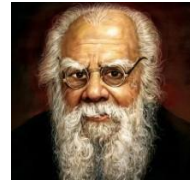




PERIYAR UNIVERSITY
Periyar Palkalai Nagar, Salem-636011
(Reaccredited with 'A' Grade by the NAAC)



School of Professional Studies

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

M.Phil. DEGREE in FOOD SCIENCE, TECHNOLOGY AND NUTRITION

[Choice Based Credit System (CBCS)]



REGULATIONS AND SYLLABUS

(Effective from the academic year 2018-2019 and thereafter)

(The syllabus is also subjected to Ph.D. Degree candidates who have to complete course work)

M.Phil. Food Science Technology and Nutrition

Regulations and Syllabus with effect from the academic year (2018-2019)

Programme Objectives

- to mould student's skills and individuality in Food Science and Nutrition research.
- to motivate the students to build a bridge between nutrition research and community development.

Programme Outcome

- Scholars can able to apply various techniques in food product development, food business plan, safe food production protocol, analysis of public health issues, strategic solution for nutritional problems, drafting and implementing nutrition policies and programmes.

Eligibility for Admission

Candidates who have qualified for post graduate degree in Food Science and Nutrition, Foods and Nutrition, Food Technology, Food Processing, Food Engineering, Agriculture, Home Science, Biochemistry and Catering Science and Technology approved by the Association of Indian Universities are eligible to register for the Degree of Master of Philosophy (M.Phil.) and Doctor of Philosophy (Ph.D.) in Food Science Technology and Nutrition.

For full – time M.Phil. registration, candidates shall be required to have obtained a minimum of 55% marks in PG programme. The candidates belonging to SC/ST community, the minimum percentage of marks for registration is 50%. The conditions specified by the University are prevailed in the respective academic year as per the revisions in M.Phil. and Ph.D. regulations proposed by University Grants Commission and thereafter.

Duration

The duration of the M.Phil. Course shall extend over a period of one year from the date of commencement.

Structure of the Programme

The course of study for M.Phil. degree shall consist of (a) Part-I comprising three written papers according to the syllabus prescribed from time to time; and (b) Part-II Dissertation/Thesis. Part-I shall consist of Paper-I: Research Methods and Techniques and Paper-II Advances in Food Science and Nutrition. There shall also be a third paper which shall be the background paper relating to the proposed research.

Scheme of Examination for M.Phil. Degree

Semester I (Part I)

S.No.	Paper Code	Title of the paper	Exam Hours	I	E	T	C
Core Papers (C)							
1	19MPFSN01	Research Methods and Techniques	3	25	75	100	4
2	19MPFSN02	Advances in Food Science and Nutrition	3	25	75	100	4
3	19MPFSN03	Guide Paper	3	25	75	100	4
		Total	-	75	225	300	12

Note:- I- Internal, E-External, T- Total, C- Credit

Semester II (Part II)

S.No.	Paper Code	Title of the paper	Exam Hours	I	E	T	C
Core Papers (C)							
1	19MPFSN04	Dissertation and Viva Voce	3	50	150	200	12
		Total	-	50	150	200	12

Note:- I- Internal, E-External, T- Total, C- Credit

The following procedure is to be adopted to award internal marks

- (i) Seminar : 10 Marks
- (ii) Tests : 10 Marks
- (iii) Attendance : 05 Marks

5. The question paper pattern is

Part A 5X5 = (25 marks)
(Internal choice)

Part B 5X10 = (50 marks)
(Internal choice)

Passing Minimum

A candidate shall be declared to have passed Part-I of the examination if he/she secures not less than 50% of the marks in each paper including Paper –III for which examination is conducted internally.

A candidate shall be declared to have passed Part-II of the examination, if his/ her dissertation is atleast commended.

All other candidates shall be declared to have failed in the examination.

M.Phil. FOOD SCIENCE TECHNOLOGY AND NUTRITION

PART I SYLLABUS

Paper I - Research Methods and Techniques

SUB CODE : 19MPFSN01

HOURS: L +T+P=C

MARKS : 100

4+0+0 = 4

Objectives

1. To gain updated knowledge on research design, data analysis, analytical techniques, publication and copyright related to Food Science and Nutrition discipline.

UNIT I

Research design in Food Science and Technology – Food sampling techniques for analysis and product development, sample preparation for various analysis, standardization and portion control, Extraction and Isolation of specific compounds in food – starch, protein, fat, phytochemicals and Nutraceutical compounds, research design- factorial design, randomised block design, central composite rotatable design, techno-economic feasibility analysis, Rapid Assessment Procedures, modeling and computer simulation studies, *in vitro* and *in vivo* methods of testing bioavailability of nutrients, Acute and chronic toxicity studies.

