY
(THEORY)**

Code: HSF- 615 Credits: 2 Marks: 50

**RESEARCH
(THESIS/DISSERTATION/PROJECT WORK)**

Code: HSF- 625 Credits: 6 Marks: 150

Objective:

To initiate research work and submit the dissertation at the end of IV Semester

The students will be guided and supervised by a member of the teaching faculty of the concerned department. The dissertation in which the research culminates should reflect the students' own original work.

Syllabus

for

M.Sc. Home Science (Human Development)

COURSE STRUCTURE

1st Semester

Paper Code	Paper Type	Paper Title	Internal Assessment Marks	End-Sem. Marks	Total Marks	No. of Credits
HSH-611	DSC	Methods and techniques of assessment in human development	20	80	100	4
HSH-612	DSC	Lab based on HSH-611	-	100	100	4
HSH-621	DSE	Mental health and Developmental Perspectives	20	80	100	4
HSH-622	DSE	Digital Media and Human Development	20	80	100	4
HSH-623	DSE	Lab based on HSH-621 and HSH-622	-	100	100	4
Total					500	20

2nd Semester

Paper Code	Paper Type	Paper Title	Internal Assessment Marks	End-Sem Marks	Total Marks	No. of Credits
HSH-613	DSC	Children with Special Needs	20	80	100	4
HSH-614	DSC	Lab based on HSH-613	-	100	100	4
HSH-624	DSE	Personality Development	20	80	100	4
HSH-615	DSC	Research Methodology	10	40	50	2
HSH-625	DSE	Research (Thesis/Dissertation/Project work/Field work/Patent)	-	150	150	6
Total					500	20

1st Semester

METHODS AND TECHNIQUES OF ASSESSMENT IN HUMAN DEVELOPMENT (THEORY)

Code: HSH-611

Credits: 4

Total Marks:100

80 marks – End Semester Examination

20 marks – Internal Assessment

Objectives:

- To appraise the students with different methods and techniques of assessment in human development.
- To expose them to the different assessment techniques throughout life span.

Learning outcomes:

Students will be able to:

- Explain the various assessment methods used in assessing human development
- Apply the different assessment techniques in studying human development

UNIT I Introduction Methods of studying human development - Longitudinal, Cross sectional and Experimental methods for studying human development, ethical consideration in childhood study Methods of assessment – Formative and Summative, Formal and Informal, Performance assessment, Dynamic assessment	25 marks
UNIT II Approaches to studying children • Introduction to fieldwork and its significance • Anthropometric measurement – height, weight, upper arm circumference, skin fold thickness. • Nutritional status of young children • Developmental assessment Scales for infant: Bayley scale APGAR Neonatal Behavioural Assessment Scale	25 marks
UNIT III Projective techniques • Meaning • Advantages and Disadvantages • Types of projective techniques (Rorschach Test, Holtzman Inkblot Test, Thematic Apperception Test, Sentence Completion Test, Graphology, Draw a Man test, House-Tree-Person, Children's Apperception Test)	25 marks
UNIT IV Non projective Techniques • Meaning • Advantages and Disadvantages • Types of non-projective techniques (Interview, Questionnaire, Observation, Checklist, Rating scale, Case Study, Wechsler battery, Raven's Progressive Matrices, Self-Esteem Inventory, Myers Briggs Type Indicator) Reliability and Validity test Sociometric method and sociogram Scoring and interpretation of Differential Aptitude Test	25 marks

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References

1. Aylward, G. (1994). Practitioner's guide to developmental and psychological testing. New York: Plenum Press.
2. Blaxter, L., Hughes, C. and Tight, M. (1999). How to Research. New Delhi: Viva Books.
3. Hayes, N. (ed). (1997). Doing Qualitative Analysis in Psychology. Hove: Psychology Press.
4. Smith, J.A., Harre, R., and van Langenhove, L. (1995). Rethinking Psychology. London: Sage.
5. Yin, R. (1994). Case study research: Design and methods (2nded.) Beverly Hills, CA: Sage Publishing.
6. Nagpal, R. and Sell, H. (1985). Subjective well-being inventory. New Delhi : World Health Organization.

