M.Sc. HOME SCIENCE

BRANCH X-D

FOOD AND NUTRITION

SEMESTER SYSTEM

2021 ONWARDS

MSC HOME SCIENCE

BRANCH X-D FOOD AND NUTRITION

REVISED SYLLABUS FROM 2021 ADMISSION ONWARDS

Programme Specific Outcomes:

PO1: To understand the concepts of physiology

PO2: To understand the basic principles in planning diets for disease condition

PO3:To analyse the need for maintaining quality in food industry

PO4: To construct a research design and to formulate research reports

PO5: To create a new standardised food product

PO6: To ascertain the role of technology in food processing

PO7: To identify and explore the various contaminants and toxins on food industry

PO8: To explore the various strategies to combat nutritional problems

PO9: To provide nutritional counselling for sports persons

PO10:To identify popular concepts in data management and statistical analysis

PO11: To discuss the metabolite pathways of major nutrients in the body

PO12: To determine the energy requirements of individuals based BMR, SDA and physical activity

PO13: To develop skills to work as dietician in hospitals

COURSE STRUCTURE & MARK DISTRIBUTION

UNIVERSITY OF KERALA

M.Sc. HOME SCIENCE

Branch XD Annexure Food and Nutrition- Course & Mark distribution

SEMESTER	PAPER CODE	TITLE OF THE PAPER	Distribution of hour / semester	Instructional hrs/week		ESE duration	Maximum Marks		
				L	P		CA	ESA	Total
I	HS 211D	Human Physiology	110	6	-	3	25	75	100
	HS212D	Medical Nutrition Therapy	110	6	-	3	25	75	100
	HS213D	Food Microbiology and Sanitation	110	6	-	3	25	75	100
	HS214B/ C/D/E	Research Methodology	120	7	-	3	25	75	100
		Total	**450**	**25**	**-**	**-**	**100**	**300**	**400**
II	HS221D	Applied Food Science	110	-	6		25	75	100
	HS222D	Nutrition Through Life Cycle	110	6	-	3	25	75	100
	HS223D	Advanced Food Technology and Engineering	110	6	-	3	25	75	100
	HS224D	Applied Food Science – Practical	120	-	7	3	25	75	100
		Total	**450**	**12**	**13**	**-**	**100**	**300**	**400**
III	HS231D	Food Safety and Quality Assurance	110	6	-	3	25	75	100
	HS232D	Public Health Nutrition	110	6	-	3	25	75	100
	HS233D	Nutrition for Sports and Fitness, Space Travel and During Disasters	110	6	-	3	25	75	100
	HS234B/ C/D/E	Statistics and Computer Applications	120	7	-	3	25	75	100
		Total	**450**	**25**	-	-	**100**	**300**	**400**
IV	HS241D	Biochemistry	110	6	-	3	25	75	100
	HS242D	Advanced Human Nutrition	110		6	3	25	75	100
	HS 243D	Nutritional Biochemistry Practical	110	6	-	3	25	75	100
	HS 244D	Internship in the field of Nutrition, Dietetics & Research	120	-	7	3	25	75	100
		Total	**450**	**18**	**7**	-	**100**	**300**	**400**
	HS245D	Dissertation	**-**	**-**	**-**	**-**	**-**	**100**	**100**
	HS246D	Comprehensive Viva	**-**	**-**	**-**	**-**	**-**	**100**	**100**
		Tutorial work	**5hrs/week**	**-**	**-**	**-**	**-**	**-**	**-**
		Grand Total		**80**	**20**	-	**400**	**1400**	**1800**

L-Lecture, P-Practical, ESE-End semester examination, CA-Continuous assessment
ESA-End semester assessment.

UNIVERSITY OF KERALA

MSc –HOME SCIENCE-Semester System

(2021 ADMISSION ONWARDS)

Branch XD FOOD AND NUTRITION

Semester –I

1.1 Human Physiology

1.2 Medical Nutrition Therapy

1.3 Food Microbiology and Sanitation

1.4 Research Methodology

Semester –II

2.1 Applied Food Science

2.2 Nutrition Through Life Cycle

2.3 Advanced Food Technology and Engineering

2.4 Applied Food Science – Practical

Semester –III

3.1 Food Safety and Quality Assurance

3.2 Public Health Nutrition

3.3 Nutrition for Sports and Fitness, Space Travel and During Disasters

3.4 Statistics and Computer Applications

Semester –IV

4.1 Biochemistry

4.2 Advanced Human Nutrition

4.3 Nutritional Biochemistry Practical

4.4 Internship in the field of Nutrition, Dietetics & Research

4.5. Dissertation

4.6. Viva Voce

Branch X D Food and Nutrition

Semester	C.A*	ESA**	Total
SemesterI	**100**	**300**	**400**
SemesterII	**100**	**300**	**400**
SemesterIII	**100**	**300**	**400**
SemesterIV	**100**	**300**	**400**
Dessertation			**100**
Comprehensive Viva Voce			**100**
Grand Total			**1800**

- *C A Continuous Assessment
- **ESA End semester assessment

UNIVERSITY OF KERALA
M.Sc. HOME SCIENCE - SEMESTER SYSTEM
BRANCH X – D

FOOD AND NUTRITON

(2021 Admission)

Semester I

- **1.1 Human Physiology**
- **1.2 Medical Nutrition Therapy**
- **1.3 Food Microbiology and Sanitation**
- **1.4 Research Methodology**

Semester II

- **2.1 Applied Food Science**
- **2.2 NutritionThrough Life Cycle**
- **2.3 Advanced Food Technology and Engineering**
- **2.4 Applied Food Science – Practical**

Semester III

- **3.1 Food Safety and Quality Assurance**
- **3.2 Public Health Nutrition**
- **3.3 Nutrition for Sports and Fitness, Space Travel and During Disasters**
- **3.4 Statistics and Computer Applications**

Semester IV

- **4.1 Biochemistry**
- **4.2 Advanced Human Nutrition**
- **4.3 Nutritional Biochemistry Practical**
- **4.4 Internship in the field of Nutrition, Dietetics & Research**

UNIVERSITY OF KERALA
M.Sc. HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
Semester I
Branch XE-FOOD AND NUTRITION
(Common to Branches XD & XE)
HS 211 E PAPER I - HUMAN PHYSIOLOGY
SYLLABUS

Total hrs: 110

Learning Objectives:

To enable the students to

1. Obtain an insight into the structure and functions of various organs in the body.
2. Understand the anatomy and physiology of the various systems in the human body
3. Gain knowledge on the functioning of various systems

Outcome: on completion of the course, student should be able to-

CO1: Explain the structure and functions of organ systems
CO2: Elaborate on functions of various hormones in the human body
CO3: Gain knowledge regarding immunity, immune mechanism and disorders
CO4: Enable students to understand organ and organ systems in human health and nutrition

Unit I -Blood and Circulatory System

Composition & Functions of the blood, Cellular Content of Blood- their properties and functions, Blood Groups, Blood transfusion, Bleeding disorders, lymph, Tissue fluids, Reticuloendothelialr system, Blood volume, coagulation.

Structure of heart, Physiology and properties of cardiac muscle, Cardiac cycle, Cardiac output, Heart rate, Heart sound and ECG

Unit II- Digestive System

Physiology of digestive system-Structure, functions, secretions; movements of gastrointestinal tract, Digestion of protein, carbohydrate and fat

Unit III Respiratory System

Structure of Respiratory organs, Mechanism of respiration, Exchange and transport of gases, Respiratory volume, Respiratory adjustments in health and diseases.

Unit IV Excretory System

Physiology of the kidney, urine formation, Micturition - normal and abnormal constituents of urine, elementary principles of dialysis, maintenance of homeostasis.

Unit V Endocrine and Reproductive System

Endocrinology- Hormones- pituitary, thyroid, parathyroid, adrenal, sex hormones, pancreas; Effects of Hypo and Hyper functions of the glands.