UNIT-II

Research design in Nutritional Science – Problem identification and idea generation, selection of a problem, hypothesis formulation, research design in descriptive surveys and experimental research, sampling techniques, research tools- Quantitative and Qualitative, Reliability and validity of data gathering / measuring instruments. Nutritional mapping and surveillance. Food security status assessment process.

UNIT-III

Statistics – Descriptive Statistics, testing of hypothesis – parametric and non – parametric tests, Computer aided software in statistical calculation - Ms Excel based, SPSS, Organization and representation of data, Ethics in research.

UNIT-IV

Report writing – types of report, parts of report, preparation of project proposal for funding support. Publication / knowledge dissemination - different forms of scientific writing, ISBN and ISSN numbering, citations, Indexing, Impact factor, IPR and patenting, public appraisal techniques for knowledge dissemination.

UNIT-V

Principles and applications of various analytical techniques – colorimetry, photometry, flourimetry, flame photometer, atomic absorption spectrophotometer, chromatography, electrophoresis, infrared spectrometry, X-Ray diffractometer, microscopes, viscometer, rheometer, texture analyser, densitometer, refractometer, penetrometer, hydrometer, hunter color lab, water activity meter.

Practical Experiences

1. Two-day Workshop on “SPSS Packages in food and Nutritional sciences”
2. Two-day Workshop on Food Science and Nutrition Research methods.
3. Training on utilization of e-resource, journal numbering, citations of an article, indexing, impact factor calculation through central library of Periyar University.
4. Training on advanced analytical techniques.

Course Outcomes

CO1: Know the concepts of different sampling techniques and analysis methods

CO2: Understand the various research designs in Food Science and Nutrition

CO3: Choose appropriate statistical method to analyze the data

CO4: Familiarize about the report writing and indexing

CO5: Select appropriate method and equipment for analysis of foods

References

1. Ghai, O.P. and Gupta, P. and Gupla, P. (1999), Essential Preventive Medicine - A Clinical and Applied Approach. Sangam Books Ltd.
2. Hendrick, T.E, Bickman, L. and Rog, D.J. (1993), Applied Research Design – A Practical Guide, California, Sage Publications, Inc.
3. Miles, M.B. and Huberman, A.M. (1994), Qualitative Data Analysis- An Expanded Source Book,

- 2nd Edition, California, Sage Publications. Inc. DOI: 10.1016/S0272-4944(05)80231-2.
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 5. Ruth M. Mickey, Olive Jean Dunn, Virginia A. Clark, (2004), *Applied Statistics: Analysis of Variance and Regression*, 3rd Edition, John Wiley and Sons.
 6. Julie Lovegrove, Sangita Sharma, (2015), *Nutrition research methodologies [e-version]*, Edith Cowan University Publications, Australia.
 7. Bernard C. Beins, (2014), *Successful Research Projects : A Step-by-Step Guide [e-version]*, Edith Cowan University Publications, Australia.
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 9. Gurumani, N.(2004),*An Introduction to Biostatistics*, 1st edition, MJP publishers, Chennai.
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 11. John A. Bower, (2009), *Experimental Design*, <https://doi.org/10.1002/9781444320947.ch7>, Blackwell Publishing Ltd.
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 13. Carol Boushey, Jeffrey Harris, Barbara Bruemmer, Sujata L. Archer, Linda Van Horn (2006), *Publishing Nutrition Research: A Review of Study Design, Statistical Analyses, and Other Key Elements of Manuscript Preparation, Part 1*, <https://doi.org/10.1016/j.jada.2005.11.007>, *Journal of the American Dietetic Association*, Vol.106, Issue1, Elsevier Publications, pp. 89-96.
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 15. Jeffrey E. Harris, Carol Boushey, Barbara Bruemmer, Sujata L. Archer, (2008), *Publishing Nutrition Research: A Review of Nonparametric Methods, Part 3*, *Journal of the American Dietetic Association*, Volume 108, Issue 9, 2008, pp. 1488-1496.
 16. Marsha Rhea, Craig Bettles, (2012), *Future Changes Driving Dietetics Workforce Supply and Demand: Future Scan 2012-2022*, *Journal of the Academy of Nutrition and Dietetics*, Volume 112, Issue 3, Supplement, 2012, pp. S10-S24.

