

**MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL – 624 101**

M.Phil. DEGREE COURSE IN FOODS & NUTRITION

(For candidates admitted from the academic year 2021-2022 onwards)



DEPARTMENT OF HOMESCIENCE

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL

MOTHER TERESA WOMEN'S UNIVERSITY-KODAIKANAL

M.Phil-Foods and Nutrition

Program Objectives

- To develop scholar's research skills and individuality in Food and Nutrition research.
- To enrich the knowledge to build a bridge between foods and nutrition research and communal development.

Program Outcomes

Provide a platform for

1. Provide research knowledge and ethics in Foods and nutrition
2. Understand various techniques of research design and formulate the research proposal
3. Application of research tools and techniques in foods and nutrition.
4. Understand the recent trends and developments in the field of foods and nutrition
5. Apply knowledge in finding solutions to emerging issues in the field of foods and nutrition
6. Apply the research concepts in food product development, food processing clinical nutrition, and community nutritional research.
7. Develop professional communication skills and publish the research articles

Program-specific outcome

1. Understand the research concepts in the field of Foods and nutrition
2. Apply the tools and techniques of research in the field of foods and nutrition
3. Analyze the research ethics and apply them in foods and nutrition research
4. Understand the trends and developments in foods and nutrition research
5. Apply the research concepts to develop a research proposal for emerging issues in the field of foods and nutrition

M.Phil Foods and Nutrition (for candidates admitted from 2021)**Course Name:** M. Phil Foods and Nutrition**Eligibility:** M. Sc (Foods and Nutrition, Nutrition and Dietetics, Food science and Nutrition and post-graduation with nutrition specialization)**Medium:** English

S.No	Subject code	Subject	Hours/ week	Total credits	Formative / Internal assessment	Summative/ External assessment	Total
SEMESTER-I							
1	M21FNT11	Research methodology	10	4	40	60	100
2	M21FNT12	Advanced paper in Foods and Nutrition	10	4	40	60	100
3	M21PST13	Professional skills	10	4	40	60	100
		Total	30	12			300
SEMESTER-II							
4	M21FNT21	Special paper related to project	10	4	40	60	100
5	M21FND21	Dissertation + Viva-voce	20	14+2	120	80	200
		Total	30	18			300
		Grand Total	60	30			600

Special papers related to Project

S.No	Subject code	Subject	Hours/ week	Total credits	Formative / Internal assessment	Summative/ External assessment	Total
1	M21FNA21	Community Nutrition: Food Processing	10	4	40	60	100
2	M21FNA22	Clinical Nutrition	10	4	40	60	100
3	M21FNA23	Food Processing and Clinical Nutrition	10	4	40	60	100
4	M21FNA24	Public health nutrition	10	4	40	60	100
5	M21FNA25	Food product development	10	4	40	60	100
6		Directed study *	10	4	40	60	100

*Any new course can be added as a special paper by getting permission from BoS and Academic council.

Semester-I**Research Methodology****M21FNT11****10hours/4 credits**

Course Code & Title	M21FNT11: Research Methodology
Cognitive Level	K2: Understand K3: Apply K4 Analyze
Learning Objectives	<p>The course aims to</p> <ul style="list-style-type: none"> ➤ Learn concepts of research-process and research proposal. ➤ Study the importance of hypothesis and its application ➤ Understand and application of different tool of research ➤ Understand and analyze the different qualitative and quantitative data analysis and apply it research report writing ➤ Apply the different statistical analysis to test the hypothesis

Unit I Research overview

Introduction to Research, Types of Research and Research Design Definition, Objectives and characteristics of research Types of Research- Basic,applied,action, evaluation and experimental Surveys- Descriptive, diagnostic and exploratory Basic components of research design Sampling design- Probability and non-probability sampling methods.

Unit II Research design

Formulation of a research problem: Research designs -meaning, principle and components Ethical importance of content, privacy and confidentiality in research; Guidelines for research on human subjects; Issue of academic fraud and plagiarisms; copyright, citations and acknowledgement, authorship and publications Design of experiments, principles of experimentations.