The female reproductive system -menstrual cycle; The male reproductive system - The process of reproduction

Unit VI Immunology

Natural immune system, cell mediated and humoral immunity, components of immune mechanism (cellular and chemical).Role of inflammation/defence (acute and chronic), Immunoglobulins and production of antibodies. Disorders –Immune deficiency, Hypersensitivity

RELATED EXPERIENCE

1. RBC/WBC Count, Total count Determination of plasma proteins
2. Determination of Blood pressure
3. Qualitative test of urine for normal and pathological conditions

SUGGESTED REFERENCES
BOOKS

1. Elaine N. Marieb, Katja N. Hoehn; Human Anatomy & Physiology, Global Edition, Pearson Education Ltd,2016

2. Thomson, R.H.S. and King, E.O. Biochemical Disorders of Human Diseases A.P., New York.

3. Anne Waugh & Allison Grant, Ross and Wilson Anatomy and Physiology in Health and Illness, 12th Edition, Elsevier, New York, 2014

4. Stuart Fox, Human Physiology, 13th edition, McGraw-Hill Education publishers, 2012.
5. Bruce M. Koeppen, Bruce A. Stanton, Berne & Levy Physiology, 6th Edition, Elsevier, 2010
6. John E. Hall, Guyton & Hall Textbook of Medical Physiology, 13th edition, Elsevier, New York, 2016
7. Chatterjee, C.C; Human Physiology, 11th Edition, CBS Publishers and Distributors Pvt Ltd.
8. NM Muthaya (2010). Human Physiology.4th ed. Jaypee Brothers PVT LTD, New Delhi.

9. VidyaRatan (2004) Handbook of Human Physiology. 7th ed. Jaypee Brothers PVT LTD, New Delhi.
10. Sudha V Khanorkhar (2012)Insights in Physiology. 1st ed. .Jaypee Brothers PVT LTD, New Delhi.
11. R Chandramouli (2010)Textbook of Physiology.3rd edition. . Jaypee Brothers PVT LTD, New Delhi.
12. R L Bijlani& S Mnajunatha (2010) Understanding Medical Physiology.4th edition. Jaypee Brothers PVT LTD, New Delhi.

JOURNALS

1. Israel Journal of Medical Sciences, Israel Medical Association, National Council for Research and Development.
2. The Journal of Laboratory and Clinical Medicine, C.V. Mosby Company.
3. The Indian Journal of Medical Research, ICMR. New Delhi

UNIVERSITY OF KERALA

M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester I
HS 212 D PAPER II MEDICAL NUTRITION THERAPY
SYLLABUS

Total hours: 110

Learning Objectives: To enable the students to
1.Understand the role of nutrition for good health.
2.Obtain knowledge of different Therapeutic diets and their preparation.
3.Develop capacity and attitudes for taking up dietetics as a profession

Course Outcomes:
CO1: To understand the basic principles in planning diets for disease condition
CO2: To impart diet counselling to individuals based on their needs
CO3: To analyse and create individualized diet plan for diseased conditions

UNIT I Introduction to Dietetics
Meaning and scope of dietetics Role of dietician in hospital and community, Registered Dietitian, Indian Dietetic Association, Nutrition Society of India

UNIT II Hospital Diet
The Hospital Diet- Clear fluids. Liquid diet, Soft diet, Balanced normal diet, Feeding methods, Enteral and Parenteral nutrition, Calculation of diet using the Ready Reckoner 1200 cal, 1500cal, 1800 cal, 2000cal. Commercial supplement available in the market, Nutrition Care Process, Common biochemical tests affecting nutritional needs–lipid profile, AC/PC, (fasting & post-prandial sugars), Liver Function tests, Kidney function tests.

UNIT III Febrile Conditions

Causes, Symptoms, metabolic changes, dietary modifications in Fevers of short duration and in chronic fevers – influenza, TB, Severe Acute Respiratory Syndrome (SARS), HIV/AIDS

UNIT IV Disease of the Gastrointestinal tract
Disorders of the gastro intestinal Tract- Peptic ulcer, Diarrhoea, Constipation, Crohn's Disease, Ulcerative colitis, Irritable Bowel Syndrome, Diseases of the liver-Hepatitis, Cirrhosis, ESLD

UNIT V NCDs and Kidney Diseases
Causes, types, symptoms, dietary modifications- Diabetes, Obesity, Cancers, Cardiovascular diseases (Atherosclerosis, Myocardial Infarction, Hypertension);

Food exchange list, My plate planner, insulin carb counting, Glycemic Index Glycemic Load,

Special Diets for Obesity- Keto, Low Carb diets, Low Calorie diets, Intermittent Fasting, Post Bariatric surgery diets

Anti-carcinogenic nutritional agents

Kidney Diseases- causes, symptoms and dietary modifications in Glomerulonephritis, Nephrosclerosis, Kidney stones, End stage renal disease; Dialysis-types and dietary modifications

RELATED EXPERIENCE

1. Visit to Dietetics Kitchen.
2. Market survey of commercial nutritional supplements
3. Plan diets for various disease conditions using the Ready Reckoner
4. To conduct mock diet clinics and provide nutritional counselling
5. To design research study in clinical settings

JOURNALS

1. Journal of American Dietetic Association. The American Dietetic Association Mount Marries, Illinois, USA.
2. The American Journal of Clinical Nutrition USA
3. The Indian Journal of Medical Research. The Indian Council of Medical Research, New Delhi.
4. British Medical Journal UK
5. The American Journal of Clinical Nutrition, Published by the American Society for Clinical Nutrition, USA
6. Nutrition Abstracts and Reviews, CNB International, UK.
7. The Indian Journal of Nutrition and Dietetics, Sri Avinashilingam Home Science College for Women, Coimbatore. India
8. Clinical Nutrition, Bell and Bain Ltd, Scotland. UK
9. Food and Nutrition Bulletin, United Nations University, Press, Japan.
10. Indian Journal of Endocrinology and Metabolism, India
11. Nutrition Reviews, Nutrition Foundation, Washington. USA

TEXTBOOKS

1. Antia F.P. Clinical Dietetics and Nutrition, Oxford University Press, Mumbai, 1989
2. Corinee et.al. "Nutrition and Diet Therapy Principle and Practice" 2nd Edition, West Publishing Company, St. Paul 1989
3. Clare M Lewis, Nutrition and Nutritional therapy in Nursing, Appleton-Century Crofts, Connecticut, 1986
4. Davidson, S. Passmore, R. Brook, J.F. and Trustwell, Human Nutrition and Dietetics, 9th edition, F. and S Livingstone Ltd., Edinburgh and London 1993
5. B. Srilakshmi, Dietetics, New Age International Private Ltd, New Delhi, 1995
6. Nihal Thomas, K.J. (2012). A Practical Guide to Diabetes Mellitus (New Delhi: Jaypee).
7. Robinson C.H. , Lawler, M.R., Chenoweth, W.L., Garwich, A.E. Normal and Therapeutic Nutrition 7th Edition, Macmillan Publishing Co. New York 1994.

8. Krause M.V. Hunscher, M.A. Food, Nutrition and Diet Therapy, W.S. Saunders Co. Philadelphia, London, 1980

9. Maurice E Shills, James A Oslen, Moshe Shike, Modern Nutrition on Health and Disease" Vol I & II, VIII edition, Lea and Pebiger, Philadelphia 1984

10. World Cancer Research Fund and American Institute for Cancer Research; "Food, Nutrition and Prevention of Cancer. A Global Perspective, "American Institute for Cancer Research, Washington, 1997.

11. Current Topics in Nutrition- Joseph et.al. 2021 Romanson Publishing House Tvpm. ISBN 978-81-9466901-2

UNIVERSITY OF KERALA
MSc HOME SCIENCE — SEMESTER SYSTEM
(2021 Admission)
BRANCH XD — FOOD AND NUTRITION
SEMESTER I
HS 213D-PAPER III - FOOD MICROBIOLOGY AND SANITATION

Total: 110 hours

Learning objectives:

To Enable Students to

1 To understand the common microorganisms related to food stuffs
2. Understand the organisms associated with food borne illnesses, and quality control measures
3. Gain knowledge on the necessity for cleanliness in preparation and service of foods.

