

**Curriculum
of
Master of Philosophy (M.Phil.)
and Doctor of Philosophy (Ph.D.)
in Nutrition and Food Science**



**Institute of Nutrition and Food Science
University of Dhaka**

Session: 2020-21 and onwards

Curriculum for M.Phil. and Ph.D. in Program in Nutrition and Food Science
University of Dhaka
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The Institute of Nutrition and Food Science (INFS), University of Dhaka, is a pioneering organization of research and teaching in the field of Nutrition and Food Science in Bangladesh. It was established in 1969 as a follow up of the 1962-64 National Nutrition Survey. INFS is devoted to the study of nutritional issues of the country to inform policies targeting the food and nutrition security of the Bangladeshi population. As part of capacity building and strengthening, INFS offers undergraduate (B.S. Honors program) and graduate (M.S. M.Phil., and Ph.D. program) and conducts specialized training for professionals. The INFS has a group of highly qualified and experienced faculty members. The primary focus of academics and research are: (i) Nutritional Biochemistry, (ii) Clinical Nutrition and Diet Therapy, (iii) Community and Public Health Nutrition, and (iv) Food Science and Technology (including Food Microbiology). Major research areas are food analysis, analysis of food toxins, the role of functional food in health and diseases, nutrition survey and surveillance, livelihood and food security, food, and nutrition policy, food hygiene and safety, and the role of diet in the disease process. Over the years, INFS has conducted several national surveys (1975-76, 1981-82, 1995-96, 2001-2003 and 2011-2012), and managed, updated and published Food Composition Tables (FCTs) and Database for Bangladesh. The Institute has a rich seminar library with an extensive collection of reference books and journals. It possesses several research laboratories with modern equipment, facilities, and service systems. The faculty and the researchers of this Institute have been regularly publishing their research findings in high impact national and international journals. The Institute has already earned a place as a center of excellence in the field of Nutrition and Food Science research in Bangladesh. The Institute has a strong collaboration with various national and international research groups.

Title of the Program: Degree of Master of Philosophy (M.Phil.); Degree of Doctor of Philosophy (Ph.D.)

Duration of the Program: Two-Year M.Phil. Degree; Four-Year for Ph.D. (Regular); Five-Year for Ph.D. (Part-time)

Level: Postgraduate

Medium of Instruction: English

Eligibility for Admission:

Students are admitted to the M.Phil. or Ph.D. Degree programs per the existing Ordinance and regulations of the University of Dhaka and the rules of the Faculty of Biological Sciences and INFS, University of Dhaka. The Institute may re-fix the minimum requirement for admission to the program from time to time with approval from the authority.

Courses and Credit Distribution:

Students of both the M.Phil. and Ph.D. shall undertake and appear at written examinations of total 200 marks in the Four Courses (i.e., 50 marks for each course) or Eight Credits (i.e., 25 marks for each Credit) of the theoretical courses and the oral examination of 100 marks (4 Credits) at the

end of the first year (First Part) of their admission, and the pass mark in the first year examination is 50% on an average for the written papers and 50% for the oral examination (viva-voce).

The students having an M.S. degree with a 4-year B.S./B.Sc. (Honors) degree in nutrition and food science from Dhaka University directly enrolled for the Ph.D. program may be exempted from the theoretical courses and the oral examination in their First Part. The students from other institutes/departments/universities, irrespective of having MPH, M.Phil and PhD degree, have to attend the first year theory classes and to pass the oral examination, as per Dhaka University Ordinances and Regulations Part- III, Chapter-VI, P-24(3), December 17, 2005; and Regulations of Faculty of Biological Sciences, March 30, 2016. For the M.Phil. Degree, students shall complete the research work and present at least one seminar in the Second Part (during 2nd Year), and for the Ph.D. degree, students shall complete the research work and present at least two seminars in the Second Part. The students should have one publication for M.Phil and two publications for PhD in peer reviewed journals from their research work before submission of thesis.