Unit III Tools of data collection

Data and Tools of Data Collection Primary and secondary data and data sources Interview schedules and questionnaires Interviews and type of Interviews Pre-testing and pilot study, Editing and coding of data. Sampling methods, different types of sampling designs, sampling errors, sampling bias Methods and tools of data collection:

Observation, questionnaire, interview, checklist, rating scale, attitude scale, reliability and validity of tools.

Unit IV Data analysis

Linear Programming - type of variables, solving problems, interpretation, use in field of Food & Nutrition. Data processing using the computer coding and classification, programming and analysis. Probability and Tests of Significance Rules of probability and its applications Normal, binomial, their properties, importance of these distributions in research studies large and small sample tests z , t , F and chi square tests ANOVA and applications

Unit V Processing and analysis of data

Processing and analysis of data: Editing, coding, classification, tabulation, Parametric or standard tests, chi-square test; Analysis of 8 variance and covariance; non-parametric or distribution free tests; Uses of multivariate analysis techniques (concepts only) classification, methods - factor analysis and path analysis, cluster analysis; Handling of qualitative and quantitative data.

References

1. Kothari, Chakravanti Rajagopalachari. *Research methodology: Methods and techniques*. New Age International, 2004.
2. Singh, Yogesh Kumar. *Fundamental of research methodology and statistics*. New Age International, 2006.
3. Goddard, Wayne, and Stuart Melville. *Research methodology: An introduction*. Juta and Company Ltd, 2004.
4. McNeill, Patrick. *Research methods*. Routledge, 2006.
5. Bhandarkar, P. L., T. S. Wilkinson, and D. K. Laldas. "Methodology & Techniques of Social Research Himalaya Publishing House." (2000).
6. Corbetta, Piergiorgio. *Social research: Theory, methods and techniques*. Sage, 2003.
7. Chiang, Chin Long. *Statistical methods of analysis*. World Scientific, 2003.

Reference books

- 1.Vijayalakshmi Ponnuraj and Sivaprakasam, C, Research Methods: Tips and Techniques, MJP Publishers, 2008.
2. Rajendra Kumar, C., Research Methodology, APH Publishing Corporation, New Delhi 2008.
3. Anantarayanan Raman and Jayashree Nimmagadda, A Handbook of Research Process, Macmillan Publishers, 2006.
- 4.Elhance .D.N, Veenaand and Agarwal .B.M, Fundamental of statistics,48thEdition, KitabMahal, Allahabad, 2005.
5. Gupta. S.P, Statistical Methods, S Chand & Sons,, New Delhi, 2008
- 6.Saravanavel, P, Research Methodology, KitabMahal Agencies, New Delhi, 2000.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	➤ Learn concepts of research-process and research proposal.
K3	CO 2	➤ Study the importance of hypothesis and its application
K4	CO 3	➤ Understand and application of different tool of research
K4	CO 4	➤ Understand and analyze the different qualitative and quantitative data analysis and apply it research report writing
K3	C05	➤ Apply the different statistical analysis to test the hypothesis

Mapping of Cos with Pos & PSOs:

CO	PO							PSO				
	1	2	3	4	5	6	7	1	2	3	4	5
CO1	S	S	S	M	M	S	M	S	S	M	M	S
CO2	S	S	S	M	M	S	M	S	S	M	M	S
CO3	S	S	S	M	M	S	M	S	S	M	M	S
CO4	S	S	S	M	M	S	M	S	S	M	M	S
CO5	S	S	S	M	M	S	M	S	S	M	M	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Advanced paper in Foods and Nutrition

M21FNT12

10hours/4 credits

Course Code & Title	M21FNT12: Advanced paper in Foods and Nutrition
Cognitive Level	K2: Understand K3: Apply K4 Analyze
Learning Objectives	The course aims to <ol style="list-style-type: none"> 1. The characteristics and behaviour of food constituents, nutritional needs of different age groups, and role of macro micronutrients in human's health 2. The changes in physicochemical and functional properties of food constituents due to processing 3. Understand the recent research and developments in foods and nutrition. 4. Understand different disease conditions and apply the concepts in diet planning. 5. Study the emerging nutritional issues in the commUnity and its overcome measures.