Course outcome

CO1: To understand common food microbial Organisms
CO2: To inculcate knowledge about the quality control measures
CO3: To gain the knowledge about the beneficial microorganisms associated with food

Unit I Fundamentals Of Microbiology

Development of microbiology, Bacteria, Introduction Morphology, reproduction, physiology. Growth curve and. biochemical changes in bacteria, Sterilization: Physical agents — light desiccation electricity and heat. Chemical agents, removal of microorganism and filtration.

Unit II Microbial physiology and morphology

Yeasts - Morphology, Methods of multiplication process of Hybridization physiology classification and importance of yeasts. Molds - Morphology, multiplication, physiology and nutrition. Significance of molds and common house hold molds. Viruses - discovery, bacteriophages, morphology, reproduction, human viral diseases, identification and control and viruses in relation of food science.

Unit III Development of microbiology

Microorganisms in Food –Bacteria, Molds, Role and Significance of Microorganisms in Foods. Parameters Affecting Microbial Growth: Intrinsic, Extrinsic factors, hurdle concept. Food born infections and intoxication

UNIT IV Microbiology of Foods

Kinds of microorganisms in milk. Sources of contamination, pathogens in milk, control of microorganisms, quality and methods of study, Microbiology of dairy products — Fermented milk, butter and cheese. Fruits and Vegetables, External contamination, preservation and spoilage of fruits, contamination and control of microorganisms in vegetables.Cereals and cereal products: Organism associated with grains, spoilage, classification and control of molds in bread.

Flesh foods spoilage of flesh foods, bacteria found in meat, microbiology of poultry, fish and meat products.Effect of salt on microorganisms, role of sugars in foods and role of spices in food preservation

Unit V Applications of Food Microbiology

Microorganisms in Intestine- Beneficial role of Bacteria-Concept of Prebiotics and Probiotics

Unit VI Quality Control In Food Microbiology

Food Preservation & Principles of Quality Control: Chemicals, antibiotics, Radiation, Low and high temperature, High-Pressure Processing, Pulsed Electric Fields. Aseptic Packaging, Nanothermosonication, Microbiological quality standards of food, FDA, Hazard Analysis Critical Control Point (HACCP).

RELATED EXPERIENCES

Visit to microbiology labs in Government and Private sectors
Microbial Examination of different microorganisms in food samples

REFERENCES

1. Jay MJ (1986) Modern Food Microbiology, 3rd edition, Van Nostrand Reinhold, New York

2. Banwart JG (1987) Bsic Food Microbiology, 1st edition, CBS publishers and Distributors

3. Frazier WC and Westoff DC (1988) Food Microbiology, 3rd edition, Tata McGraw Hill Publishing Company

UNIVERSITY OF KERALA.
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D —FOOD AND NUTRITION
Semester I
HS 214 B/C/D PAPER IV - RESEARCH METHODOLOGY
(Common to Branches X B, C, D)

Total hrs 110 hours

Learning Objectives:

1. To have a basic knowledge about research and its methodologies
2. To identify and define appropriate research problems
3. To organize and conduct research in a more appropriate manner
4. To understand various steps in writing a research report, thesis research proposal

Course Outcomes:

CO1: To identify appropriate research problems and methodologies

CO2: To construct a research design and to formulate research reports

CO3: To recognize the ethics in Home science research

Unit I: Research Methodology, Research Problem

Research Methodology-Meaning, objectives and significance of research. Types of research, Research process and criteria of good research.

Research Problem- Selection of research problem, justification**,** Research gap, Development of hypothesis and its significance, hypothesis testing**,** Variables – types and characteristics.

Unit II: Review of literature

Functions, sources, steps in carrying out a literature review; types of review-Narrative, systematic, metanalysis, developing searching strategies, use of bibliographic databases, free reference management software- Mendeley, Zotero

Unit III: Research design

Meaning and needs, features of a good design; Important concepts relating to research design; Different research designs - 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) Pilot studies

Unit IV: Methods and tools of Data Collection-

Interview, Case study, Survey, Scaling methods, Schedules and questionnaires, Reliability and validity of measuring instruments**.**

Unit V: Sampling design

Population and sample, Steps in sampling design, Criteria for selecting a sampling procedure, Different types of sampling techniques- probability sampling and non-probability sampling. Merits and demerits of sampling

Unit VI: Ethics in Research in Home Science and Scientific Writing

Ethical issues in human studies. Information fact sheet, Informed consent of participant, Ethics in Academic writing- Plagiarism and tools

Scientific Writing-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. Formulation of research design / proposal

References

1. Best J M and Kahn, J.V. Research in education, 10thedition, Prentice Hall of India, New Delhi, 2006
2. Devadas, R.P. A Handbook on methodology of research. Sri Ramakrishna Vidyalaya, Coimbatore, 1989
3. Gosh B.N. Scientific methods and social research. 4th edition, Sterling Publishers Pvt. Ltd. New Delhi, 2012
4. Kothari, C. R. Research Methodology – methods and techniques, 3rd edition, New age International Publishers, New Delhi, 2014
5. Kulbir Singh, Sidhu. Methodology of Research in Education, Sterling Publishers Pvt.Ltd. New Delhi,
6. Sharma, B.A. V, Prasad, R.D. and Satyanarayana, P. Research methods in Social Science, Sterling Publishers Pvt. Ltd.,
7. Wilkinson, T.S and Bhandarkar, P.L. Methodology and Techniques of Social Research, Himalaya Publishing House, Bombay.

UNIVERSITY OF KERALA
MSc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D - FOODS AND NUTRITION
Semester II
HS 221D - PAPER V - APPLIED FOOD SCIENCE

Total hrs: 110

Learning objectives:

To enable the students to

1. Gain knowledge on sources and properties of food.
2. Develop skills to judge the quality of cooked foods.
3. Apply the principles while preparing and cooking foods.

Course outcome

1 To understand the different physico chemical properties of food
2 To analyse and interpret the different factors for quality cooking in experimental cookery
3 To inculcate knowledge on recent trends in food science

UNIT I Physiochemical Changes

Introduction to food science, Different methods of cooking, Physical and physiochemical changes in
foods in relation to cookery, Gel formation, denaturation of Proteins —properties of colloids, emulsions stabilizers, browning reactions, Enzymatic and non- enzymatic changes in cooking.

UNIT II Carbohydrates

Sugar Cookery — sources, uses and properties, Carbohydrates Crystallization of sugar, stages of sugar
Cookery. Starch Cookery: Sources and use of starch. Factors affecting, Gelatinization, synergenesis and
Retrogradation, types of Flours, baking qualities. Bread making –role of ingredients, proportion of
ingredients, Dough development, method of dough mixing, dough chemistry, leavening agents.

UNIT III Proteins

Meat- Structure, cuts of meat and post mortem changes -methods of cooking Fish Kinds of fish, constituents, selection and cooking. Eggs- structure, composition and selection, coagulation. Milk and milk products, constituents, processing-clarification, homogenization, pasteurization. cheese making –basic steps, Pulses and legumes processing- germination, fermentation.

UNIT IV Fats and Oils

Sources and extraction of edible fats and oils-characteristics of fats, physical, chemical properties. Changes in fat during storage and cooking - uses of fat-shortening , emulsifying and creaming agent

UNIT V Food Preservation

Needs, benefits, principles and methods of food Preservation, Use of irradiation and microwave for Preservation. Processing and specifications.

UNIT VI Evaluation of Food Quality

Introduction, International: FPO, Codex Alimentarius, FDA. National: FSSAI- Introduction, regulations, standard review groups (SRGs)

Food safety: The concept of food safety and its definition. Elements of food safety management.

Challenges in management of food safety and outlook. Hazards associated with foods

Sensory evaluation of food. Factors to be considered in food testing. Types of sensory tests. Sensory panel. Food additives Definition, Types of Food Additives, Food Adulteration Convenience foods Fast foods, ready to eat foods - merits, demerits.

