Subject: Public Health Nutrition

Part A: Food and Nutrition

1. Course Objectives

At the end of the course, the students will be able to:

a. Understand nutrition science and the importance of nutrients in health.
b. Understand the life cycle of under nutrition with attention to the underlying causes and the measures for mitigation.
c. Critically appraise the current international trends and national policies, strategies and programs of GoN for addressing the problem through multi-sector approaches.
d. Understand the importance and provisions for food safety, food security and surveillance for nutrition.

2. Course contents

Unit 1: Nutrition science 14 hrs

Concept and importance of food and nutrition; classification of nutrients and nutritive value of food; role of diet and the importance of locally available food

Unit 2: Nutritional requirements at different stages of life 10 hrs

Pre-conception, conception, infancy and childhood, adolescence, adulthood and elderly

Unit 3: Malnutrition, its causes and consequence 10 hrs

Role of diet, care, health services and environment; importance of food security and cultural practices in under nutrition

Unit 4: Nutrition policy, strategies and nutritional deficiency diseases 12 hrs

a. Current nutrition policies and strategies of GoN on food and nutrition
b. Program implementation and the involvement of other sectors including civil society organizations
c. Food security: concept and measurement
d. Legislative issues and quality control regarding food production, transportation, marketing and consumption
e. Review of nutritional deficiency diseases and assessment of nutritional status

f. Nutritional Surveillance

Part B: Essentials of Public Health Nutrition

1. Course Objectives

At the end of the course, learners will be able to:

a. Explain the concept and importance of nutrition in public health
b. Describe nutritional physiology, nutrition biochemistry, molecular nutrition and body composition
c. Identify critical food and nutrition-related factors that affect health
d. Demonstrate and analyze the linkages between food and nutrition, and public health
e. Examine breast feeding situation and dietary requirement of all stages of life in Nepal and compare with other countries and relate to indicators and variables in Nepal
f. Use to interpret the WHO growth chart for classifying the nutritional status of the population under study
g. Relate the role of nutrition in causation of various communicable and non-communicable diseases
h. Describe public health nutrition cycle for assessment, design, implement and evaluate programs which can improve the nutritional status of the population at national and international level
i. Plan and implement dietetics for various diseases and conditions during conflicts, disaster and emergencies

2. Course Contents

Unit 1: Food and Nutrition 10 hrs

a. Concept and importance of food and nutrition, constituents, classification and nutritive value of food.
b. Nutrients and their functions
c. Introduction to Macro and micro nutrients

Unit 2: Basic Sciences for Public Health Nutrition 25 hrs

a. Nutritional Physiology- digestion and absorption of carbohydrates, proteins and lipids, mechanism of absorption of vitamins, minerals and water from

gastrointestinal tract. micro and macro nutrients (carbohydrate, fats, proteins, vitamins and minerals), functions at organ system, organ, cellular and subcellular levels, the role of nutrition in the pathogenesis of disease of malnutrition, principles governing function in the human body, Nutritional deficiency disorders including anemia, goiter and night blindness

b. Nutrition Biochemistry- basic concepts of food and nutrition, fundamentals of nutrition Nutrients and their functions, micro and macro nutrients (carbohydrate, fat, proteins, vitamins and minerals), digestion, absorption and metabolism of carbohydrate, protein and fats, digestion, absorption and importance of macro- and micronutrients, role of vitamins, photochemical, vitamin supplementation.
c. Molecular Nutrition- introduction to genes, genetic variation and genetic regulation followed by the developments in modern genomic technologies that permit analyses of whole genomes, the interaction of nutrients and the genome and the role of individual genetic variation in the context of determining nutritional requirements in health and disease, metabolomics and proteomics, DNA and RNA, the role of proteins in bridging the gap between nutrition and genes, genetic sequence of a particular gene involved in nutritional metabolism, epigenetic modification of a gene.
d. Balanced diet and dietary guidelines

Unit 3: Body composition, Growth and Development of human body in different life stages 10 hrs

a. Chemical composition of the human body
b. Methods to accurately measure body composition, the principles of the various body composition methods such as DEXA, BOD POD etc, the 4C model of body composition
c. Physical changes of the body- lifecycle approach (Pre-birth to elderly)
d. Cognitive growth and development and role of nutrition