Unit I Functions of food: Carbohydrates

Functions of food: food groups, classification of food groups. Nutrients: definition, classification, macronutrients: Carbohydrates, proteins, and fats: functions, requirements, food sources, and deficiencies. Carbohydrates: Types, classification, digestion, and transport. Dietary fibre, fructo-oligosaccharides, resistant starch – chemical composition and physiological effects Glycemic index of foods. Sweeteners – nutritive and non-nutritive.

Unit II Proteins and lipids

Proteins: Classification, digestion, absorption and transport. Metabolism of proteins. Protein quality, methods of evaluating protein quality. Lipids: Classification, digestion, absorption, transport. Functions of EFA Role of n-3, n-6 fatty acids in health and disease. Requirements of total fat and fatty acids. Trans fatty acids. Prostaglandins.

Unit III Micronutrients

Micronutrients: Vitamins and minerals: functions, requirements, food sources, and deficiencies. Macro minerals: calcium, phosphorus, magnesium, sodium, potassium & chloride. Micro minerals: Iron, copper, zinc, manganese, iodine, fluoride. Trace minerals: Selenium, cobalt, chromium, vanadium, silicon, boron, nickel. Vitamins; Historical background, structure, food sources, absorption and transport, metabolism, biochemical function, assessment of status. Interactions with other nutrients

Unit IV Life cycle nutrition

Life cycle nutrition:

Infancy: stages of growth and development, nutritional needs, nutritional deficiencies, RDA and dietary measures.

Pre school children: stages of growth and development, nutritional needs, nutritional deficiencies, RDA and dietary measures.

Adolescents: Growth and development of secondary sexual characters nutritional needs, nutritional deficiencies, RDA and dietary measures, menstrual cycle and its importance.

Adults: nutritional needs, nutritional deficiencies, RDA and dietary measures.

Old age: physiological changes, nutritional needs, nutritional deficiencies, RDA and dietary measures.

Unit V Communicable and non-communicable diseases:

Communicable and non-communicable diseases: causes, symptoms, risk factors, consequences, dietary management. Obesity, cardiovascular diseases, gastro intestinal diseases, liver diseases, renal and excretory system dysfunctions, degenerative diseases: cancer and types. Osteoporosis, osteo arthritis, and bone disorders.

References

1. Potter, Norman N., and Joseph H. Hotchkiss. *Food science*. Springer Science & Business Media, 2012.
2. Sri Lakshmi, B. *Food science*. New Age International, 2003.
3. Vaclavik, Vickie A., Elizabeth W. Christian, and Elizabeth W. Christian. *Essentials of food science*. Vol. 42. New York: Springer, 2008.

4. Sembulingam, Kirma, and Prema Sembulingam. *Essentials of medical physiology*. JP Medical Ltd, 2012.
5. Ashalatha, P. R., and G. Deepa. *Textbook of Anatomy & Physiology for Nurses*. JP Medical Ltd, 2012.
6. Parija SC, *Textbook of Microbiology & Immunology*, 2nd Edition, Elsevier India, 201
7. AnandanarayananR and Panicker CK, *Textbook of Microbiology*, Seventh edition, University Press, Hyderabad, 2009.
8. Srilakshmi B, *Dietetics*, sixth edition, New age Publishing Press, New Delhi, 2011
9. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., *Nutritive value of Indian foods*, NIN, Hyderabad, 2001

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	The characteristics and behavior of food constituents, nutritional needs of different age groups, and role of macro micronutrients in humans health
K2	CO2	The changes in physicochemical and functional properties of food constituents due to processing
K3	CO3	Understand the recent research and developments in foods and nutrition.
K2	CO4	Understand different disease conditions and apply the concepts in diet planning.
K4	CO5	Study the emerging nutritional issues in the commUnity and its overcome measures.