TEXTBOOKS

1. Food Science: Fifth Edition (Food Science Text Series) 5th Edition.by Norman N. Potter and Joseph H. Hotchkiss
2. **Introduction to Food Engineering, Fifth Edition (Food Science and Technology)** Aug 16, 2013. R Paul Singh and Dennis R. Heldman
3. Essentials of Food Science (Food Science Text Series) 4th ed. 2014 Edition. Vickie A. Vaclavik and Elizabeth W. Christian
4. **Lawrie's Meat Science, Eighth Edition; Woodhead Publishing Series in Food Science, Technology and Nutrition;** Fidel Toldra**.**
5. Flavor, Satiety and Food Intake Beverly Tepper and Martin Yeomans. ISBN: 978-1-119-04489-5

JOURNALS

1. Herald of Health – India
2. World Health forum – Magazine of WHO
3. Food Processing U.S.A.

UNIVERSITY OF KERALA

M.Sc. HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester II
HS222D PAPER VI - NUTRITION THROUGH LIFE CYCLE
SYLLABUS

Total hrs 110

Learning Objectives: To enable the students to

1. Understand the role of nutrition in different stages of life cycle.
2. Gain knowledge about the nutritional problems, its implications and appropriate diet during different life cycles.

Course Outcomes:

CO1: To construct a research design and to formulate research reports
CO2: To ascertain the nutritional needs if the individuals of different age groups
CO3: To create individualized diet plan for the particular age group

Unit I Food Groups and Recommended Daily Allowance

Different food groups and planning diets using the Ready Reckoner to meet the requirement of different socio economic levels, Recommended Daily allowances for Indians 2020- Basis for requirement, computation

Unit II Nutrition in Pregnancy and Lactation

Nutritional requirements in pregnancy, weight gain during pregnancy. Physiological cost of pregnancy, Nutritional complications of pregnancy. Effects of alcohol and smoking on foetal growth, RDA, balanced diet for pregnant woman using the Ready Reckoner

Nutritional needs in lactation, Physiological changes during lactation, common problems related to breast feeding, RDA, balanced diet for a lactating mother using the Ready Reckoner

Unit III Nutrition in infancy

Nutritional requirements of infants, assessment of Infant growth, growth charts- Indian, WHO,' breast feeding, breast feeding versus formula feeding, weaning foods- WHO guidelines, food square, feeding the premature infant. Baby friendly hospitals, significance of the first 1000 days of life, RDA for Indian infants

Unit IV Nutrition in Preschool age and school age

Nutritional requirements, assessment of nutritional status, Growth and development, RDA, balanced diet using the Ready Reckoner.

Unit V Nutrition during adolescence

Nutritional requirements, assessment of nutritional status, Puberty and growth related changes, RDA, balanced diet for an adolescent using the Ready Reckoner

Unit VI Nutrition for the adults and the aged

Nutritional requirements, assessment of nutritional status, body composition of male and female, RDA, balanced diet using the Ready Reckoner.

Related Experience

Assessment of nutritional status of children/adults/aged in their environment
Plan balanced diets for individuals (through the life cycle) using the Ready Reckoner.

JOURNALS

1. Reports of the State of World's Children, Who and UNICEF, Oxford University.
2. Reports of National Family Health Survey, International Institute for Population Science, Mumbai.
3. World Development Reports, Investing in Health, World Development Indication.
4. Indian Journal of Medical Research, ICMR, New Delhi,
5. Indian Journal of Paediatrics,
6. Indian Journal of Nutrition and Dietetics, Avinashlingam Deemed University, Coimbatore.

TEXTBOOKS

1. Robinson C.H. , Lawler, M.R., Chenoweth, W.L., Garwich, A.E. Normal and Therapeutic Nutrition 7th Edition, Macmillan Publishing Co. New York 1994.

2. .Davidson,S. Passmore,R. Brook, J.F. and Truswell, Human Nutrition and Dietetics, 9th edition, F. and S Livingstone Ltd., Edinburgh and London 1993

3. Jelliffe, B.E. Assessment of the Nutritional status of the community, WHO, Geneva, 2nd edition 1989

4. Shanti Gosh, The feeding and care of infants and young children, voluntary health association of India,, New Delhi 6th edition 1992

5. Rao, D.H and Vijayaraghavan, K (1996), Anthropometric assessment of nutritional status in "Text Book of Human Nutrition", New Delhi; (eds. Bamji, M.S, Rao, N.P and Reddy, V.); Oxford and IBH Publishing Co. Pvt. Ltd., P 515.

6. Srilakshmi, B (2008), "Dietetics", New Delhi; New Age International (P) Ltd. Publishers, Pp 319-325.

7. Thimmayamma, B.V.S and Rao, P (1996), Dietary assessment as part of nutritional status in "Textbook of Human Nutrition", New Delhi; (eds. Bamji, M.S, Rao, N.P and Reddy, V.); Oxford and IBH Publishing Co. Pvt. Ltd., P 135.

8. Indian Council of Medical Research (2010), “Nutrient requirements and Recommended Dietary Allowances for Indians”, Hyderabad; National Institute of Nutrition, Pp 7-230.

9. Mahan, L.K and Stump, S.E (2004), “Krause’s Food Nutrition and Diet therapy”, Philadelphia; WB Saunders Co., Pp 534-555.

10. Emma, M.L (2008), “Handbook of Nutrition and Food”, London; CRC Press, Taylor and Francis group, Pp 373-388.

11. FAO/WHO/UNU (1985),"Energy and Protein Requirements", Geneva; World Health Organisation.

12. Gopalan, C; Sastri, B.V.R and Balasubramanian, S.C (1989), “Nutritive Value of Indian Foods”, Hyderabad; National Institute of Nutrition, ICMR, Pp 45-95.

13. Current Topics in Nutrition. Joseph et.al. 2021. Published by Romansons Publishing House, Trivandrum ISBN 978-81-9466901-2

WEBLIOGRAPHY

1.http://www.eeb.cornell.edu/biogeo/nanc/Food_Feed/table%201%20gopalan%20et%20al%201989.pdf _Nutritive Value of Indian foods

UNIVERSITY OF KERALA
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester II
HS223D PAPER VII - ADVANCED FOOD TECHNOLOGY & ENGINEERING

Total hrs 110

Learning Objectives:

To enable the students to

1. To understand the role of technology in food processing.
2. To learn principles of principles of food processing methods.

Course Outcome

CO1: To ascertain the role of technology in food processing

CO2: To update the student on the advancements in food technology

CO3: To compare and distinguish the various packaging materials in food industry

UNIT I Introduction to Food Technology

Concept of Food Technology, Physico-chemical properties of food – Boiling point, melting point, smoking point, freezing point.

UNIT II Food Grain and Oil Technology

Processing Technology of cereals -Avorio process, Conversion process, Malek process. Breakfast cereals – Processing- Batch cooking, continuous cooking, extrusion cooking. Textured protein products.

UNIT III Meat, Fish, Poultry and Dairy Technology

Grading, meat quality. Application of freezing system in meat and fish processing. Egg-Quality parameters, Product - Egg powder.

UNIT IV Beverage technology

Processing technology of alcoholic beverages – Wine making and Types- white, red and sparkling wine, Carbonated soft drinks – Ingredients and preservatives used in carbonation, Tea and coffee – General processing technique. Types – Green and Oolong Tea, Expresso and Instant Coffee.

UNIT V Application of Bio-Technology in Food and Nutrition

Impact and significance of biotechnology on the nutritional quality of foods. Genetic Engineering in foods. Nutrigenomics, Nutraceuticals, Xenobiotics, Nano Technology in Foods, Single cell protein, Novel proteins.

UNIT VI. Storage of grains and packaging technology

Role of Food Corporation of India FCI, Central Warehousing Corporation CWC, State Warehousing Corporation SWC, Indian Grain Storage Institute IGSI, Save Grain Campaign SGC in controlling food losses. packaging materials, Selection of packaging materials for specific food materials.

RELATED EXPERIENCE

Visit to Food Processing Plant.

