# M Sc Programme
# (4 semesters)
# in Food and Nutrition

Department of Food and Nutrition
West Bengal State University

**Introduction:**

The Department of Food and Nutrition offers M.Sc. in Food and Nutrition and PhD in Food and Nutrition. The M Scprogramme endeavors to train professionals who can create nutrition awareness for promotion of healthy lifestyle among the population. The courses of this programme have been designed to enhance the core competency of students in the fields of clinical nutrition and dietetics and public health nutrition,. The curriculum provides a strong theoretical base. The programme aims to strengthen the research acumen of students to enable them to develop into academicians and researchers in the field of Food and Nutrition.

**Programme Specific Objectives:**

The objectives of 2 y M.Sc. programme in Food and Nutrition are:

- To impart the understanding of the concepts of human health, food chemistry
- To enable the students to learn the methods of assessing human nutritional requirements, nutritional assessment and diet planning
- To understand the applications of nutritional sciences in clinical interventions, communication for health promotion, food service management,
- To improve understanding and develop skills for planning, management and monitoring of public health nutrition programmes implemented by the government.
- To acquire skills to undertake systematic research in the area of food science, clinical nutrition and public health nutrition
- To apply theoretical concepts in laboratory setting as per standard methods in the above mentioned areas

**Programme Specific Outcomes:**

The programme trains students to become professionals who can work as public health nutritionists, dieticians.

After completing this programme the student will be able to:

- Assess nutritional status and plan appropriate diets.
- Use the knowledge of nutritional sciences in clinical interventions and communication for health promotion
- Work as program planners and managers in the field of public health nutrition
- Manage a food service establishment
- Apply theoretical concepts and practical training for research in the field of clinical nutrition and public health nutrition

| | Course Code | COURSE TITLE | Credit | Marks |
|---|---|---|---|---|
| | **SEMESTER 1** | | | |
| | FNT2PCOR01T | PRINCIPLES OF HUMAN HEALTH -1 | 4 | 50 |
| | FNT2PCOR02T | FOUNDATION OF HUMAN NUTRITION | 4 | 50 |
| | FNT2PCOR03T | FOUNDATION OF FOOD SCIENCE | 4 | 50 |
| | FNT2PCOR04T | PRINCIPLES OF EPIDEMIOLOGY | 4 | 50 |
| | FNT2PCOR05M | HUMAN BIOLOGY INCLUDING ANTHROPOMETRY | 4 | 50 |
| | FNT2PAEC01M | TECHNIQUES IN CLINICAL NUTRITION | 2 | 50 |
| SEMESTER 1 TOTAL | | | 22 | 300 |
| | **SEMESTER 2** | | | |
| | FNT2PCOR06T | PRINCIPLES OF HUMAN HEALTH -2 | 4 | 50 |
| | FNT2PCOR07T | COMMUNITY NUTRITION | 4 | 50 |
| | FNT2PDSE01T | FOOD SERVICE MANAGEMENT | | |
| | FNT2PDSE01T | FOOD TOXICOLOGY | 4 | 50 |
| | FNT2PDSE02M | EMERGING AREAS IN FOOD AND NUTRITION | | |
| | FNT2PDSE02M | INTERNSHIP AND VISITS FOR EXPERIENTIAL LEARNING IN FOOD AND NUTRITION | 4 | 50 |
| | FNT2PCOR10M | TERM PAPER ON FOOD AND NUTRITION | 4 | 50 |
| Semester 2 Total | | | **20** | **250** |
| | **SEMESTER 3** | | | |
| 1 | FNT2PCOR11T | PRINCIPLES OF HUMAN HEALTH FOR CLINICAL NUTRITION | 4 | 50 |
| 2 | FNT2PCOR12T | HUMAN NUTRITION | 4 | 50 |
| 3 | FNT2PCOR13T | FOOD SCIENCE AND FOOD MICROBIOLOGY | 4 | 50 |
| 4 | FNT2PCOR14T | PUBLIC HEALTH NUTRITION | 4 | 50 |
| 5 | FNT2PCOR15M | APPLICATION OF STATISTICS AND COMPUTER IN FOOD AND NUTRITION | 4 | 50 |
| SEC | FNT2PSEC01M | PRINCIPLES OF COMMUNICATION AND MANAGEMENT FOR ENTREPRENEURSHIP AND START UPS IN FOOD AND NUTRITION | 2 | 50 |
| Semester 3 Total | | | 22 | 300 |
| | **SEMESTER 4** | | | |
| 6 | FNT2PCOR16T | EPIDEMIOLOGY, RESEARCH METHODOLOGY AND APPLICATION OF STATISTICS | 4 | 50 |
| 7 | FNT2PCOR17T | THERAPEUTIC NUTRITION | 4 | 50 |
| 8 | FNT2PCOR18T | FOOD PROCESSING AND PRESERVATION | 4 | 50 |
| 9 | FNT2PCOR19T | FOOD, NUTRITION IN HUMAN DEVELOPMENT | 4 | 50 |
| 10 | FNT2PCOR20M | MEDICAL NUTRITION THERAPY | 4 | 50 |
| 11 | FNT2PCOR21M | PROJECT WORK | 4 | 50 |
| Semester 4 Total | | | 24 | 300 |
| | Grand Total | | 88 | 1150 |