Mapping of Cos with POS & PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	M	M	S	S	S	S	S	S	M	S	M
CO2	M	M	M	S	S	S	S	S	S	M	S	M
CO3	M	M	M	S	S	S	S	S	S	M	S	M
CO4	M	M	M	S	S	S	S	S	S	M	S	M
CO5	M	M	M	S	S	S	S	S	S	M	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

M21PST13 PROFESSIONAL SKILLS (Common Paper)**Hours 10/ Credits****4****Objectives:**

1. To develop skills on ICT and apply them in teaching, learning and research.
2. To acquire knowledge on communication skills with special reference to its elements, types, development and styles.
3. To understand the concepts on Communication technology, Computer Mediated Teaching.
4. To develop different teaching skills and to develop Multimedia /E-contents in their respective subjects.

Unit I - Computer Application Skills

Fundamentals of Computers and windows, Operating System – **MS – Office** Components; **Word**: Equation editor, Table Manipulation – Formatting Features – organizational Chart. **MS – EXCEL**: Statistical Functions – Number Manipulation – Chart Preparation with various types of graphs. **MS Powerpoint**: Powerpoint presentation with multimedia features. **Internet and its applications**: E-mail and attachments – working with search engines.

Unit II - Communication Skills (English/Tamil/Both)

English: Skills of Communication: Listening, Speaking, reading and Writing – Writing Synopsis, Abstract and proposals. Developing good language abilities – Public speaking – Writing Skills.

Tamil: gapw;Wtpf;Fk; jpwd; - Ngr;Rj;jpwd; - ntspg;ghl;Lj; jpwd; - Ma;Tj;jpl;lk; - Ma;Tr;R&f;fk; jahhpj;jy;.

Unit III - Communication technology

Computer Mediated Teaching: Multimedia, E – Content, Satellite Based Communication – EDUSAT and ETV channels. Web: Internet I Education.

Unit IV - Pedagogical Skills

Micro teaching Skills: Skill of Induction, Skill of Stimulus Variation. Skill of Explaining, Skill of Probing Questions, Skill of Blackboard, Writing and Skill of Closure

– Integration of Teaching Skills – Evaluation of Teaching Skills – Research Extension and Consultancy.

Unit V - Industrial Technology

Lecture Techniques: Steps, Planning of a lecture, Lecture Notes, Updating, Delivery of Lecture. Teaching – Learning Techniques: Team teaching, Group Discussion. Seminar, Workshops, Symposium and Panel Discussion – Games and Simulations – Web Based Instructions.

References

1. Michael D. and William (2000). Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, New York.
2. Information and Communication Technology in Education: A Curriculum for Schools and Programme of Teacher development. Jonathan Anderson
3. Pandey S.K.(2005). Teaching communication. Commonwealth publisher, Delhi
4. Sharma. R.A.(2006), Fundamentals of education technology, Surya publication, Meerut
5. Kum Babu A. and Dandapani S. (2006), Microteaching, Neelkamal Publications, Hyderabad.
6. Vanaja M and Rajasekhar S. (2006), Computer Education, Neelkamal Publications, Hyderabad

Special papers

Community Nutrition: Food Processing (M21FNT21)10hours/4 credits

Unit I Community nutrition

Research design-formulation of research design-research tools- hypothesis formulation and testing- data analysis-concepts of the research report. Community nutrition: Assessment of the nutritional status of the community and individuals- direct parameters- indirect parameters: Different types of nutritional assessments.