BOOK REFERNCE

1. Fellows, P.J. 2000. Food processing Technology: Principles and Practice, Second Edition, CRC Woodhead Publishing Ltd., C
2. Von Loesecke, H.W. 1998. Food Technology Series: Drying and dehydration of foods, Allied Scientific Publishers, Cambridge.
3. Horseny R.C. 1986. Principles of Cereal Science and Technology. American Association of Cereal Chemicals, St. Paul MN.
4. Sahu, J.K Introduction to Advanced Food Process Engineering. 2014. CRC Press Reference 717 Pages - 91 B/W Illustrations. ISBN 9781439880715 - CAT# K13794.
5. Zeki Berk. 2015. Food Process Engineering and Technology (Second Edition) A volume in Food Science and Technology. ISBN: 978-0-12-415923-5.

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2. www.sciencedirect.com/science/book/9780124159235
3. onlinelibrary.wiley.com/doi/10.1002/9781118406281.fmatter/pdf
4. https://www.elsevier.com
5. https://www.researchgate.net/publication/304571979_Latest_Food_Technology

JOURNALS:

1. Food Technology, Journal of Institute of Food Technology, Illinois, U.S.A
2. Journal of Food Science and Technology by Association of Food Scientists and Technologists, India.
3. Food Technology, Abstracts, Central Food Technological Research Institute, Mysore.
4. Packaging in India, Indian Institute of packaging, Mumbai.
5. Journal of Technology, Institute of Technology, Illinois, U.S.2N.
6. Food Technology, Abstracts Control Food Technological Research Institute.
7. Advance Journal of Food Science and Technology
8. American Journal of Food Technology
9. Annual review of food science and technology.

UNIVERSITY OF KERALA
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester II
HS 224D PAPER VIII- APPLIED FOOD SCIENCE (Practical)
SYLLABUS

Total Hours 120

Learning Objectives

1 Understand the different aspects of cooking with demonstration
2 Gain knowledge about experimental cookery

Learning Outcome

1 To gain knowledge about different aspects of cooking
2 To inculcate the different aspects related to experimental cookery

1. Sugar Cookery- sources, Crystallization of sugar, stages of sugar Cookery, fondant, fudge, caramel and brittles , Indian preparations (Halwa and Syrup of Gulab jamoon,) coconut burfi, peanut brittle and an indigenous food item (eg. athirasam)

2. Starch cookery -use of flour mixtures, cereals and pulses, Microscopic examination of starch. Gelatinization of starch, preparation of dosai, iddli, appam, puri, chappathis and parathas (Batters and dough)

3. Demonstration of Bakery Products.

4. Fats-Smoking temperature-deep fat fried foods

5. Meat, fish and poultry- changes in cooking during different cooking methods and tenderness

6. Coagulation of egg proteins- Eggs cooked in shell, poached eggs, custards, egg white foams, Omelette, Cakes, Emulsion-mayonnaise.

7. Milk- principles involved in the preparation of tomato soup, cooking vegetables in milk, Cheese curry, setting of curds.

8. Fruit and vegetable cookery

9. Evaluating the acceptability of food through subjective and objective methods

10. Food preservation- Preparation of jams, jellies, squash, wine -dehydration, pickling

UNIVERSITY OF KERALA
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester III
HS 231D PAPER IX – FOOD SAFETY AND QUALITY ASSURANCE
SYLLABUS

Total hrs 110

Learning Objective

1. To enable the students to gain theoretical information and practical experience, directly and indirectly
2. To get a better understanding of food safety problems, their origin and solutions.
3. To ensure Food safety and quality in the food industry.

Course Outcomes

CO1: To introduce the various food laws and safety regulations of the food industry

CO2: To identify and explore the various contaminants and toxins on food industry

CO3: To understand food safety problems, their origin and solutions.

UNIT I **Introduction to food safety**: Food safety and its importance, Food Hazards ,Allergens, Food spoilage, Basic quality concepts

UNIT II **Food Laws and Regulations**

Food Safety and Standards Authority of India (FSSAI), The Prevention of Food Adulteration Act (PFA),

The Bureau of Indian Standards (BIS), Agricultural Marketing Quality Certification Standard (AGMARK), Indian standard institute, International Organization for Standardization (ISI), Codex Alimentarius (CODEX), International Organisation for Standardisation (ISO).

UNIT III **Hazard Analysis Critical Control Point (HACCP)**

Principles and pre- requisites of HACCP - Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), Good Agricultural Practice (GAP), Good production practice (GPP), Good distribution practice (GDP),Good trade practice (GDP);Total Quality Management (TQM), Sanitation and safety in food services.

UNIT IV **Food Toxicology**

Types of Toxicology, Principles of toxicology, classification of toxicants, impact of toxic chemicals on health

UNIT V Environmental contaminants and drug residues in food:

Fungicide and pesticide residues in foods; heavy metal and their health impacts; use of veterinary drugs (e.g. Malachite green in fish and β- agonists in pork); radioactive contamination of food, Food adulteration and potential toxicity of food adulterants. Processing contaminants- contaminants during packaging, storage and transport: cleaners, sanitizers and cross contaminants.

RELATED EXPERIENCE

Visit to any food quality lab.

JOURNAL REFERENCES

1. Journal of Food: Microbiology, Safety & Hygiene.
2. Journal of Food Safety and Hygiene
3. Comprehensive Reviews in Food Science and Food Safety.
4. Journal of Food and Chemical Toxicology.
5. Journal of Food Quality and Preference.
6. Journal of Food Protection.

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1. Early, R. (2006) Guide to Quality Management Systems for the Food Industry, Blackie, Academic and professional, London.
2. Gould, W.A and Gould, R.W. (2005) Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
3. Pomeraz, Y. and MeLoari, C.E. (2008) Food Analysis: Theory and Practice, CBS publishers and Distributor, New Delhi.
4. Bryan, F.L. (2007) Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva.
5. Kirk, R.S and Sawyer, R. (2005) Pearson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England.
6. FAO (2006) Manuals of Food Quality Control. 2-Additives Contaminants Techniques, Rome.
7. Pelczar, M.I., and Reid, R.D. (2009) Microbiology, 5th Ed., McGraw Hill Inc., New York.
8. James, M.J. (2007) Modern Food Microbiology, 2nd Ed., CBS Publisher, New Delhi
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10. Frazier, W.C. (2008) Food Microbiology, 4th Ed., McGraw Hill Inc., New York.
11. Doyle, P., Bonehat, L.R. and Mantville, T.J. (2007) Food Microbiology, Fundamentals and Frontiers, ASM Press, Washington DC.
12. The training manual for Food Safety Regulators. Vol.II- Food Safety regulations and food safety management. (2011) Food safety and Standards Authority of India. New Delhi.
13. AOAC International. (2005) Official methods of analysis of AOAC International. 17th Ed., current through 1st revision. Gaithersburg, MD, USA, Association of Analytical Communities.