Unit 4: Introduction to Public health nutrition 10 hrs

a. Concept of public health nutrition
b. The public health nutrition cycle – Triple A model
c. Roles and responsibilities of public health nutritionists
d. Government's and other sector's role in public health nutrition
e. Nutrition training in public health

Unit 5: Dietary requirement and life course perspective 25 hrs

a. Dietary requirements at various stages of life
b. Evaluate importance of nutrition on growth and development of the foetus, infant, child and adolescent,
c. Evaluate importance of nutrition during of pregnancy and lactation and outcome
d. Examine nutritional issues and problem of targeted groups (childhood, adolescent, reproductive age, menopausal and senior-elderly citizens)
e. Nutritional need of special group of the population childhood, adolescent, reproductive age, menopausal and senior-elderly citizens)

Unit 6: Infant and young child feeding and growth monitoring 10 hrs

a. Introduction, importance and proper method of feeding
b. Growth monitoring and interpretation of measurement
c. Benefits of growth monitoring
d. Current trend in breastfeeding practices in rural and urban communities
e. Trends in Nutritional Status of Children under Five Years
f. Infant and young child feeding practices
g. Importance of micronutrients and macronutrients among under five children

Unit 7: Nutrition and diseases 20 hrs

a. Nutrition and infections (and infestations)
b. Nutritional changes/consequences that result from the common infections and infestations (malaria, diarrheal diseases, TB, HIV/AIDS and intestinal parasites etc.)
c. Non-communicable diseases and their relation to nutrition (Diabetes, Cancer, Hypertension and other chronic diseases etc)
d. Concept of fetal origin of adult diseases
e. Nutritional needs in communicable and non-communicable diseases state
f. Examine overweight, obesity and its relation to diseases and conditions
g. Identify risk group and design prevention program

Unit 8: Dietetics in diseases and conditions 10 hrs

a. Application of dietetics, Principle of Dietetics, Dietary goals and Dietary

Guideline

b. Dietetics plan in various diseases (NCDs and CDs) conditions with lifecycle approach
c. Ensuring nutrition during and after conflict and complex emergencies
d. Evaluate individual's dietary and physical activity with respect to health
e. Design dietary and physical activity plan for individual, population and community to improve health

Part C: Advanced Public Health Nutrition

1. Course Objectives

At the end of the course, the learners will be able to:

a. Describe the overall approach of nutritional study to apply in nutritional research, project and evaluation.
b. Describe interdisciplinary research methods including ethics in relation to nutritional study
c. Design and choose appropriate method to be applied in different context to nutritional research and interventions, and analyze and present the nutritional data using appropriate statistical software
d. Critically appraise different methods and findings based on scientific papers published in the field of nutrition
e. Develop and demonstrate competencies to participate in planning, management, implementation and evaluation of interdisciplinary research projects sensitive to cultural diversity, in national as well international settings
f. Identify and analyze different indicators used to assess nutritional status of children, adolescent and adult and perform anthropometric measurement (height, weight, age, arm circumference, BMI, etc) and their uses and limitation
g. Plan, implement, monitor and evaluate nutrition assessment programs at community level
h. Design and implement various assessment methods to determine nutritional status of community
i. Select appropriate indicators for identification, measurements and monitoring of acute and chronic nutrition and analyze use and limitation of them.

2. Course Contents

Unit 1: Introduction to Nutrition Research 10 hrs

a. Overview of different methods and tools used in nutritional studies
b. Overview of importance, advantages and disadvantages of each methods and tools- dietary recall, clinical assessment, biochemical and anthropometric measurements
c. Choice of different methods and tools in different context- local, regional, national and international
d. Application of different methods and tools in different context of public health nutrition

Unit 2: Assessment of Nutritional Status 15 hrs

a. Measurement, use and interpretation of Weight, Height, Varies body circumferences/skin thickness measurements in relation to age and sex
b. Other assessment methods: Clinical, Biochemical, Dietary
c. Appropriate application of methods and their advantages and disadvantages

Unit 3: Nutritional needs assessment at community level 20 hrs

a. Indirect assessment
- Age specific mortality rates, health service data and indicators

b. Direct assessment
- Measurement of dietary intake, weighing method, chemical analysis of replicate diet and dietary recall and dietary recording
- Clinical assessment
- Biochemical test
- Reference Z score used by WHO 2006

c. Needs assessment and program planning
- Priorities and action plan
- Program design and implementation
- Program evaluation

d. Measurement of indicators
e. Practice of tools and software used in nutritional assessments
f. Short term dietary assessment method (24 hr recall, food records, FFQ)
g. Reproducibility and validity of Food frequency questionnaire