M.Phil. FOOD SCIENCE AND NUTRITION
PART I SYLLABUS
Paper II – Advances in Food Science and Nutrition

SUB CODE: 19MPFSN02

HOURS: L +T+P=C

MARKS : 100

4+0+0= 4

Objectives

1. To explore research oriented knowledge and entrepreneurial skill on Food Science and Nutrition discipline.

UNIT I

Properties and quality of food – Principles and methods of determination of physical, functional, chemical, nutritional, thermodynamic, mass – transfer, kinetic, microbiological and sensory properties of food. Food‘omics’ – metabolomics, proteomics and nutrigenomics.

UNIT-II

Food value chain – Origin of food, production trend, post harvest technology- from farm yard to consumer table, shelf life of a product, packaging material and systems, labeling, food processing industries in World and India, food industrial by products and waste management.

UNIT-III

Food safety and regulations - Anti nutritional factors, contaminants and toxic elements in food, food additives, food laws and regulations- National and International laws and legislations, food safety management tools, consumer protection procedures, laws and regulations, food safety testing kits and rapid diagnostic procedures.

UNIT-IV

Special Nutrition – Nutrition in exercise, sports, space, defense, high altitudes, low temperatures, submarines. nutrition and diet in common deficiency disorders, nutrition and diet in common diseases / disorders, nutrition in critical care – pre and post operative diets, nutrition and behaviors, role of Nutraceutical and functional components in health claim.

UNIT-V

Public Health Nutrition – Evolution of nutrition, nutrition transition, nutritional and non-nutritional indicators of nutritional status of a community, food security status in India, systems, policies and organization deliverables of food and nutritional security in India. Nutrition in emergencies.

Practical experience

1. Training on food safety and quality control by FSSAI personnel.
2. Field visit to public health department to study its functional and current status.
3. Visit to food processing industries.
4. Any one entrepreneurship programme.

Course Outcomes

CO1: Recognize the different properties, quality aspects and omics technology

CO2: Comprehend the importance and factors of food value chain

CO3: Know the various National and International level food safety and regulations

CO4: Understand the concepts behind specialized nutrition

CO5: Grasp the knowledge about the Public Health Nutrition

References

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2. Aïchatou Ndob Malik Melas André Lebert, (2015), Physical-Chemical Properties of Foods, 1st Edition, ISTE Press – Elsevier Publications.
3. Yantiyati Widyastuti Tatik Khusniati Endang Sutriswati Rahayu, (2013), Food: Production, Properties and Quality, Edited by Visakh P. M. Sabu Thomas Laura B. Iturriaga Pablo Daniel Ribotta, <https://doi.org/10.1002/9781118659083.ch6>, Wiley Online Library.
4. Visakh P. M.Sabu ThomasLaura B. IturriagaPablo Daniel Ribotta (Editors), (2013), Advances in Food Science and Technology, DOI:10.1002/9781118659083, Scrivener Publishing LLC.
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Engineering and Quality Assurance, Apple Academic Press, CRC Press, Taylor and Francis Group.

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9. Dhiraj A. Vattem, and Vatsala Maitin (Editors), (2016), *Functional Foods, Nutraceuticals and Natural Products -Concepts and Applications*, DEStech Publications Inc.
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12. Arlene Spark, Lauren M. Dinour and Janel Obenchain, (2015), *Nutrition in Public Health: Principles, Policies and Practice*, Second Edition, CRC Press.
13. *Indian Food Safety Regulations – Gazette Notifications and Amendments*, 2011 & 2016.

19MPFSNE01**FOOD PRODUCT DESIGN AND DEVELOPMENT**

Prog. & Branch	M.Phil. Food Science, Technology and Nutrition	Sem.	L	T	P	Credit
Pre requisite	PG Degree in relevant discipline	I	2	1	2	4
Marks: 100						

Objectives

This course provides an insight for design, development, standardization, regulatory aspects and commercialization of food products.

UNIT – I**9**

New product development: Introduction- new products, customers and consumers, value addition, and market. Marketing characteristics of new products-product life cycle and profit picture. Corporate avenues for growth and profitability, opportunities in the marketplace for new product development, technological advances driving new product development, government's role in new product development.

UNIT – II**16**

Designing new products: New Food Product Development (NPD) process and activities, NPD success factors, design thinking process, new product design, food innovation case studies, market-oriented NPD methodologies, organization for successful NPD; Recipe development; use of traditional recipe and modification; involvement of consumers, chefs and recipe experts; selection of materials/ingredients for specific purposes; modifications for production on large scale, cost effectiveness, nutritional needs or uniqueness; use of novel food ingredients and novel processing technologies.