Practical based on HSH-611

Code: HSH-612

Credits: 4

Marks: 100

Based on HSH-611 Methods and Techniques of Assessment in Human Development

1. Preparation of data collection tools: interview schedule, questionnaire and observation sheet on relevant areas
2. Conduct a case study for different age groups on different topics and submit a detailed report
3. Assessment of a child (5 to 10 years) using sociometric method
4. Conduct an analysis of data generated from an in-depth qualitative or quantitative evaluation study in order to draw inferences and suggest an improvement plan for the programme / system evaluated.
5. Visit to an institution for observation and administration of projective technique
6. Conducting qualitative observation of a child in a Laboratory Nursery School and writing a report
7. Use of non-projective techniques for assessment using
 - Raven's Progressive Matrices
 - Self-Esteem Inventory
 - Sex-Role Inventory
 - Myers Briggs Type Indicator
8. Report of visit
9. Notebook
10. Viva

MENTAL HEALTH AND DEVELOPMENTAL PERSPECTIVES
(THEORY)

Code: HSH-621

Credits: 4

Total Marks:100

80 marks – End Semester Examination

20 marks – Internal Assessment

Objectives:

- To understand the concept, dimensions, and importance of mental health across different stages of life.
- To understand common mental health problems and developmental disorders among children, adolescents, adults, and the elderly.

Learning Outcome:

After completing this paper, students will be able to:

- Explain the concepts and importance of mental health and human development.
- Analyze the relationship between developmental processes and mental wellbeing.
- Identify factors affecting mental health and recognize common mental health issues and developmental challenges faced during childhood, adolescence, adulthood, and old age.
- Apply knowledge of developmental perspectives in understanding behaviour, emotions, and adjustment patterns.

UNIT I - Introduction to Mental Health & its relevance during infancy Definition, Concept and Importance of holistic health, well-being and happiness; National Mental Health policy of India (1982); Needs and programmes for community mental health. Infancy – Implication of attachment and bonding for mental health; Deprivation syndrome.	25 marks
UNIT II - Mental health needs and Behavioural Difficulties Manifested from Early Childhood Years till Adolescence Safety, Security, Relationships, Autonomy and Self-concept, Nutrition and Health; Feeding problems, Aggression, Withdrawal and Problems related to early schooling and formal living. Mental health needs, Problems related to school and adolescence Maladjustment at home and school – recognition, appreciation, friendships and industry, discipline, truancy, fears and phobias. Providing guidance / Intervention work with children, parents, teachers, peers and school administration. School mental health programmes for students and teachers, Improving school climate; Mental health needs of adolescent.	25 marks
UNIT III - Adulthood and Elderly Mental health problems in the community – Life events that cause stress, violence and sexual abuse, marital adjustments and career adjustment, Traumatic Childhood; Substance abuse and addiction; Midlife crisis; Management of stress – coping strategies, counselling, training in relaxation, yoga, meditation.	25 marks

UNIT IV - Mental Health - Causes, Sign & Symptoms and Treatment of different types of Mental Health problems Behavioural and Developmental Disorders, Anxiety Disorder, Mood Disorder, Eating and Sleep Disorder, Psychotic Disorder, Personality Disorder, Trauma and Stress Related Disorders, Substance Use Disorders, Cognitive Disorders Therapies for mental health problem: Psychotherapy, Behavioural Therapy and Family and Social Support Therapy Mental Health Assessment tools	25 marks
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Suggested Readings

1. Gururani G. D. (2006), Textbook of Mental health and Hygiene, Akanksha Publishing.
2. Innes, A., Kelly, F., & McCabe, L. (2012). *Key Issues in Evolving Dementia Care: International Theory based Policy and Practice*. Jessica Kingsley.
3. Kennedy Carroll (1988). Human Development. New York : Macmillan.
4. Kimmel Douglas (1974). Adulthood and Aging. New York : Wiley.
5. Fontaine Karen Lee (2008), Mental Health Nursing 5th Edition, Pearson India publication.
6. Ramesh chadurveti, R. (2006). Guidance and counselling techniques. Chennai: SBA Book Publishers.
7. Shreevani R. (2011), A Guide to Mental Health and Psychiatric Nursing 3rd Edition, Jaypee Brothers.
8. Sidana Ajeet , et al., (2012), Community Mental Health in India, JAY PEE publishing.
9. Nayar Usha S (2012), Child and Adolescent Mental Health, New Delhi, SAGE India
10. Hazen Eric P , Mark A Goldstein , Myrna Chandler Goldstein (2010), Mental Health Disorders in Adolescents: A Guide for Parents, Teachers, and Professionals, Rutgers University Press
11. Nair Mkc (2016), Adolescent Counseling, Jaypee Brothers Medical Publishers Pvt. Ltd.
12. Martin Michael, Cynthia Waltman Greenwood (1995), Solve Your Child's School-Related Problems, Perennial publishers
13. Segal, D.L., Qualls, S.H. and Smyer, M.A. (2018). *Aging and Mental Health*. Chichester: Wiley Blackwell.
14. Stuart Hamilton, I. (2012). *The Psychology of Ageing*. London: Jessica Kingsley Publishers.