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15. George, A.B. (2006) Encyclopedia of Food and Color Additives, Vol. III, CRC Press, LLC. Boca Raton, FL.
16. George, A.B. (2008) Fenaroli's Handbook of Flavor Ingredients, 5th Ed, CRC Press, LLC. Boca Raton, FL.
17. Madhavi, D.L., Deshpande, S.S., & Salunkhe, D.K. (2006) Food Antioxidants: Technological, Toxicological and Health Perspective, Marcel Dekker
18. Morton, I.D., & MacLeod, A.J. (2008) Food Flavors, Part A, B & C. Elsevier.
19. Nakai, S., & Modler, H.W. (2007) Food Proteins. Processing Applications. Wiley VCH.
20. The training manual for Food Safety Regulators. Vol.II- Food Safety regulations and food safety management. (2011) Food safety and Standards Authority of India. New Delhi
21. Mortimre, S., and Wallace, C., (2005) HACCP: A practical approach, 2nd Ed, Aspen Publication
22. Surak, J.G., and Wilson, S. (2007) American Society for Quality, 2nd Ed., Quality Press
23. Helferich, W., and Winter, C.K. (2007) Food Toxicology, CRC Press, LLC. Boca Raton, FL.
24. Shibamoto, T., and Bjeldanes, L. (2009) Introduction to Food Toxicology, 2nd Ed. Elsevier Inc., Burlington, MA.
25. Watson, D.H. (1998) Natural Toxicants in Food, CRC Press, LLC. Boca Raton, FL
26. Duffus, J.H., and Worth, H.G. J. (2006) Fundamental Toxicology, The Royal Society of Chemistry.
27. Stine, K.E., and Brown, T.M. (2006) Principles of Toxicology, 2nd Ed. CRC Press.
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2. www.thanut-swu.com/images/BOT331/food%20quality%20assurance.pdf
3. www.sciencedirect.com/science/book/9781845690106
4. onlinelibrary.wiley.com/doi/10.1002/9781118846315.ch10/summary
5. www.value-chains.org/.../GTZ-Food_Quality_And_Safety_Referencebook-Ed_2007

UNIVERSITY OF KERALA
M.Sc. Home Science

(2021 Admission)

Branch XE -FOOD AND NUTRITION
Semester III
Paper X – HS232E – Public Health Nutrition
(Common to Branches XD & XE)
Syllabus

Total hours: 110

Learning Objectives

1. To gain insight into the public health problems and their implications
2. To develop skills in organizing and evaluating nutrition projects in the community
3. To appreciate the national and international contribution towards nutrition improvement in India

Course Outcome: on completion of the course, student should be able to-

CO1: Demonstrate systematic knowledge and understanding of the commonly occurring nutritional problems

CO2: Create awareness on the basic programmes provided by national and international organizations

CO3: Apply different assessment techniques for nutritional screening

CO4: Describe the various strategies to combat malnutrition

Unit I - Public Health Nutrition – An Overview

Concept and importance of public health nutrition

Public health issues and problems

Health care system in India

Role of public nutritionist in health care delivery

Unit II - Public Health Problems - Prevalence and management

Non Communicable diseases- Obesity, Cardio-vascular diseases, Diabetes, Cancer and their preventive measures

Nutrient deficiencies – PEM, severe acute malnutrition, anemia, Vitamin D, Folic acid, IDD

Unit III - Assessment of nutritional status in community settings

Methods of nutritional assessment - ABCD technique

Dietary assessment – family diet survey, assessment of dietary intake of individuals, qualitative diet surveys, institutional diet surveys, food balance sheet

Unit IV - Strategies to combat Public Health Problems

Improving food and nutrition security - Green White and Blue revolution

Nutrition education - Principles of planning –, where, when, whom, Kitchen garden, food fortification, food enrichment, PDS, PHC

Unit V - Nutrition Intervention programmes

National Nutrition Policy Preschool feeding programme, ICDS, MDM, SNP, WNP, ANP, BNP, NNAPP, FNB, NIDDCP, National Program for Prevention of Blindness due to Vitamin A Deficiency

Unit VI- Strategies to combat malnutrition

International organizations concerned with food and nutrition: FAO, WHO, UNICEF, CARE, AFPRO, CWS, CRS World Bank and others.

National organizations concerned with Food and Nutrition: ICMR, ICAR, CHEB, CSWB, SSWB

Economics of Nutrition: Malnutrition and its economic consequences; Economics in Nutrition – Food security, food production and food pricing

RELATED EXPERIENCE

- Weighment of food intake by a family for 7 days (report)
- Visiting a few local feeding centre and evaluating the conduct of the programmes.
- Planning, conducting and evaluating nutrition education programme in rural areas.

JOURNALS

1. Proceedings of the Nutrition Society of India, Nutrition Society of India, New Delhi.
2. Nutrition Newsletter, Food and Agricultural Organization of the United Nations.
3. Ecology of Food and Nutrition, Gordon and Breach Science Publishers, London.
4. Social Welfare, Central Social Welfare Board, New Delhi.
5. WHO Chronicle, WHO, Geneva.
6. Swasth Hind, Central Health Education Bureau, New Dan.
7. Journal of Home Science, Sri Avinashlingam Home Science College, Coimbatore.

8. The Indian Journal of Nutrition and Dietetics, Sri Avinashlingam Home Science College, Coimbatore.

BOOK REFERENCES

1. Gulani, K.K. 2005. Community Health Nursing. 1st Edition. Kumar Publishing House. New Delhi. Pp – 662 to 664.
2. Gupta M.C., Mahajan B.K. 2003. Textbook of Preventive and Social Medicine. Third Edition. Jaypee Brothers Medical Publishers. New Delhi. India. Pp- 355-357.
3. Kishore J. 2007. National Health Programmes of India. 7th Edition Century Publication. New Delhi.Pp- 340-361.
4. .Oxford textbook of Public Health Ed. Roger Detels, James Mcewen, Robert Beaglehole, and Heizo Tanaka Oxford University Press (OUP) 4th Edition: 2002.
5. 2. Public Health at the Crossroads – Achievements and Prospects. Robert Beaglehole and Ruth Bonita 2nd Edition Cambridge University Press
6. 3) Maxcy-Rosenau-Last Public Health & Preventive Medicine, Fourteenth Edition Ed Robert Wallace, MD, et al.
7. 4) Epidemiology and Management for Health Care: Sathe , P.V. Sathe, A.P., Popular Prakashan, Mumbai, 1991
8. 5) International Public Health: Diseases, Programs, Systems, and Policies by Michael Merson, Robert E Black, Anne J Mills - Jones and Bartlett Publishers
9. 6) Preventive and Social Medicine, K Park, BansaridasBhanot Publishing House.

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3. http://wcd.nic.in/sites/default/files/nnp_0.pdf
4. "Nutrition and Anaemia" (PDF). Retrieved 2009-11-26.
5. "A campaign to end malnutrition in Bihar". www.ideasforindia.in.
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7. "Child Development Website". Source: Child Development programmes site (2009).
8. Programs to address malnutrition in India.
9. "National Rural Health Mission" (PDF). Source: National Rural Health Mission (2005–2012).
10. The Indian exception". The Economist. 31 March 2011.
11. "Putting the smallest first". The Economist. 23 September 2010. "Turning the tide of malnutrition" (PDF). World Health Organization.

UNIVERSITY OF KERALA
M.Sc. HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester III
HS233D PAPER IX – NUTRITION FOR SPORTS AND FITNESS, SPACE TRAVEL AND DURING DISASTERS

Total Hrs 110

Learning Objectives: To enable the students to

1. To get an insight into the role of nutrition in different Sports activities, Space travel and various natural disasters
2. To provide nutritional support for sportspersons, for space travel and during disasters.

Course Outcomes:

CO1: To get an insight into the role of nutrition in different sports activities, space travel and various natural disasters
CO2: To explore the role of macro, micro nutrients and fluids in sports nutrition
CO3: To provide nutritional counselling for sports persons
CO4: To facilitate nutrition support to disaster hit areas

UNIT I Exercise and Metabolism

Energy pathways during exercise of various duration and intensity- aerobic, anaerobic, very short duration, long duration, endurance, fatigue, onset of fatigue, nutrition and fatigue

UNIT II Macronutrients and Exercise

Carbohydrates and Exercise, Endurance training and fatigue, carbohydrate loading, Fats and exercise, Proteins and exercise, Protein requirements of sports –power sports/endurance athletes/

UNIT III Fluids & electrolytes

Water requirements, Functions of water in exercise, Role of electrolytes during exercise, fluid and electrolyte replacements

UNIT IV Ergogenic Aids, Sports supplements

Commonly used ergogenic aids (nutritional), Sports drinks

UNIT V Common Nutritional problems

Sports anaemia, female athlete triad, Eating disorders, RED-S

UNIT VI Nutrition during Space Travel and during disasters

Dietary modification and nutritional requirements- Space diet, Space foods;
Nutritional aspects to be considered during disasters

RELATED EXPERIENCE

1. Provide nutritional counselling and suggests pre, post event food options to sportsperson
2. To identify nutritional deficiencies in the female sportsperson

JOURNALS

1. Journal of Sports Nutrition and Exercise metabolism
2. Journal of Sports Science and Medicine
3. Physical Sports Medicine
4. Journal of Allied Sport Psychology
5. Physiology of Sports Medicine
6. Journal of Strength conditioning Research
7. Current Sports Medicine Reports
8. Sports Medicine
9. British Journal of Sports Medicine
10. Medicine Science of Sports Exercise
11. International Journal of Sports Nutrition and Exercise Metabolism
12. Clinical Sports Medicine

TEXTBOOKS

1. International Life Sciences Institute, Sports Authority of India and National Institute of Nutrition (2009), "Nutrition and Hydration guidelines for Excellence in Sports Performance", Hyderabad; ILSI, SAI & NIN, Pp 1-60.