# SEMESTER 1

# FNT2PCOR01T: PRINCIPLES OF HUMAN HEALTH -1

Course Objective: To facilitate students acquire knowledge in principles of human health so that they can function as clinical nutrition professional independently

- Anatomy and Physiology of different human systems
- Chemistry of Carbohydrates, Protein, Lipids, Nucleic Acids
- Enzymology
- Nutritional management diseases associated with different human systems, along with case studies

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical knowledge in principles of human health so as to function as clinical nutrition professional independently

# FNT2PCOR02T: FOUNDATION OF HUMAN NUTRITION

Course Objective: To facilitate students acquire theoretical knowledge in basic principles of human nutrition

- Human nutritional requirements
- macro nutrients and micro nutrients

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical knowledge in basic principles of human nutrition

# FNT2PCOR03T: FOUNDATION OF FOOD SCIENCE

Course Objective: To facilitate students acquire theoretical knowledge in basic principles of food science

- Cereals, Pulses, and Oilseeds: Structure, composition, and milling (wheat, rice, corn, oats, and millets). Processing by-products of cereals, texturized vegetable proteins, and oilseed meals

Course Outcome: On successful completion of the particular course, the students are expected to acquire working knowledge in food science

# FNT2PCOR04T: PRINCIPLES OF PRINCIPLES OF EPIDEMIOLOGY

Course Objective: To facilitate students acquire theoretical foundation in principles of epidemiology so that they can function as public health nutrition professional and researcher in nutrition

- Basic Concepts and Definitions in Epidemiology
- Types and uses
- Measurements
- Study designs
- Screening, surveillance

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical knowledge in principles of epidemiology so as to function as public health nutrition professional

# FNT2PCOR05M: HUMAN BIOLOGY INCLUDING ANTHROPOMETRY

Course Objective: To facilitate students acquire theoretical foundation in principles of epidemiology so that they can function as public health nutrition professional and researcher in nutrition

- Experiments/assignments on
    - Anthropometric techniques in nutrition
    - Biochemistry, histology, microbiology
    - Clinical nutrition

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical knowledge in principles of epidemiology so as to function as public health nutrition professional

# FNT2PAEC01M: TECHNIQUES IN CLINICAL NUTRITION

Course Objective: To facilitate students acquire theoretical foundation and hands on experience in different tools as required to function independently in clinical nutrition

- Basics of cognitive science
- Motivation theories
- Nutritional Counselling requirements
- Qualitative and quantitative procedures in clinical nutrition

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical knowledge and hands on experience in different tools as required to function independently in clinical nutrition