The completion, submission, and assessment of Thesis, Seminar presentation, and other matters will be followed as per regulations and guidelines approved by the University of Dhaka. The layout of the M.Phil. or Ph.D. in Nutrition and Food Science program is given below:

Course Number	Name of the Course	Credits
FIRST PART		
Theory:		
NFS-601	Advances in Nutrition and Food Science	2
NFS-602	Community and Public Health Nutrition	2
NFS-603	Advanced Research Methods	2
NFS-604	Advanced Data Management and Analysis	2
Sub-total		8
NFS-621	Viva Voce	4
Total		12
SECOND PART		
Seminar Presentation		
Thesis (M.Phil./ Ph.D.)		
Thesis Defense (MPhil./ Ph.D.)		

DETAILED CURRICULUM AND SYLLABUS OF M.Phil. or Ph.D. IN NUTRITION AND FOOD SCIENCE

FIRST PART

Course No. NFS- 601

Advances in Nutrition and Food Science

2 Credits

Course Overview:

This is an advanced course in nutrition and food science, which deals with the effects of food and its constituents on living organisms, with emphasis on humans. This course integrates nutrition with biochemistry, physiology, clinical nutrition, and microbiology. The focus of the course will be on metabolism, examining its regulation from cellular to whole-body perspective.

Learning Outcomes:

Upon completion of this course, the students should be able to

- Understand the integrated metabolism of food
- Understand the role of antioxidants and Phyto-protectants and heavy metals and their toxicity in our body
- Understand recombinant DNA, nutrient-gene interactions, and nutrient- nutrient interactions
- Use the nutrition care process to make decisions, to identify nutrition-related problems and determine and evaluate nutrition interventions, including medical nutrition therapy, disease prevention, and health promotion
- Evaluate the quality of foods

Content:

1. Integration and regulation of metabolism and the impact of exercise
2. Antioxidants: Free radicals and oxidative stress. Roles of antioxidant nutrients in health and disease. Phyto protectants and functional foods and their role in nutrition.
3. Biochemical aspects of heavy metals and their toxicity
4. Recombinant DNA and its application in nutrition
5. Nutrient-gene interactions.
6. Nutrient-nutrient interactions.
7. Obesity and weight management
8. Diabetes: Clinical Guidelines, Diabetes prevention and treatment; Insulin action; Diabetes and related disorders. Policy & Community education—the Extension model Diabetes treatments; Diabetes Complications
9. Cardiovascular Disease: Atherosclerosis and Ischemic heart disease: Definition, pathophysiology, risk factors, clinical manifestation and diagnosis, MNT for atherosclerosis and Ischemic heart disease
10. Chronic kidney diseases (CKD): Role of the kidney; Stages of chronic kidney disease (CKD); Diagnostic and lab tests; some causes of kidney failure; Signs & symptoms of kidney failure; Medical nutrition therapy for CKD patients
11. Aseptic processing of foods: aspects of good manufacturing practice (GMP), scheduled processes, GMP guidelines, decontamination of packaging, aseptic Filling.
12. Food preservation: major preservation techniques, food preservatives and additives.

13. Quality factors in different kinds of foods: Milk and milk products, meat, poultry and eggs, fruits and vegetables, cereal products, fruit juices and beverages.

Learning and Teaching method:

Lectures, PowerPoint presentation, video clip, question-answer

Assessment:

Final examination (graded)

References:

1. Human Nutrition- J.S. Garrow, W.P.T. James, A. Ralph.
2. Present Knowledge in Nutrition (7thrd) – E.E. Ziegen
3. Modern Nutrition in Health and Disease – M.E. Shils, T.A. Olson, M. Shike.
4. Recombinant DNA (2nd edition) –Waston and Gilman
5. Fatty Acids and Lipids – New findings. T. Hamnazaki and H. Okuyama. Vol-88.
6. Textbook of Human Nutrition – M.S. Bamji; N.P. Rao and V. Reddy (eds).
7. Human Nutrition in the Developing World – M. C. Latham. FAO.Food& Nutrition Series.

Course No. NFS-602 Community and Public Health Nutrition

2 Credits

Course Overview:

This is an advanced course that comprises various topics related to community and public health nutrition. Public health nutrition is the application of evidence-based knowledge and policies for reducing disease risks and improving population health, with a focus on the prevention of nutrition-related illnesses. This course will focus on current public health nutrition issues relative to programming and public policy. This course combines theory, critical appraisal, and understanding of community and public health nutrition issues with approaches for implementing community nutrition interventions.