Digital Media and Human Development (THEORY)

Code: HSH-622

Credits: 4

Total Marks:100

80 marks – End Semester Examination
20 marks – Internal Assessment

Objectives:

- Understand the role of digital media in human development across the lifespan.
- Examine the impact of social media, AI, gaming, and digital environments on children, adolescents, and families.
- Analyze opportunities and risks associated with digital technology.
- Develop skills for responsible digital engagement, media literacy, and digital wellbeing.
- Gain practical exposure to digital tools used in education, communication, and developmental research.

Learning outcomes:

Students will be able to:

1. Understand the role and influence of digital media on human development across different stages of life.
2. Analyze the impact of digital media on self-concept, behaviour, mental health, relationships, and wellbeing.
3. Apply media literacy, digital citizenship, and responsible technology-use practices in educational, family, and social contexts.

Unit I: Introduction to Digital Media and Human Development Meaning, nature, and scope of digital media, Concept of digital childhood and digital society Types of digital media: Social media, Streaming platforms, Gaming, AI-based applications, Educational technologies; Human development in the digital age Theoretical perspectives in digital media usage: • Ecological systems theory • Social learning theory	25 marks
Unit II: Digital Media Across Developmental Stages • Screen exposure in infancy and early childhood • Digital learning and media engagement among school-age children • Role of digital media in cognitive, language, and social development, • Self-concept and self-image in the digital age; social media and identity formation during adolescence; Peer influence, online validation, and self-esteem • Social comparison and presentation of self on digital platforms • Influence of influencers, beauty standards, and online trends on self-image • Online friendships, relationships, and emotional wellbeing • Digital relationships and communication among young adults • Parenting in the digital era: Digital parenting styles, Monitoring and mediation, Co-viewing and guidance; Impact of digital media on family interaction and communication	25 marks

Digital engagement and technological adaptation among older adults	
Unit III: Digital Media, Mental Health, and Wellbeing - Concept of digital wellbeing and balanced technology use - Psychological effects of excessive screen exposure; Internet addiction and problematic media use; Social media addiction and fear of missing out (FOMO); Cyberbullying, trolling, online harassment, and cyberstalking - Sleep disturbances and sedentary lifestyle associated with digital media - Social comparison, body image concerns, and self-esteem issues - Influence of influencers, celebrity culture, and online trends on behaviour - Gaming behaviour: Online gaming and aggression, Gaming disorder, Educational and therapeutic gaming - Digital stress, anxiety, loneliness, and emotional regulation - Exposure to inappropriate content and its developmental implications - AI algorithms, personalized feeds, and behavioural influence - Strategies for healthy and mindful technology use - Role of parents, teachers, and counsellors in promoting digital wellbeing	25 marks
Unit IV: Media Literacy, AI, and Emerging Trends - Meaning and importance of media literacy - Critical evaluation of digital content - Fake news, misinformation, propaganda, and fact-checking - Digital footprints and online identity management - Privacy, data protection, and cyber security awareness: AI and human development, AI in education, AI-assisted learning tools, AI and child development - Chatbots and virtual assistants - Role of digital media in education, advocacy, and social change - Digital inclusion and accessibility for diverse populations - Assistive technologies for children with special needs - Virtual classrooms and online learning environments - Emerging technologies: Virtual Reality (VR), Augmented Reality (AR), Metaverse, Wearable technologies - Ethical concerns in AI and digital technology - National and international policies related to digital safety and media regulation	25 marks