# SEMESTER 2

# FNT2PCOR06T: PRINCIPLES OF HUMAN HEALTH -2

Course Objective: To facilitate students acquire theoretical foundation in principles of human health, especially in the areas of molecular so that they can function as clinical nutrition professional independently

- Cell and Molecular Biology, and Nutrition
- Genetics including Nutrigenomics; nutritional management of associated diseases; case studies
- Food, Nutrition and Immunology
- Food, Nutrition and Pharmacology
- Biophysics

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical knowledge in principles of human health especially the molecular level understanding of metabolic pathways in human system so as to function as clinical nutrition professional

# FNT2PCOR07T: COMMUNITY NUTRITION

Course Objective: To facilitate students acquire theoretical knowledge in community nutrition, especially management of malnutrition in the community so that they can function as community nutrition professionals

- Community and community nutrition
- Malnutrition: types, factors
- Management of malnutrition: tools, assessment procedures, educating the community

Course Outcome: on successful completion of the particular course, the students are expected to acquire knowledge in community nutrition, especially management of malnutrition in the community so that they can function as community nutrition professionals

# FNT2PDSE01T: FOOD SERVICE MANAGEMENT

Course Objective: To facilitate students acquire working knowledge in food service management

- Basics of Food service management
- Panning and setting up of food service establishment
- Food management
- Layout, planning of facilities

Course Outcome: on successful completion of the particular course, the students are expected to acquire working knowledge in food service management so that they may run food service establishments

# FNT2PDSE01T: FOOD TOXICOLOGY

Course Objective: To facilitate students acquire basic knowledge on the principles of food toxicology

- Principles of Toxicology
- Natural Toxins in Food
- Food Allergies and Sensitivities 9Hrs
- Environmental Contaminants and Drug Residues in Food
- Toxins generated during Food Processing

Course Outcome: on successful completion of the particular course, the students are expected to acquire working knowledge of the principles of food toxicology, on the impacts of natural toxins in foods

# FNT2PDSE02M: EMERGING AREAS IN FOOD AND NUTRITION

Course Objective: To facilitate students acquire sound theoretical and/or practical knowledge in emerging areas of food and nutrition

- Nutrition for sportspersons
- Space Nutrition
- Nutrition during disasters
- Food and Nutrition in relation to other natural and social sciences
- Policies and regulations in Food and Nutrition

Course Outcome: on successful completion of the particular course, the students are expected to acquire sound theoretical and/or practical knowledge in emerging areas of food and nutrition

# FNT2PDSE02M: INTERNSHIP AND VISITS FOR EXPERIENTIAL LEARNING IN FOOD AND NUTRITION

Course Objective: To facilitate students acquire an idea in real life settings of practices in hospitals, clinics, community settings

- A candidate will be required to undergo an internship and visit community settings.

Course Outcome: on successful completion of the particular course, the students are expected to acquire working knowledge in functioning of hospitals, clinics, community settings

# FNT2PCOR10M: TERM PAPER ON FOOD AND NUTRITION

Course Objective: To facilitate students acquire a habit and practise of reading and comprehending latest published literature and also to acquire the skill of scientific writing in the field of food and nutrition

- A candidate will be required to prepare a proper term paper under supervision of a teacher and make a presentation thereof.

Course Outcome: on successful completion of the particular course, the students are expected to acquire ability to understand latest developments in the field of food and nutrition and also skill of scientific writing in food and nutrition.