Learning Outcomes:

Upon completion of this course, students should be able to:

- Demonstrate knowledge and understanding of public health/community nutrition.
- Understand programs that have been developed to address community nutrition issues and serve different target populations
- Use current research to make decisions about community nutrition programming
- Critically appraise public health/community nutrition issues
- Write a community nutrition proposal

Content:

1. **Dynamics of Community Nutrition:** The concept of community, public health, and community interventions, Concept of health, Health promotion, Health objectives; Social-Ecological Models of health behavior; Entrepreneurship in community nutrition
2. **Theories of behavior change and their application to public health nutrition:** Behavior change theories and models—the Transtheoretical Models (TTM), Motivational Interviewing, Health Belief Model (HBM), the Theory of Planned Behavior (TPB), Social-Cognitive

Theory (SCT). Strategies to use dietary behaviors and food intake (individual and upstream approaches)

3. **Community Needs Assessment:** Basic principles of needs assessment, methods of obtaining data about the target population, issues in data collection.
4. **Program Planning:** Factors that trigger program planning; Steps in program planning; Logic Model
 - a. **Nutrition projects and programs:** the project concept, aspects of project preparation and analysis, the project cycles, agricultural project analysis, and nutrition, identifying project costs and benefits, feeding programs and food-related income transfers
 - b. **Monitoring of nutrition projects:** Project monitoring, indicators, characteristics
 - c. **Evaluation of public health nutrition Interventions and Policies:** Evaluation design (Process evaluation, impact evaluation, outcome evaluation, Economic evaluation; Data collection tools and their validation; data analysis and statistics; ethical issues; Recommendations
 - d. **Managing Nutrition Programs:** Four Functions of Management, Management issues in nutrition program
 - e. **Nutrition projects and programs in Bangladesh:** Food for work, Vulnerable group development program, Food for Education, Public food distribution system, Bangladesh Integrated Nutrition Program, National Nutrition Program, National Nutrition Services, Community Clinic Services, Nutritional Blindness Program, Salt Iodization Program
5. **Developing Strategies in the Community:** Group or Population approaches-national regulation, disincentives at the national level, Nudging. Community programs to improve nutrition behavior of children and adults—Individual approaches, Omics approaches
6. **Agriculture–Nutrition linkages:** Food systems for improved health, agricultural diversification, biofortification, nutritional effects of agricultural advances
7. **Telehealth, Telemedicine, eHealth, and mHealth in Nutrition Programs:** Definition of Telemedicine, eHealth, and mHealth; Barriers to Telemedicine/eHealth/mHealth; assessing and implementing telemedicine, eHealth, and mHealth programs
8. **Global and National Public Health Nutrition Approaches:** Global nutrition challenges; the world Health assembly; the Committee for food security; The United Nations General assembly; The second International Conference on Nutrition; The united nation Conference on Climate Change; Developing national Nutrition Policies and Program

Learning and Teaching method:

Lectures, PowerPoint presentation, video clip, question-answer

Assessment:

Final examination (graded)

References:

1. Community Nutrition in Action, An Entrepreneurial Approach-Marie A. Boyle
2. Public Health Nutrition, 2nd Edition- Edited by Judith L. Buttriss, Ailsa A. Welch, John M. Kearney, Susan A. Lanham-New
3. Public Health Nutrition, Principles and Practices in Community and Global Health-Natalie Stein

4. Economic analysis of agricultural projects – J.P. Gittinger
5. Global Health 101-Richard Skolnik
6. Leading Issues in Economic Development - G. M. Meier
7. Human Nutrition in the Developing World – M.C. Latham

Course No. NFS-603

Advanced Research Methods

2 Credits

Course Overview:

The advanced course is intended to have both theoretical as well as practical exposure on different aspects of research methodology with specific emphasis on understanding which designs are most compatible and effective with particular research situations, and, in turn, which analytic procedures are most appropriate to those designs. Other concepts such as critical review of the literature, ethical conduct of research, and the human subjects research (IRB) approval process essential to the proper conduct and dissemination of nutrition research will be covered. Further, this course will cover topics such as systematic review and meta-analysis, survey research, qualitative research, and implementation research., research and grant proposal writing, dissertation/thesis, and article writing.