Unit II Nutrition and National Development,

Nutrition and National Development, Ecology of Malnutrition, Strategies To Overcome Malnutrition Relation of nutrition to national development; Consequences of malnutrition; IMR, NMR,MMR and prevalence of common nutritional problems- PEM, Vitamin A Deficiency Diseases, Anaemia, Iodine Deficiency Disorders and Fluorosis Ecological factors leading to malnutrition; Synergism between malnutrition and infection; Measures to overcome malnutrition Nutrition Intervention programmes - Nutritious Noon Meal Programme. ICDS, Prophylaxis programme – Vitamin A deficiency, Iron deficiency anaemia, Iodine deficiency

Unit III Nutritional deficiency diseases

Nutritional deficiency diseases: identification and preventive measures. Role of community-based researches in national development. Non-communicable diseases. Epidemiology Of Communicable Diseases Definition of epidemiology - causes, signs and symptoms, treatment and prevention of communicable diseases, respiratory infections, intestinal infections, Other infections- dengue, filariasis. Types of immunity- active, passive and herd-group protection Immunization agents- vaccines, immunoglobulins Immunization schedules (SS) - Active- National and WHO Expanded Programme on Immunization- Universal Passive, Combined, Chemoprophylaxis, non-specific measures

Unit IV Food processing and supplementation

Food processing and supplementation: physical and chemical principles of food product- low-cost nutrient supplementation-value addition- Importance of processing- methods of processing cereals (wheat, rice, maize), breakfast cereals Processing of pulses Processing of fruits and vegetables, meat, fish, poultry, egg Processing of sugars.

Unit V Processing of oil seeds and dietary intervention

Processing of oil seeds Processing of milk and milk products Processing of condiments and spices Beverages, tea, coffee and cocoa

Nutrition intervention: Nutrition education-role of nutrition education in promoting health-planning, conducting, and evaluating intervention programs

References

1. Park, K. "Park's textbook of preventive and social medicine." *Preventive Medicine in Obstet, Pediatrics' and Geriatrics*, 2005.
2. Bamji, Mahtab S., Kamala Krishnaswamy, and G. N. V. Brahmam, eds. *Textbook of human nutrition*. Oxford & IBH, 2016.
3. Swaminathan, M. "Use of food exchange lists in dietary calculations, Essentials of food and nutrition, The Bangalore printing and Publishing co." *Ltd 2* , 2007.
4. Vir, Sheila Chander, ed. *Public health nutrition in developing countries*. Woodhead Publishing Limited, 2011.
5. Lawrence, Mark, and Tony Worsley, eds. *Public health nutrition: from principles to practice*. Routledge, 2020.
6. Hughes, Roger. *Practical public health nutrition*. John Wiley & Sons, 2010.
7. Manay S and Swamy M S, *Foods: Facts and Principles*, New Age International (P) Limited, Chennai, 2005.
8. Stein, Natalie. *Public Health Nutrition: Principles and practice in commUnity and global health*. Jones & Bartlett Publishers, 2014.
9. Carr, Tanya, and Koen Descheemaeker, eds. *Nutrition and health*. John Wiley & Sons, 2008.

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. Indian Journal of Medical Research, ICMR, New Delhi,
4. Indian Journal of Pediatrics, Valley Nicro, Missouri, U.P.
5. Indian Journal of Nutrition and Dietetics, Avinashilingam Deemed University, Coimbatore.
6. Proceedings of the Nutrition Society of India, NSI, Hyderabad
7. Indian Journal of Nutrition and Dietetics.3. Nutrition Update Series.
8. American Journal of Clinical Nutrition
9. European Journal of Clinical Nutrition
10. World Review of Nutrition and Dietetics
11. Journal of Applied Nutrition
12. WHO Expert Committee
10. British medical journal

M.Phil (Foods & Nutrition)

Area Paper-Clinical Nutrition (M21FNT22)

10hours/4 credits

Unit I Clinical nutrition over view

Research design-formulation of research design-research tools- hypothesis formulation and testing- data analysis-concepts of the research report. Pre and post operative nutrition, enteral and parenteral nutrition- Enteral formula composition, advantages and disadvantages. Pharmacological use of nutrients.