Unit 4: Nutritional Epidemiology 20 hrs

a. Introduction and concept of nutrition epidemiology
b. Development and application of nutrition epidemiology in policy and programs

c. Over nutrition and ~~chronic~~ disease epidemiology with reference to different chronic diseases

- Methods and research skills, with an application to obesity and non-communicable diseases, with a focus on diabetes and cardiovascular diseases.
- Search and appraise epidemiological studies from areas such as obesity, cardiovascular disease, and diabetes, illustrate methodological concepts, and explore main issues in study design and interpretation of epidemiological study results (review at least two articles).

d. Disease epidemiology with reference to different infectious diseases

- Introduction to epidemiologic methods used in infectious disease studies.
- Epidemiologic methods applied to the etiology, estimation of incidence and prevalence, natural history, and survival of infectious diseases.
- Search and appraise case studies to explore the role of nutrition in the pathogenesis of endemic, emerging, and hospital-acquired infections, in individuals and communities (review at least two articles).

e. Role of immunological response in relation to nutrition
f. Surveillance and monitoring and its application in Public Health Nutrition
g. Application of nutritional epidemiology with examples
h. Recent advances in nutritional epidemiology

Unit 5: Qualitative Research Methods for Nutrition 15 hrs

a. Overview of qualitative researches carried out in different context and setting (national and international level)
b. Critically review of different methods and tools used in nutritional studies
c. Qualitative data management, analysis and interpretation in relation to nutritional studies
d. Write up of nutritional studies (qualitative studies) and trustworthiness and application

Unit 6: Advanced Analytical Methods for Nutrition Policy Research 15 hrs

a. Critically analyze and discuss how policy and science interact with regard to food and nutrition
b. Policy agenda, and policy debates influenced by science and scientific agendas (Success stories)
c. The scientific underpinnings of food and nutrition policies
d. Empirical findings in scientific research and operational programming and their way into nutrition policy and law
e. Debates and controversies in Nepal and international nutrition and

nutrition research

f. What works best and what the alternatives might be
g. Key institutions and organizations involved in nutrition policy and programming in the Nepal and around the world

Unit 7: Program Assessment, Planning and Evaluation in Public Health Nutrition 10 hrs

a. Step-wise processes to guide practice
b. Core functions and competencies of public health nutrition
c. Approaches of evaluation of Public Health Nutrition practice
d. A bi-cyclic framework for program evaluation in public health nutrition practice

- Intelligence
- Action
- Evaluation

Unit 8: Critical Review of Research Papers in Public Health Nutrition 15 hrs

a. Selecting good research articles in nutrition
b. Application of research designs and statistics in a particular paper
c. Critically analyze nutrition science research (topic, rational, objectives, findings and conclusion) based on published scientific articles
d. Critical question, presenting and writing critiques
e. Review of research ethics in relation to nutrition article/paper

Part D: Food and Nutrition Policy and Management

1. Course Objectives

At the end of the course learners will be able to:

a. Understand international and national food and nutrition policies
b. Assess food and nutrition systems, policy framework and key stakeholders both in the government and non-government sectors.
c. Analyze and design policy analysis process, development, advocacy, implementation and evaluation

2. Course Contents

Unit 1: Global and National Food and Nutrition Policy 15 hrs

a. Paradigms in international food and nutrition policy
b. Policy influence on food and nutrition by other stakeholders including multilateral and bilateral agencies, and civil society organizations.
c. Nutrition policy initiatives- global and national including nutrition policies program, plans and plan of action including multi-sector nutrition plan
d. Review and appraise food security policy and programs
e. Social Development Goals (SDGs) and Nutrition

Unit 2: Policy Analysis and Development 20 hrs

a. Policy Analysis: Identify and communicate the health, financial, administrative, legal, social and political implications of policy options.
b. Describe and apply the components and processes of major policy analysis using epidemiological, economics and social science tools.
c. Understand the determinants and causality theories that considers biological, behavioral, social/cultural and environmental factors and relevant models and theories in policy analysis
d. Application of evidence for policy analysis