Learning Outcomes:

Upon completion of this course, students should be able to:

- Understand designs/analysis procedures for nutrition research
- know of ethical issues in nutrition research & obtain relevant ethical research certification
- Understand systematic review and meta-analysis, survey research, qualitative research, and implementation research methods.
- Prepare a research proposal
- Communicate their research in small and large group settings

Content:

1. **Research:** Definition, the purpose of research, types of research. The ethical aspect of research; Regulatory protections of human subjects in research
2. **Research process:** Problem formulation; Formulating research objectives, hypothesis, and research questions; Review of the literature
3. **Research methods:** Types/Classification. Design of observational nutrition studies (Ecological, cross-sectional, case-control, and cohort); Design in experimental settings (Single-arm studies, parallel studies, Crossover studies)
4. **Sampling methods and sample size calculation**
5. **Data collection:** Questionnaire design process; Paper-based vs. tablet-based data collection
6. **Systematic review and meta-analysis:** Types of review, steps of systematic review; methodology of meta-analysis in nutrition research; presentation and interpretation of results
7. **Survey research:** Types of surveys, survey planning, survey item construction, survey instrument, pilot testing; choosing meaningful survey questions, issues in survey research
8. **Qualitative research:** Research design/strategy (Ethnography, Grounded theory, Phenomenology, Case study, Narrative inquiry, Mixed method Delphi methods), data collection (Individual interview, Focus group discussion, Key informant interview, Online interview, document review), data analysis (Coding, categorizing, concepts); Qualitative

analysis techniques (Generic approach, constant-comparison method, content analysis, discourse analysis, narrative analysis) and interpretation; Computer-assisted qualitative data analysis

9. **Implementation research (I.R.):** Concept, definition, classification of I.R.; Characteristics, components, and the cycle of I.R.; Conceptual framework for I.R. outcome; I.R. and community engagement; Integrating implementation research into the health system; Concepts, frameworks, and principles for implementation science (I.S.) in nutrition; Success factors for implementation research in nutrition
10. **Writing research/grant proposals:** Background and significance; Causal model, fact-hypothesis matrix; Objectives; Hypotheses/ research questions; Methodology—Variable indicator method matrix, study design, population under survey; Sample size and sampling procedure; Measurement methods, Plans for data analysis; Ethical considerations; Operational planning—time schedule, human resources, equipment and material, Budget, Risk management plan; Funding sources of nutrition research
11. **Writing and Publishing:**
 - a. Writing thesis/dissertation chapters
 - b. Writing research articles: Abstract, introduction, methodology, results, discussion, references

Learning and Teaching method:

Lectures, PowerPoint presentation, video clip, question-answer

Assessment:

Final examination (graded)

References:

1. Introduction Research and Medical Literature—J. Glenn Forister& J. Dennis Blessing
2. Analysis in Nutrition research-Edited by George Pounis
3. Qualitative Research in Education: A User's Guide—Marilyn V. Lichtman
4. Research Methodology-M.A. Salam Akanda
5. Writing dissertation and grant proposal—Lisa C. Ray
6. How to Write a Better Thesis-David Evans, Paul Gruba and Justin Zobel

Course No. NFS- 604

Advanced Data Management and Analysis

2 Credits

Course Overview:

The goal of this course is to develop an understanding of basic as well as advanced statistical concepts and data management techniques. Upon completion, the student should feel comfortable applying simple statistical methods, be familiar with more specialized/advanced analysis techniques.

Learning Outcomes:

Upon completion of this course, students will be

- Fluent in simple statistical analysis techniques
- Aware of more specialized/advanced statistical analysis techniques
- Able to use SPSS/STATA for data management and analysis

- Able to analyze a dataset and interpret results and present them in tables, figures, and text
- Able to apply data management and statistical analysis techniques to pre-selected data sets from nutrition and public health research projects.