2. McArdle, W.D; Katch, F.I and Katch,V.L (2009), "Exercise Physiology-Energy, Nutrition and Human Performance",Philadelphia; Lippincott Williams and Wilkins, 5th edition

3. Williams, M.H (2005), "Nutrition for Health, Fitness and Sport", Boston; MacGraw-Hill Higher Education, Pp 294-313, 397- 400.

4. Jamison D.T, Breman J.G, Measham A.R, et al., editors: The International Bank for Reconstruction and Development / The World Bank; Washington DCNew York: Oxford University Press; 2006

5. Current Topics in Nutrition. 2021. Published by Romansons Publishing House, Trivandrum ISBN 978-81-9466901-2

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2. http://www.athleticadvisor.com/weight_room/athletic_ nutrition.htm
3. http://www.nhs.uk/Conditions/**Sports-injuries**/Pages/**Causes**.aspx
4. http://www.nimh.nih.gov/health/publications/eating-disorders/complete-index.shtml
5. http://www.nof.org/
6. http://www.sportsmedicine.about.com/cs/nutrition/a/012604.htm

7. http://www.time-to-run.com/
8. http://www.wordiq.com/definition/Sports
9. www.innvista.com/ailments/anemias/sports-anemia
10. http://www.fao.org/3/a-i4434e.pdf- *Disasters*
11. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_extension_trainees/disasterpreventionpreparedness.pdf- *Disasters*
12. http://nptel.ac.in/courses/105105110/pdf/m6l02.pdf- *Drought and Flood management*
13. http://www.wamis.org/agm/meetings/anadia06/Sivakumar_Overview.pdf-*an overview of Disasters*
14. https://spaceflight.nasa.gov/shuttle/reference/factsheets/food.html- *space foods*
15. https://www.nasa.gov/audience/forstudents/postsecondary/features/F_Food_for_Space_Flight.html -*space foods*
16. https://airandspace.si.edu/exhibitions/apollo-to-the-moon/online/astronaut-life/food-in-space.cfm- *space foods*

UNIVERSITY OF KERALA.
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D —FOOD AND NUTRITION
Semester III
HS 234 B/C/D/E PAPER XII - STATISTICS AND COMPUTER APPLICATIONS
(Common to Branch X- B, C, D & E)

Total 120 hrs

Learning Objectives:

1. To enable the students to develop knowledge in statistical tools and computer applications.
2. To demonstrate the understanding of descriptive statistics by practical application of quantitative reasoning and data visualization
3. To distinguish between Karl Pearson's coefficient of correlation and Spearman's rank correlation coefficient.
4. To understand the meaning of correlation, regression and demonstrate the use of correlation and regression analysis for estimation and prediction purposes.
5. To demonstrate the concept of association of attributes and to derive criteria for the independence of attributes.
6. To discuss and demonstrate the use of various tests of significance for attributes, variables and draw inferences based on one or more population.
7. To develop the practical skill of students in using software so as to equip them with to classify, organise, analyse and draw inferences to various problems arising in different fields.

Course Outcomes:

CO1: To identify popular concepts in data management and statistical analysis

CO2: To calculate measure of central tendency and dispersion

CO3: To compute large and small sample test and interpretations

CO4: To estimate parametric and nonparametric tests in data analysis

CO5: To apply excel and SPSS in data analysis

Unit I- Part A: Introduction to Statistics (Topics for general awareness in Statistics which are not intended for Examination purpose)

- Introduction to Statistics - Definition, importance and scope of statistics, limitations of statistics, distrust of statistics, Divisions of statistics- Descriptive and Inferential statistics.

Unit I- Part B: and Data Management

- Raw data, ungrouped frequency distribution, grouped frequency distribution, relative frequency table, cumulative frequency tables, how to convert raw data to the form of a frequency distribution, the information that can be obtained from a frequency table, merits and demerits of a grouped frequency table. Graphs: histogram, frequency polygon, frequency curve, ogives.
- Scales of measurement-nominal, ordinal, interval and ratio scales. Coding of data.

Unit II: Measures of central tendency and dispersion

- Measures of central tendency- Definition, arithmetic mean-: simple and weighted arithmetic mean, median, mode, geometric mean, mid–range and its uses, merits and demerits.
- Partition values – quartiles and percentiles.
- Measures of dispersion –Definition, Absolute and relative measures of dispersion: range, variance, standard deviation, standard error, coefficient of variation.

Unit III: Normal Distribution and its applications

- Probability- classical approach, random variable- discrete and continuous random variables, probability mass function and probability density function (Definition and examples only).
- Normal random variable, characteristics and properties of a normal curve, standard normal distribution, converting raw scores into standard normalized scores, standard normal curve, making use of standard normal tables.
- Examples of applications of the normal curve.

Unit IV: Correlation, Regression and Association of Attributes

- Linear correlation- meaning and types of correlation, scatter diagram, Karl Pearson's coefficient of correlation, Spearman's Rank correlation coefficient (Definition and problems only. No derivation), coefficient of alienation, interpretation of correlation coefficient.
- Linear Regression and Prediction: Concept of regression lines and regression equations, use of regression lines, role of coefficient of alienation in prediction.
- Association of Attributes – Introduction, notation, dichotomy, classes and class frequencies, consistency of data, independence of attributes, association of attributes-Yule's coefficient of association, coefficient of colligation.

Unit V: Testing of Hypotheses

- Definition, Hypothesis, concepts of statistical hypothesis-simple and composite, null hypothesis, alternative hypothesis, test of a statistical hypothesis, critical region, Type I error, Type II error, significance level, power of the test. Parametric and non-parametric tests (Definition and examples only).
- Parametric test- Testing of hypothesis concerning the mean of a population, testing the equality of means of two populations, testing the hypothesis that proportion has a specified value, testing the equality of proportions of two populations, chi-square test, F test, ANOVA concepts, ANOVA-single factor.

- Non parametric chi-square test- testing goodness of fit, independence of attributes, homogeneity of proportions.

Unit VI: Presentation using Power point, Statistical Analysis using Excel and Introduction to SPSS

- Basics for creating a power point presentation.
- Basics in Excel, statistical analysis using excel based on modules I, II, III, IV and V.
- Introduction to SPSS, Presentation of data, Histogram, pie diagram, scatter diagram graphs using SPSS.

References

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2. Agarwal, Y. P. (1986). *Statistical methods' concepts, applications and computations*, Sterling publishers (pvt) Ltd. New Delhi.
3. Berk, K., & Carey, P. (2009). *Data analysis with Microsoft excel: updated for office 2007*. Nelson Education.
4. Boyce, J. (2003). *Absolute Beginner's Guide to Microsoft Office 2003*. Que Publishing.
5. Chiang, C. L. (2003). *Statistical methods of analysis*. World Scientific.
6. Cox, J., & Lambert, J. (2013). *Microsoft PowerPoint 2013*. Microsoft.
7. Devore, J. L., & Berk, K. N. (2012). *Modern mathematical statistics with applications* (p. 350). New York: Springer.
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9. Gupta, S. (2002). *Research methodology and statistical techniques*. Deep and Deep Publications.
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11. Gupta, S. P. (2001). Advanced Practical Statistics. *S. Chad and Company Ltd., New Delhi*.
12. Gupta, S. P. (2001). Statistical Methods, Sultan Chand & Sons. *New Delhi*.
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20. Sharma, B. A. V. (Ed.). (1983). *Research methods in social sciences*. Sterling Publishers.