# SEMESTER 3

# FNT2PCOR11T: PRINCIPLES OF HUMAN HEALTH FOR CLINICAL NUTRITION

Course Objective: To facilitate students acquire theoretical foundation and proficiency in Principles of Human Health so that they can function as Clinical Nutrition professional independently

- Structure and function of different human systems
- Metabolism of Carbohydrates, Protein, Lipids, Nucleic Acids
- Nutritional management of Metabolic diseases and diseases associated with different human systems

Course Outcome: on successful completion of the particular course, the students are expected to acquire proficiency in Principles of Human Health so as to function as clinical nutrition professional independently

# FNT2PCOR12T: HUMAN NUTRITION

Course Objective: To facilitate students acquire theoretical foundation in basic principles of Human Nutrition so that they can function as clinical nutrition professional independently

- Derivation of requirements
- Sources of nutrients
- Problems associated with deficiency

Course Outcome: On successful completion of the particular course, the students are expected to acquire proficiency in principles of human nutrition so as to function as clinical nutrition professional independently

# FNT2PCOR13T: FOOD SCIENCE AND FOOD MICROBIOLOGY

Course Objective: To facilitate students acquire theoretical foundation in basic principles of food science and food microbiology

- Horticultural & Special Crops: Post-harvest handling, storage (ZECC, CCSR), and minimal processing of fruits and vegetables. Processing of juices, tomato products, preserves, tea, coffee, and cocoa.
- Animal Products and Spices: Dairy plant operations, fluid milk processing and traditional/fermented dairy products. Structure and processing of meat, poultry, fish, and eggs. Introduction to spice oleoresins and supercritical fluid extraction (SCFE).
- Microbial Growth Dynamics: General characteristics of industrially important molds, yeasts, and bacteria. Growth curves, generation time, and industrial applications (probiotics, prebiotics, postbiotics, synbiotic, fungalsubstrate and single-cell proteins).
- Kinetics and Thermal Destruction: Intrinsic and extrinsic parameters affecting microbial growth in food. Kinetics of thermal destruction: calculating and modeling D-values, Z-values, F-values, and the 12D concept.
- Isolation and Diagnostics: Culture techniques, staining, and pure culture isolation (streak/pour plate). Standard bacteriological examination of milk and water.

Course Outcome: On successful completion of the particular course, the students are expected to acquire working knowledge in food science and food microbiology

# FNT2PCOR14T: PUBLIC HEALTH NUTRITION

Course Objective: To facilitate students acquire theoretical foundation and proficiency in public health nutrition so that they can function as public health nutrition professional independently

- Evolution and Basic Concepts of Public Health including Occupational Health, Environmental Health
- Health Policies and Regulations and Health services in India
- Social Sciences, Social Medicine and Health
- Basic Determinants of Health
- Demography
- Recent Advances in Public Health
- International Health

Course Outcome: On successful completion of the particular course, the students are expected to acquire proficiency in principles of public health nutrition

# FNT2PCOR15M: APPLICATION OF STATISTICS AND COMPUTER IN FOOD AND NUTRITION

Course Objective: To facilitate students acquire proficiency through hands on training in application of statistics and computational techniques in Food and Nutrition.

- Quantitative techniques- principles and practice of statistical techniques for analyses of data as required in Food and Nutrition
- Computational techniques- for analyses and presentation of data as required in Food and Nutrition

Course Outcome: On successful completion of the particular course, the students are expected to acquire proficiency in application of statistics and computational techniques in Food and Nutrition

# FNT2PSEC01M: PRINCIPLES OF COMMUNICATION AND MANAGEMENT FOR ENTREPRENEURSHIP AND START UPS IN FOOD AND NUTRITION

Course Objective: To facilitate students acquire essential skills as required for entrepreneurship and start ups in Food and Nutrition

- Basics of Entrepreneurship and Start ups in Food and Nutrition
- Principles of Communicationwith special reference to as required in different professions associated with food and nutrition
- Principles of Management
- Resource Management and Consumer Issues
- Different Types of Industries
- Food Service Management

Course Outcome: On successful completion of the particular course, the students are expected to acquire essential skills as required for entrepreneurship and start ups in food and nutrition.