Suggested Readings

- Livingstone, S. (2021). *Parenting for a Digital Future*. Oxford University Press.
- Turkle, S. (2017). *Reclaiming Conversation: The Power of Talk in a Digital Age*. Penguin.
- Valkenburg, P. M., & Piotrowski, J. T. (2017). *Plugged In: How Media Attract and Affect Youth*. Yale University Press.
- Ito, M. et al. (2019). *The Digital Youth Network*. MIT Press.
- American Academy of Pediatrics. (Latest Guidelines on Children and Media Use).
- UNICEF. (2023). *Children in a Digital World*.
- OECD Reports on Digital Education and Wellbeing.
- Government of India. National Education Policy (2020) — Digital Learning Initiatives.

Practical based on HSH-621 and HSH-622

Code: HSH-623

Credits: 4

Marks: 100

Based on HSH-621 Mental Health and Developmental Perspectives

1. Administration of standardized psychological mental health assessment tools.
2. Develop Interview schedule and conduct a case study of individuals from different developmental stages to study their emotional, behavioural, or adjustment problems.
3. Organize campus-wide mental health awareness campaign using self-developed tools.
4. Interaction programme with a resource person on mental health.
5. Visit to Mental Health Institute to observe mental health services
6. Notebook/Report
7. Viva

Based on HSH-622 Digital Media and Human Development

1. Prepare and administer a survey on screen time habits among children, adolescents, or adults and report writing.
2. Analyze selected social media posts/videos for themes related to body image, gender roles, parenting, or mental health.
3. Develop a digital wellbeing plan for a child, adolescent, or family including healthy media use guidelines.
4. Review and evaluate one educational app or AI tool used for child learning or development.
5. Design a poster, infographic, short video, or presentation on:
 - Cyber safety
 - Responsible social media use
 - Media literacy
 - Healthy screen habits
6. Articles prepared during the course
7. Notebook/Report
8. Viva

2nd Semester

CHILDREN WITH SPECIAL NEEDS (THEORY)

Code: HSH-613

Credits – 4

Total Marks:100

80 marks – End Semester Examination
20 marks – Internal Assessment

Objectives:

- To understand the concepts of disability, its classification, challenges and needs of children with special needs.
- To enable the students to know the importance of identification, screening and intervention
- To gain knowledge of educational services, teaching strategies and management approaches
- To understand the importance of special and inclusive education to enhance their learning and development.

Learning outcomes: Students will be able to:

- Identify the differently abled children and engage them in a better manner
- Trace children with social and emotional problems and channelize them in a positive way
- Enlighten the disabled on the different provisions of the government

Unit -I Introduction <i>Differently abled children</i> Concept, meaning, types and definitions Difference between impairment, disability and handicap, Need for early identification and intervention, Needs and problems of differently abled children, Special schools and integrated school, Inclusive education <i>Children with emotional/behavioral disorders and children in difficult circumstances</i> Emotional/behavioral disorders- definition, classification, characteristics, causes, identification and remedial measures Children in difficult circumstances- juvenile delinquency, abused children, deprived children, orphan, Labored children- definition, characteristics, causes and remedial measures.	25 marks
Unit –II Intellectually challenged children and children with motor difficulties <i>Intellectually challenged children</i> Definition, classification/types, characteristics, causes, prevention and management Gifted and creative children, Mentally retarded children, Cerebral palsy and Down syndrome <i>Children with motor difficulties</i> Definition, characteristics, significance and symptoms, treatment and management, Muscular dystrophy, spina bifida, traumatic injuries, spinal cord injury, multiple sclerosis, Tourette Syndrome, paraplegia	25 marks
Unit-III: Neuro developmental disorder Definition, classification/types, characteristics, causes, prevention and management ADHD, Learning disability, slow learners, Autism	25 marks
Unit-IV: Sensory/communicative disorder Definition, classification/types, characteristics, causes, prevention and management: Visual impairment, Hearing impairment, Speech impairment	25 marks

References

Books

1. Mangal S.K. (2000). Educating exceptional children. RHI Learning Pvt Ltd, New Delhi
2. Reddy G.I. and Sujatha I. (2006). Children with disabilities, Discovery Publishing House, New Delhi
3. Reddy G.I. (2007). Education of children with special needs. Discovery Publishing House, New Delhi
4. Reddy I., Ramar R. and Kusuma A. (2004). Hearing impairment – an educational consideration. Discovery Publishing House, New Delhi
5. Relakar S., Delvi I. and kaul A. (2006) fundamentals of speech and speech teaching.
6. Sharma K. (2006) Rehabilitation of hearing impaired children. Sarup and Sons, New Delhi