UNIT – III**12**

Standardization & Large scale production: Process and equipment design; manufacturing protocol, establishing process parameters for optimum quality; sensory evaluation; food testing lab requirements; different techniques and tests; statistical quality control; comparison of market samples; stages of the integration of market and sensory analysis.

UNIT – IV**18**

Quality, Safety & Regulatory aspects: Product stability; evaluation of shelf life; changes in sensory attributes and effects of environmental conditions; accelerated shelf life determination; developing packaging systems for maximum stability and cost effectiveness; regulatory aspects; approval for proprietary product, food safety management system and quality audits for a food product, regulatory aspects of FSSAI for a food product.

UNIT – V**17**

Advertisement, Marketing & Case studies: Product performance testing; market positioning, Marketing: developing test market strategies; various tools and methodologies to evaluate consumer attitudes, preferences and market acceptance factors; Case Studies - successes and failures, innovation, best practices, technological and marketing approaches to NPD; food choice models and new product trends.

Lecture:72**Course Outcomes**

- CO1: Understand the concepts of new food products development
- CO2: Develop novel and innovative new food products
- CO3: Choose appropriate method for production, testing and analysis of developed products
- CO4: Adapt the quality and safety standards of the developed new food products
- CO5: Apply the acquired knowledge for marketing and advertisement of the developed new food products

References

1. Brody, A. L., and John B. L., "Developing New Food Products for a Changing Marketplace", 2nd Edition, CRC press, Taylor and Francis Group, UK, 2008.
2. Gordon W Fuller, "New Food Product Development: From Concept to Marketplace", 3rd Edition, CRC press, Taylor and Francis Group, UK, 2016.
3. Catherine Side., "Food Product Development: Based on Experience", 2nd Edition, Iowa State Press, Blackwell publications, 2008
4. Macfie, H., "Consumer-led Food Product Development", 1st Edition CRC press, Wood Head publications, 2007

19MPFSNE02**MEDICAL NUTRITION THERAPY**

Prog. & Branch	M.Phil. Food Science, Technology and Nutrition	Sem.	L	T	P	Credit
Pre requisite	PG Degree in relevant discipline	I	2	1	2	4

Marks: 100**Objectives**

This course provides intense learning on causes, pathophysiology, nutritional alterations and nutrition care process inculcating evidence-based practice and practice based evidence.

UNIT – I**12**

Nutrition Care Process (NCP): Historical and contextual perspectives on advanced medical nutrition therapy; NCP insights; steps in nutrition care process – nutrition assessment, nutrition diagnosis, nutrition intervention and nutrition monitoring and evaluation; case studies on nutrition care process and dietetic practice at global and national level; Role of IDA in nutrition care process model development, implementation and documentation.

UNIT – II**12**

Diet, Nutrient and Drug Interaction: Effect of drug on ingestion, digestion, absorption and metabolism of nutrients; Effect of food, nutrients and nutritional status on drug dosage and efficiency.

Nutrition, Exercise and Immunity: Nutrients for immunity, immune modulation in nutritional deficiencies, Exercise and Yoga on immunity, psychological wellbeing and immunity; healthy gut vs immunity.

UNIT – III**15**

From DNA to Personalised Diets: Basics of DNA and RNA, gene markers for nutrients, omics in nutrition diagnosis and MNT, systematic literature review and meta-analysis on nutrigenomics, epigenetics on prevention and management of nutrition disorders; a scientific perspectives of personalised gene based dietary recommendations; DNA testing and nutritional plans.

UNIT – IV**16**

Medical Nutrition Therapy: Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in medical nutritional management of weight imbalances, cardiovascular disorders, diabetes mellitus and other metabolic disorders, genetic and immunodeficiency disorders.

UNIT – V**17**

Medical Nutrition Therapy: Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in medical nutritional management of GI disorders, liver, gall bladder and pancreatic disorders, renal disorders, stress and trauma, cancer, neurological disorders, musculoskeletal disorders, respiratory problems, infections and AIDS.