# SEMESTER 4

# FNT2PCOR16T: EPIDEMIOLOGY, RESEARCH METHODOLOGY AND APPLICATION OF STATISTICS

Course Objective: To facilitate students acquire theoretical foundation and proficiency in Epidemiology, Research Methodology and Application of Statistics so that they can function as professional and pursue career in research in Food, Nutrition and allied subjects

- Epidemiology
- Research methodology
- Quantitative techniques
- Qualitative techniques
- Application of statistics
- Research Ethics
- Basics of IPR

Course Outcome: on successful completion of the particular course, the students are expected to acquire proficiency in Epidemiology, Research Methodology and Application of Statisticsso as to function as professional and pursue career in research in Food, Nutrition and allied subjects.

# FNT2PCOR17T: THERAPEUTIC NUTRITION

Course Objective: To facilitate students acquire theoretical foundation and proficiency in therapeutic nutritionso that they can function as clinical nutrition professional independently

- Principles of Therapeutic Diet
- Nutritional Management of Infections (including food borne diseases) and Fever
- Nutrition, Diet and Cancer
- Nutritional Management of Eating Disorder
- Nutritional Management in Surgery
- Nutritional Management of Burns

Course Outcome: on successful completion of the particular course, the students are expected to acquire proficiency in therapeutic nutritionso as to function as clinical nutrition professional independently

# FNT2PCOR18T: FOOD PROCESSING AND PRESERVATION

Course Objective: To facilitate students acquire theoretical foundation in basic principles of food science and food microbiology

- Thermal and Emerging Preservation: Traditional thermal processing alongside advanced non-thermal hurdles: High-Pressure Processing (HPP), Pulsed Electric Fields (PEF), ultrasonic, and ohmic heating.
- Fermentation Process: Bioprocessing models (batch, continuous, submerged, and solid-state). Fermenter design, upstream/downstream processing, and enzyme immobilization. Production of beer, wine, yogurt, cheese, amino acids (like MSG), and vitamins. Mass production of antibiotics (like penicillin), organic acids (citric acid, lactic acid), and Manufacturing enzymes for food processing.
- Food Toxicology: Toxicants & Contaminants: Anti-nutritional factors, natural plant/animal toxins, and food allergies. Environmental contaminants (heavy metals, pesticide/veterinary residues) and process-induced toxins (acrylamide, packaging plastics).
- Packaging Systems: Material properties (glass, metal, plastics, bio-films). Protective, active, smart, and intelligent packaging. Industrial applications: MAP/CAP, aseptic processing, retort pouches, and irradiation.Nanotechnology in Packaging.
- HACCP

Course Outcome: On successful completion of the particular course, the students are expected to acquire working knowledge in food science and food microbiology

# FNT2PCOR19T: FOOD, NUTRITION AND HUMAN DEVELOPMENT

Course Objective: To facilitate students acquire theoretical foundation and proficiency in principles of human developmentso that they can function as public health nutrition and clinical nutrition professionals independently

- Principles of Child and Human Development
- Developmental Biology
- Family and Food Nutrition
- Community Development

Course Outcome: on successful completion of the particular course, the students are expected to acquire proficiency in principles of human developmentso that they can function as public health nutrition and clinical nutrition professionals independently

# FNT2PCOR20M: MEDICAL NUTRITION THERAPY

Course Objective: To facilitate students acquire theoretical foundation and proficiency through hands on training in medical nutrition therapyso that they can function as clinical nutrition professionals independently

- Anthropometric techniques especially those relevant for screening of non communicable diseases
- Familiarization with latest versions of relevant guidelines
- Assignments on dietary management of different health condition
- Case studies

Course Outcome: on successful completion of the particular course, the students are expected to acquire proficiency in medical nutrition therapyso as to function as clinical nutrition professionals independently

# FNT2PCOR21M: PROJECT WORK

Course Objective: To facilitate students acquire hands on skills in carrying out a project work ethically following all required steps.

A project work is to be carried out ethically under supervision of a teacher on a topic having relevance in food and nutrition. A report is to be submitted and presented.

Course Outcome: on successful completion of the particular course, the students are expected to acquire proficiency in carrying out a project work and making a presentation thereof.