Unit II Endocrine disorders

Endocrine disorders and Diet in Fever and Infections Diabetes mellitus: etiology, types, clinical and biochemical changes, Clinical signs and symptoms, diagnosis, mode of treatments. Disorders of thyroid and para thyroid glands, tetany, gout and arthritis (SS). Obesity- etiology, theories on Obesity, types, Dietary modification, complications. Under weight- etiology, nutritional and food requirement. Fevers- causes, types, metabolic changes, fevers of short duration and chronic fever and infections

Unit III Gastrointestinal diseases

Diseases of gastrointestinal tract- etiology, type, clinical, signs and symptoms, diagnosis, diet modifications-peptic ulcer, diarrhoea, dysentery, constipation and other GTI problem like gastritis, tropical sprue dumping syndrome, lactose intolerance, irritable bowel syndrome, diverticulosis. Assessment of clinical history of Dyslipidemia with different parameters. A therapeutic diet and other dietary-related issues on dyslipidemia.

Unit IV Liver disease

Diseases of liver: functions of liver, etiology, physiological and metabolic consequences, prevalence of liver diseases in global and national level, clinical signs and symptoms, Mode of treatment and diet modifications of jaundice, hepatitis, Cirrhosis, hepatic coma, cholecystitis, cholelithiasis and pancreatitis.

Unit V Renal diseases

Diseases of renal system: function of kidney, etiology, physiological and metabolic consequences, clinical signs and symptoms and diet modification for Nephritis, nephrosis. Nephrosclerosis, renal failure-acute & chronic Dialysis: principles and types (SS). Kidney stones- etiology, types, dietary modification.

References

1. Sharma M, Textbook of Nutrition, 1st edition, CBS publishers & distributors PVT Ltd, New Delhi, 2017.
2. Longvah T, Ananthan R, Bhaskar K, Venkaiah K, Indian Food Composition Tables, National Institute of Nutrition, 2017
3. Abraham S, Nutrition Through Lifecycle, 1st edition, New age international publishers, New Delhi, 2016
4. Verma P, Food ,Nutrition & Dietetics, 1st edition, CBS publishers & distributors PVT Ltd, NewDelhi, 2015
5. Edelstein S, Lifecycle Nutrition- An evidence based approach, 2nd edition, Jones & Bartlett learning publications, 2015,
6. Mahan LK, Stump SE and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri, 2012
7. Stump SE, Nutrition and diagnosis related care, 7th edition, Lippincott, 2012
8. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005
9. Whitney EN and Rolfes SR, Understanding Nutrition, 9 th edition, West/Wordsworth, 2002
10. Garrow JS, James WPT, Ralph A, Human Nutrition and Dietetics 10th edition, Churchill Livingstone, NY, 2000

Journals

1. Indian Journal of Nutrition and Dietetics.
2. Journal of Dietetic American Association.
3. Nutrition Update Series.
4. American Journal of Clinical Nutrition

Area Paper - Food Processing and Clinical Nutrition (M21FNT23)10hours/4 credits

Unit I Food processing overview

Food processing overview: Status of food processing industry in India: Status, scope, need, and major constraints in the growth of food processing in India. Per capita availability of food grains, Production trends of cereals, pulses, fruits and vegetables, nuts and oilseeds, and milk and milk products.

Unit II Principles of quality control and evaluation

Principles of quality control and evaluation - General principles of quality control, quality attributes of raw materials, process control and finished product evaluation, subjective and objective methods of evaluation of foods. Physio-chemical characteristics of bakery products (bread, biscuits, cookies, chocolates, and cakes), fruit and vegetable products (jam, squash & puree) milk and milk products (milk powder – toned & skimmed, cheese & ice cream), and pulses. Basic tests for identification of microbial contamination, water activity in processed foods – definition and importance.

Unit III Metabolic disorders

Metabolic and clinical aberrations, diagnostic features, complications, prevention, and recent dietary advances in the nutritional management of - Weight imbalances, diabetes Mellitus, Cardio-vascular disorders, and other metabolic disorders. Role of metabolism in health and well ness.