Journal

1. Childhood Disability Update- A Ramco scientific communication, New Delhi
2. Consult Education for persons with handicapped. NIMHANS, Bangalore

Code: HSH-614

Practical based on HSH-613

Credits: 4

Marks: 100

1. Preparation of checklist for identification of different types of children with special needs.
2. Preparation of teaching aids /charts /poster /play equipment /materials for children with special needs.
3. Visit to institutions of children with special needs to observe their teaching methods.
4. Case profile of a child/an adolescent with disability.
5. Three Day exposure visit to institutions dealing with children with special needs/occupational therapy centre.
6. Assessing/Surveying various public spaces for Universal Design Principles for Inclusion.
7. Report of Visit
8. Notebook
9. Viva

PERSONALITY DEVELOPMENT (THEORY)

Code: HSH-624

Credits: 4

Marks: 100

Objectives:

- To enable the students to understand the concept of personality.
- To equip them with the skills to develop a healthy personality.

Learning outcomes:

Students will be able to:

- Explain the different theories of personality and the different types and factors influencing
- Compare and contrast the different types of personality disorder and its associated symptoms and characteristics

Unit-I: Concept of personality Definitions, meaning and forms of personality. Influence of heredity and environment on personality-physical, intellectual, emotional, social, sex, education, aspiration and achievement Impact of Media culture on Personality Development	25 marks
Unit-II: Theories of personality and its Implications <i>Implications of various theories relevant to personality development:</i> <i>Trait theories</i> - OCEAN 5 factors of personality, Cattell, Eysenck <i>Psychodynamic theories</i> - Freud's Psychoanalytic theory, Erickson's Psycho-social theory, Carl Jung's theory, Alfred Adler theory <i>Humanistic theories</i> – Carl Rogers, Abraham Maslow <i>Social Cognitive theory</i> – Albert Bandura <i>Behavioural theories</i> – Watson, Skinner	25 marks
Unit-III: Development of personality Self-image, self-esteem, self- concept <i>Determinants of personality development-</i> self-confidence, body language, communication skills, public speaking, social etiquette, projecting a positive social image <i>Other aspects of personality development-</i> problem solving, conflict and stress management, decision making skills, leadership qualities, time management, SWPOT analysis	25 marks
Unit-IV: Personality disorders Concept, definition and causes Types of personality disorders – • Suspicious (Paranoid, Schizoid and Anti-social), • Emotional and Impulsive (Borderline, Narcissistic, Bipolar) and • Anxious (Avoidant, Dependent, Obsessive Compulsive) Symptoms, characteristics and related therapies.	25 marks

References

Books

1. Fediman J. (2009), Personality and Personal Growth, Darling Kindersly Publisher, South Asia.
2. Hariharan M. (2008), Coping with life stream, Nag Publications, New Delhi.
3. Harish C.M. (2007), Personality, development, modern methods and technique
4. Howard E.S. (2006), Personality, classic theories and modern research, Darling Kindersle India
5. Hadock E.B. (2008), Personality Development, 32nd Edition, Tata McGraw Hill Publishing Company Limited, New Delhi
6. John A. (2007), Personality Development, Lotus Press, New Delhi
7. Santrock J.W. (2007), Psychology Essential, Tata McGraw Hill Publication, New Delhi
8. Wallnee R.H and Mastress C.A. (2009), Personality Development, Baba Baskhenath Publishers India

Journals

1. Journal of Child development, Black Well Publications Pvt. Ltd., United States
2. Psychological Studies, ICSSR, New Delhi

**RESEARCH METHODOLOGY
(THEORY)**

Code: HSH- 615

Credits: 2

Marks: 50

**RESEARCH
(DISSERTATION)**

Code: HSH- 625

Credits: 6

Marks: 150

Objective:

To initiate research work and submit the dissertation at the end of IV Semester

The students will be guided and supervised by a member of the teaching faculty of the concerned department. The dissertation in which the research culminates should reflect the students' own original work.