Lecture:72**Course Outcomes**

- CO1: Infer the concepts of nutrition care process
- CO2: Assess the interaction drug, nutrient interaction
- CO3: Choose appropriate diet for personalized nutrition
- CO4: Adapt appropriate diet for CVD, diabetes and metabolic disorders
- CO5: Suggest appropriate diet for GI disorders, cancer and other pathological conditions

References

1. Esther Myers and YivaOrrevall, (2020), Using the Nutrition Care Process, TBA, USA.
2. Paul Glasziou and Chris Del Mar (2007), Evidence based Practice Workbook, Second Edition, Blackwell Publishing.
3. Dietitians of Canada (2006-2011), Practice based Evidence : PEN Writers' Guide, pennutrition.com.
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5. Noland, Diana, Drisko, Jeanne A., Wagner, Leigh (Eds.), (2020), Integrative and Functional Medical Nutrition Therapy, Principles and Practices, Springer Publications.
6. Kelly Kane and Kathy Prelack (2019), Advanced Medical Nutrition Therapy, First edition, Jones and Bartlett Learning, LLC.
7. Annalynn Skipper, (2009), Advanced Medical Nutrition Therapy Practice, Jones and Bartlett Learning, LLC.

19MPFSNE03**PUBLIC HEALTH NUTRITION**

Prog. & Branch	M.Phil. Food Science, Technology and Nutrition	Sem.	L	T	P	Credit
Pre requisite	PG Degree in relevant discipline	I	2	1	2	4

Marks: 100**Objectives**

This course will enable the students to develop an understanding on the nature of nutrition problems, its prevention and control through IEC programmes.

UNIT – I**9**

PHN Fundamentals: History of public health, determinants of public health, global health and epidemiological transition, sources of demographic and health data, evolution of public health initiatives – primary health care, MDGs and SDGs; nutrition transition in India, food security – factors affecting food security, economics of food security and community development, food security bills, national food security Act (2013), food security system in India – e-PDS and food security portal in India.

UNIT – II**16**

Nutrition Care Process of the Community: Demographic trends and epidemiological description of major nutritional problems, indicators of nutritional problems, village survey, household food security status, assessment of dietary diversity and food frequency, food budgeting and food equity; Assessment of nutritional status of the individual using ABCDEF as components.

UNIT – III**12**

Nutrition Intervention: Health based interventions, food based interventions including fortification and genetic improvement of foods, supplementary feeding, national nutrition programmes – National Nutrition Policy (1993), National Nutrition Strategy (2017), nutritious noon meal programme, ICDS, national nutritional anemia prophylaxis programme, national iodine deficiency disorders control programme, National Nutrition Mission - Poshan Abhiyan, Anemia Mukt Vharat, Eat Right India Movement; International, national and voluntary organisations towards nutrition interventions; nutrition education programmes – importance of nutrition education, training workers in nutrition education programmes, methods of nutrition education and use of computers in nutrition education, planning and implementation of nutrition education programmes.

UNIT – IV**18**

Nutrition Monitoring and Evaluation: Introduction to nutrition monitoring and evaluation, programme logic models and theory of change models, Evaluation principles and approaches for field-based programs, Identifying evaluation questions and developing a learning agenda, Selecting an appropriate evaluation design, Collecting evaluation data, Developing Objectives and indicators for monitoring and evaluation : quantitative and qualitative indicators, Evaluation : types, evaluation question, Identifying program stakeholders and their information needs, Selecting appropriate communication tools for monitoring and evaluation.

UNIT – V**17**

Information, Education and Communication (IEC): Introduction, objectives, importance and relevance of IEC in public health nutrition, preparation of IEC materials, apps and softwares for the development of IEC materials for public health nutrition, refining of IEC messages, social mobilisation and social marketing of IEC, role and use of IEC by the community, IEC for different target groups - Policy makers, Managerial level and middle level officials from Government donor agencies and NGOs, Grassroots functionaries and community, case studies of various IEC programmes for public health nutrition.

Lecture:72**Course Outcomes**

- CO1: Understand the fundamental of PHN
- CO2: Infer the nutrition care process for community
- CO3: Choose appropriate nutrition intervention programme for the community
- CO4: Adapt appropriate nutrition monitoring and evaluation method for the community
- CO5: Amend suitable IEC system for the community

References

1. Vir S.C., (2015), Public Health Nutrition in Developing Countries (Part I and II), Woodhead Publishing India Pvt, Ltd.
2. Mann, J. and Truswell, S. eds., (2017), Essentials of Human Nutrition. Oxford University Press.
3. Park, K. (2020), Preventive and Social Medicine, 25th Edition, Bansaridas Bhanot Publishing House.

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5. Bhatt D.P (2008), Health Education, Khel Sahitya Kendra, New Delhi
6. Suryatapa Das, (2016), Textbook of Community Nutrition, Second Edition, Academic Publishers.
7. Food and Agricultural Organisations of the United Nations, (2016), Nutrition Education Needs and Capacity Analysis Package, <http://www.fao.org/nutrition/education/professional-training/needs-assessment>.