Unit IV Functional foods

Functional foods: role of functional foods, different types of functional foods and medicinal uses, Antioxidants and phytochemicals- types, role & mechanism of action in scavenging free radicals, role in health & disease. Probiotic & Prebiotic foods for health benefits. Commercial prebiotics and probiotics in the market.

Unit V Nutrition education

Nutrition education - Definition, planning, conducting, and evaluation. Tools of nutrition education- merits and demerits, curriculum designs for nutrition education, nutrition education through health care systems. Formulation of realistic developmental health plans based on needs with special reference to vulnerable group populations and women.

References

1. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, 2005.
2. Paul, P.C., and Palmer, H. H., Food Theory and Applications. John Wiley and Sons, New York, 2000 Revised.
3. Srilakshmi, M., Food science, New Age International (P) Ltd., Publishers 2010.
4. Robertson, G.L. Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis, 2006.
5. Pepler, H.J. and D. Perlman, Microbial Technology: Fermentation Technology, 2nd Edition, Vol. II Academic Press / Elsevier, 2004.
6. Stanbury, P.F., A. Whitaker and S.J. Hall, Principles of Fermentation
7. Stump SE, Nutrition and diagnosis related care, 7th edition, Lippincott, 2012
8. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005
9. Whitney EN and Rolfes SR, Understanding Nutrition, 9 th edition, West/Wordsworth, 2002
10. Garrow JS, James WPT, Ralph A, Human Nutrition and Dietetics 10th edition, Churchill Livingstone, NY, 2000
11. Groff JL, Gropper SS, Advanced Nutrition and Human Metabolism 3 rd edition, West / Wadsworth, UK. 2000

Area Paper –Public health nutrition (M21FNT24)10hours/4 credits**Unit I Public health nutrition: overview**

Nutrition and National Development, Ecology of Malnutrition, Strategies To Overcome Malnutrition Relation of nutrition to national development; Consequences of malnutrition; IMR, NMR,MMR and prevalence of common nutritional problems- PEM, Vitamin A Deficiency Diseases, Anaemia, Iodine Deficiency Disorders and Fluorosis Ecological factors leading to malnutrition; Synergism between malnutrition and infection; Measures to overcome malnutrition Nutrition Intervention programmes - Nutritious Noon Meal Programme. ICDS, Prophylaxis programme – Vitamin A deficiency, Iron deficiency anaemia, Iodine deficiency National Nutrition policy Empowering women towards improving the nutritional status of the family, community and nation at large.

Unit II Community Nutrition

Community Nutrition: Assessment of the nutritional status of the community and individuals- direct parameters- indirect parameters.Assessment of nutritional status and nutritional knowledge through anthropometric measurements, vital statistics, mortality and morbidity rate, clinical, biochemical and biophysical assessments, Food and nutrition survey on selected groups.

Unit III Environmental sanitation

Environmental Sanitation and Disaster Management Pollution, Bio manure, Vermicomposting (SS), Effective Microorganisms Water purification and recycling Types of disaster - natural and manmade –earthquakes, volcanic eruptions, flash foods, major floods, tsunami and drought, fire accidents , bomb blast. Disaster management-mitigation strategies-Role of NGO's and GO's and nutritionists. Prevention, warning systems and relief Major nutritional and health considerations in disaster Emergency feeding ,mass and supplementary feedings ,management of feeding operations ,water and food safety

Unit IV Agencies for nutrition empowerment

National and international agencies for developing community development: functions and beneficiaries. Nutritional deficiency diseases: identification and preventive measures. Role of community-based researches in national development. Non-communicable diseases: prevalence and its control measures by health care agencies.