Content:

1. **Introduction:** Concept of data management; Steps in data management; Data management issues—data selection, data collection, data analysis, data handling, data reporting and publishing, and data ownership
2. **Data management in SPSS/STATA:** Graphical user interface, types of files, basic command syntax; Enter and edit data, import, and export data, Merge Files, variable and value labels, Data Cleaning. Data transformation—Recoding variables, Computing Variables, Count Values within cases, Ranking. Data manipulation—Selecting cases, Splitting files, Weight cases, Aggregate
3. **Statistical analysis of retrospective health and nutrition data:** Hypothesis testing; Descriptive statistics; Assessment of normality; Confidence interval; Pearson Chi-Square test; *t*-test; One way ANOVA; Pearson Correlation Coefficient; Non-parametric tests; Simple linear regression analysis; Multiple linear regression analysis; Logistic regression analysis (Odds Ratio, Simple binary logistic regression analysis, Multiple binary logistic regression analysis); Strategies for model fitting.
4. **Statistical analysis of prospective health and nutrition data:** Descriptive statistics, Measures to calculate Incidence, Relative risk. Survival analysis—Basic concepts, Kaplan-Meier analysis, Log-rank test, Cox regression analysis. Contingency Tables - Mantel-Haenszel test, Confounding, interaction
5. **Collection and management of dietary data:** dietary information; Data management and dietary analysis—Portion sizes, Estimation of the nutrient content of foods, handling of food group data. Data manipulation—validation, reproducibility, calibration, and biomarkers. Measurement error, misreporting, and outliers; Energy adjustment
6. **Analysis of dietary pattern (Priori, posteriori, and hybrid):** Principal components/Factor analysis; Cluster analysis; Score-based approaches
7. **Data presentation:** Graphical, Tabular
8. **Secondary data analysis:** Advantage and disadvantage of secondary data analysis; locating appropriate secondary data; research uses of secondary data analysis; Secondary data Analysis process; Challenges of secondary data analysis
9. **Exercises:** Practical exercises in anthropometric and socioeconomic data management and analysis using SPSS/STATA, Anthro, AnthroPlus, and other related software packages

Learning and Teaching method:

Lectures, PowerPoint presentation, video clip, question-answer

Assessment:

Final examination (graded)

References:

1. Medical statistics: A guide to data analysis and critical appraisal. Peat, J. and Barton, B.
2. Analysis in Nutrition Research-Edited by George Pounis

3. Biostatistics: A guide to design, Analysis, and Discovery—Forthofer, R. N., Lee, E. S., & Hernandez, M. (2006).
4. Fundamentals of Biostatistics—B. Rosner.
5. Medical Statistics—Kirkwood and Sterne
6. Research Methodology-M.A. Salam Akanda
7. WHO Anthro & AnthroPlus Manual
8. SPSS, EPI Info, Anthro, Excel, Access and other related Packages

Course No. NFS- 621

VivaVoce

4 Credits

The oral examination is designed to assess the student's aptitude and potential to perform as an independent nutritionist and food scientist professional ultimately.

Assessment: Total Marks – 100. The pass mark in this oral examination is 50%.

SECOND PART

Thesis

The Institute will provide all laboratory facilities to the students for the Thesis works. The students may also avail the opportunity to work in other reputed research laboratories for carrying out part of their works. Upon completion of the works, the M.Phil./ Ph.D. students will prepare a thesis based on his or her research findings. This document will be reviewed by the respective supervisor(s) before submission for Final Evaluation by externals and defended in a final examination. The students will also submit a prescribed submission form provided by the Institute. It is expected that students should present their works in scientific meetings/ conferences and prepare manuscripts for publication in peer-reviewed scientific journals. The students should have one publication for M.Phil and two publications for PhD in peer reviewed journals from their research work before submission of thesis.

Learning Outcomes:

1. Formulate a focussed and realistic research question with specific aims, objectives and hypothesis, based on a literature review
2. Design an appropriate research method to investigate the research question and to test hypotheses
3. Collect, code, enter and manage data
4. Conduct appropriate analyses using software
5. Discuss and interpret study findings and draw sound conclusions
6. Apply results to the wider field of nutrition and food science, and suggest recommendations

Seminar Presentation

During the progress of the program, the students of both M.Phil. and Ph.D. shall deliver at least one and two seminars, respectively, related to their thesis work. It is expected that the students should participate in research seminars and other scientific seminars arranged by the Institute throughout their tenure in the postgraduate programs.