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22. Singh, Y. K. (2006). *Fundamental of research methodology and statistics*. New Age International.
23. Singh, V. P. (2009). *Simplified MS Office 2007*. Computech Publications Limited.
24. Wackerly, D., Mendenhall, W., & Scheaffer, R. L. (2014). *Mathematical statistics with applications*. Cengage Learning.

UNIVERSITY OF KERALA
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester IV
HS 241 D PAPER XIII- BIO CHEMISTRY
SYLLABUS

Total hrs 110

Learning Objectives:

To enable the students to

1. Obtain depth in the study of Biochemistry of major nutrients and metabolic pathways.
2. Understand the application of Biochemistry in the field of Foods and Nutrition.

Course Outcome:

CO1: To discuss the metabolite pathways of major nutrients in the body
CO2: To familiarise the techniques used in biochemistry

UNIT I Carbohydrates and its metabolism

Structure and properties of monosaccharaides, Pentose (Ribose, deoxyribose) hexoses (glucose, galactose and fructose), disaccharides (Structural, elicitation is not necessary) polysaccharides (starch, glycogen and cellulose). Glycogenesis, glycolysis, TCA cycle, HMP shunt, energy production in the above cycles, gluconeogenesis,

UNIT II Lipids and its metabloism

Classification, reactions of fatty acids, Triglycerides, phospholipids and other conjugated Lipids, characteristics of fats, (free and esterified). Oxidation of fatty acids, Biosynthesis of fatty acids, biosynthesis of cholesterol

UNIT III Proteins and its metabolism

Structure, classification, properties of proteins and amino acids. General Pathways of Metabolism of Amino Acids: Deamination, Transamination, Decarboxylation, Urea Formation, Synthesis and Breakdown of Haemoglobin, Bile Pigments, Bio-Synthesis of Proteins.

UNIT IV Nucleic acids

Composition, functions and classification Isolation, structure and properties of DNA and RNA (M-RNA, T-RNA and R-RNA) Biosynthesis and breakdown of purine and pyrimidine.

UNIT V Techniques in biochemistry

Chromatography - Principles and applications of Chromatography; Electrophoresis-Principles and applications of electrophoresis; Colorimetry - Principles and applications of colorimetry, fluorimetry, spectrophotometry; Isotopes - Radioactive and stable isotopes used in biological investigations and food preservation.

Related experiences

Visit to a lab to observe the various techniques in biochemistry

REFERENCES

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UNIVERSITY OF KERALA
M.Sc. HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester III
HS 242 D PAPER XIV- ADVANCED HUMAN NUTRITON
SYLLABUS

Total hr.: 110

Learning Objectives:

To enable the students to

1. Obtain in-depth knowledge of both macro and micro nutrients.
2. Understand the role of each nutrient in various stages of life and diseases due to their deficiencies and excess intake.

Course Outcomes:

CO1: To obtain the in depth knowledge of macro and micro nutrients
CO2:To determine the energy requirements of individuals based BMR, SDA and physical activity

UNIT I Energy
Energy content of food, energy measurement, direct and indirect calorimetry, basal metabolism, physical activity, specific dynamic actions of food, total energy requirements, energy balance.

UNIT II Carbohydrates
Functions, digestion, absorption, transport, storage, homeostasis, deficiency, toxicity; Dietary fibre - nutritional importance, types, sources.

UNIT III Proteins and Amino acids
Functions, digestion, absorption, transport, protein synthesis, nitrogen balance, deficiency, toxicity, dietary protein quality.

UNIT IV Lipids
Functions, digestion, absorption, transport, Lipids transformation in the liver, lipotropic factors, lipoproteins, role of essential fatty acids, deposition of fats in the body. Effects of deficiency and excess of fats.

UNIT V Macro elements and Micro elements
Macro elements-Calcium, Phosphorous- Concentration in the body, Functions in human health, absorption, transport, storage, homeostasis, calcium-phosphorous ratio, deficiency, toxicity, RDA
Microelements- Fluorine, Iodine, Iron- Concentration in the body, Functions in human health, absorption, transport, storage, homeostasis, deficiency, toxicity, RDA

UNIT VI Vitamins- Fat soluble vitamins and Water soluble vitamins
Classification, physiological action, transport, absorption, storage, deficiency diseases and toxicity

BOOKS REFERENCES

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2. World Review of Nutrition and Diabetics, All the Volumes Published.
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17. Howe, P. S. Basic Nutrition in Health and Diseases, W. B. Saunders Co. Philadelphia, London, Toronoto, 1971.
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1. All Monographs and Technical Reports of FAO and WHO.
2. The Nutrition Foundation Inc. Nutrition Reviews, Present Knowledge in Nutrition, Fourth Edition, New York, Washington, 1976.

Beston, G. H and McHenry, W. W. Nutrition- A Comprehensive Treatise- Volume I, II and III. Academic Press, 1977.

UNIVERSITY OF KERALA
M.Sc HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOOD AND NUTRITION
Semester IV
HS 243 D PAPERXV – NUTRITIONAL BIOCHEMISTRY (Practical)
SYLLABUS

Total hrs. 110

Learning Objectives:

- To develop practical skills in the estimation of biochemical parameters
- To develop familiarity with biochemical laboratory techniques
- To understand the levels of biochemical parameters in normal and clinical conditions

Course Outcomes:

CO1: To develop the skill for qualitative analysis of sugars and starch

CO2: To analyse urine for relevant parameters

CO3: To obtain the in-depth knowledge of macro and micronutrients

CO4: To determine the energy requirements of individuals based BMR, SDA and physical activity

1. Qualitative estimation a. Sugars- mono, di and poly-saccharides.
2. Analysis of Urine for a. Creatinine b. Urea c. Vitamin C.
3. Operation of pH meter determination of serum proteins. Electrophoresis, isoelectric precipitation of protein.
4. Estimation of RNA & DNA
5. Chromatography of sugar amino acids- ascending; circular, column and chromatography of carotenoids.
6. Study of Electrophoresis technique.
7. Experiments in Nutrition: (Individual Experiments)-
   (a) Analysis of Food for Fibre, Moisture, Calcium, Phosphorus, Iron, Carotene, Vitamin C and Fat.
   (b) Fats, sap value, Acid number, Extraction of lipids from egg Yolk.
   (c) Sorensen formol titration.
8. Food Adulteration, test for common adulterants.
9. Therapeutic tube feed preparation – high calorie and low calorie feeds, high protein feeds.

UNIVERSITY OF KERALA
M.Sc. HOME SCIENCE - SEMESTER SYSTEM
(2021 Admission)
BRANCH X D- FOODS AND NUTRITION
Semester IV
HS 244 D PAPER XVI – INTERNSHIP IN THE FIELD OF NUTRITION / DIETETICS / RESEARCH

Total hours 110

Learning Objectives:

1. To understand the functioning of a professional working in the area of Clinical Nutrition
2. To develop professional skills for functioning in the Food Industry
3. To imbibe the qualities required to work in the area of Community Nutrition

Course Outcomes:

CO1: To gain insight into the public health problems in India with special emphasis on vulnerable groups

CO 2:To explore the various strategies to combat nutritional problems

CO 3: To analyse and create individualized diet plan for diseased conditions and provide follow up care to patients

CO4: To gain insight into planning, implementing, monitoring and evaluating nutritional strategies to combat nutritional problems of our society

CO5: To comprehend the functioning of a food industry with respect to food standards and safety matters

Internship

The student will complete internship (6 weeks) in the area of Nutrition. During this period of internship, the student will actively participate in all activities of the institution- (Dietary Dept of Hospital/Community Nutrition centre/Food industry/Food Quality Lab/ Nutrition Research Centre)

Internship report

The student will submit an Internship report with details of all activities carried out during the field experience.