Unit V Importance of nutrition education

Importance of Nutrition education to the community and lessons to be taught (SS) Training workers in nutrition education programmes Methods of education when to teach, whom to teach Use of computers to impart nutrition education Organization of Nutrition education programmes. Dietary intervention: Nutrition education-role of nutrition education in promoting health-planning, conducting, and evaluating intervention programs

References

- 1.Park, K. "Park's textbook of preventive and social medicine." *Preventive Medicine in Obstet, Pediatrics' and Geriatrics*, 2005.
- 2.Bamji, Mahtab S., Kamala Krishnaswamy, and G. N. V. Brahmam, eds. *Textbook of human nutrition*. Oxford & IBH, 2016.
- 3.Swaminathan, M. "Use of food exchange lists in dietary calculations, Essentials of food and nutrition, The Bangalore printing and Publishing co." *Ltd 2* , 2007.
- 4.Bamji, M.S., Rao, P.N., Reddy, V (Eds): *Textbook of Human Nutrition*, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2003.
- 5.Lawrence, Mark, and Tony Worsley, eds. *Public health nutrition: from principles to practice*. Routledge, 2020.
- 6.Hughes, Roger. *Practical public health nutrition*. John Wiley & Sons, 2010.
- 7.Manay S andSwamyM S, *Foods: Facts and Principles*, New Age International (P) Limited, Chennai, 2005.
- 8.Stein, Natalie. *Public Health Nutrition: Principles and practice in commUnity and global health*. Jones & Bartlett Publishers, 2014.

9. Carr, Tanya, and Koen Descheemaeker, eds. *Nutrition and health*. John Wiley & Sons, 2008.

Journals

1. Indian Journal of Nutrition and Dietetics.
2. Journal of Dietetic American Association.
3. Nutrition Update Series.
4. American Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition
6. Nutritional Reviews
7. World Review of Nutrition and Dietetics
8. Journal of Applied Nutrition
9. WHO Expert Committee
10. British medical journal

Area Paper –Food product development (M21FNT25)10hours/4 credits

Unit I Chemical composition of foods

Chemical composition of water in foods, structure, water activity, the phase diagram of water, phase transition of food containing water, the relation between water activity, temperature, and WLF equation, the interaction of water solute and food compounds, water activity and its influence on quality and stability of foods, methods for stabilization of food systems by control of water activity, sorption isotherm, colloidal properties of foods.

Unit II Nutrients in foods

pH: Hydrogen ion concentration in food, an oxidation-reduction potential of foods, and their applications in food systems.

Protein and Enzymes: Iso-electric points of proteins, proteins as enzymes in the food system, its nature, stability and action, proteolysis, application of enzymes and immobilized enzymes.

Sugars: Composition and properties of different types of sugars, their application in food systems, crystallization, caramelization, Maillard reaction, and its industrial application.

Lipids: Properties of fats, functional properties of fats and oils, fat stabilizers, fat deterioration and antioxidants, interesterification of fats.

Unit III Basic concepts of new product development

Market research, consumer dynamics, the process of product development and standardization, sensory evaluation, packaging, labeling, and marketing of new food products. Different types of food product developments with its analysis, scope and development of food product development.

Unit IV Food safety laws and standards

Hazard Analysis and Critical Control Points (HACCP), Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), International Organisation for Standardization (ISO), Essential Commodities Act, Codex Alimentarius, World Trade Organisation (WTO), Technical Barrier to Trades (TBT), Sanitary Phyto-Sanitary (SPS) rules, Bureau of Indian Standards (BIS), AGMARK, Food Safety, and Standards Act, 2006 (FSSA):

Prevention of Food Adulteration Act (PFA), Milk and Milk Products Order (MMPO), Meat Food Products Order (MFPO), Fruits Products Order (FPO).

Unit V Nutrient analysis

Nutrient analysis of foods, organoleptic evaluation: methods and analysis, AOAC methods, Microbial analysis of shelf life. Shelf Life Testing of Packaged Foods, Evaluation of Packaged Foods Labeling – Definition, Purpose, Types, Materials, Adhesives (SS) Food and Nutritional Labeling as per FSSAI specifications Packaging Laws and Regulations – National and International Specifications.

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