Unit 3: Policy Advocacy 10 hrs

a. Identify healthy public food and nutrition policies that promote and protect the health and well being of individuals and communities.
b. Design policy options and feasibility and expected outcomes of each policy option
c. Identify the role of evidence in policy advocacy

Unit 4: Policy Planning, Implementation and Evaluation 15 hrs

a. Interpret and apply national policy and strategy at local, national, regional and global level
b. Design policy and strategy at local, national or regional level
c. Use appropriate methods and tools to assess the impact or potential impact of policy on health and nutrition at local, regional or national levels
d. Food and Resource Economics:

- Public good characteristics of food and allied resources
- Production, supply, and distribution: market and public forces
- Food policies and Consumer behavior
- Market structure of food-business and government regulation

- Contribution of Food to health and economy

Unit 5: Food and Nutrition Systems in Nepal 20 hrs

a. Describe and discuss the structure and dynamics of the food and nutrition systems
b. Understand and critic nutrition system and the key dimensions of system performance with example: Multi-sector Nutrition Plan
c. Identify and review key stakeholders in the food and nutrition system
d. Examine approaches adopted by the government to address nutrition and food issues in Nepal
e. Concept of food and nutrition security
f. Climate change, food and nutrition
g. Proper pathways of nutrition- best practices in nutrition, agriculture, including transportation

Unit 6: Food Services 20 hrs

a. Describe and compare food service systems in national, regional and global level
b. Assess opportunities to improve nutrition and food standards within a food service
   e.g. food fortification, food additives, preservatives, quality standards etc.
c. Review and design quality assurance in food services
d. Legislation and quality control of food production, storage, transportation, marketing and consumption and monitoring mechanism
e. Food and food related raw materials collection, storage, transport, process, in relation to environmental sanitation, handling and distribution, quality assurance and quality control and marketing in Nepal comparing with WHO standard
f. Role of toxicology in food quality system

Unit 7: Nutrition Act and Regulations 15 hrs

a. Review and appraise national nutrition act and regulation
b. Review and appraise consumer act and regulation
c. Review and appraise food adulteration and fortification act and regulation
d. Review and appraise black market act and regulation
e. Review and appraise food safety act and regulation
f. Review and appraise breast feeding act and regulations
g. Review and appraise other relevant act and regulations in food and nutrition
h. Healthy People Initiatives

Part E: Research Methods

1. Objectives

At the end of the course, the learners will be able to:

a. Explain the concepts, process and steps involved in conducting health research
b. Select suitable approaches to quantitative and qualitative data analysis
c. Design quantitative and qualitative research
d. Apply mixed methods in different research activities
e. Demonstrate a critical understanding of various research methods.
f. Reflect critically on evidence-based practice in public health issues
g. Demonstrate knowledge and understanding of the assumptions of the research approaches that are commonly used in public health and other relevant areas.
h. Demonstrate skills in processing, interpretation and use of data
i. Develop a research proposal on a selected health problem

2. Course contents

Unit 1: Theoretical orientation on research methodology 20hrs

a. Research paradigm and knowledge generation
b. Research problems
c. Research objectives
d. Research framework
e. Research design
f. Rationale of research
g. Literature review
h. Ethics and research

Unit 2: Process of research 10 hrs

a. Identifying research problems
b. Setting research objectives
c. Deciding research design
d. Literature search and review
e. Data collection – Techniques, tools and process
f. Data analysis – management and analysis process
g. Validity and reliability

Unit 3: Qualitative research Method 15hrs

a. Qualitative research designs
b. Selection of participants

c. Instruments of qualitative study
d. Qualitative data collection methods
e. Qualitative data analysis
f. Trustworthiness of Qualitative data

Unit 4: Mixed method in health research 5hrs

a. Introduction to Mixed Methods (MM) study
b. Theory of mixed methods
c. Variations on the MM Designs
d. Characteristics of MM Studies

Unit 5: Development of research proposal 10hrs

a. Proposal of a research project - concept of proposal, components of a research proposal, research development process, obtaining ethical approval.

Unit 6: Writing Research Report

a. Concept of research report
b. Components of research report
c. Organizing results
d. Discussions of the results
e. Limitations of research
f. Conclusion and recommendation

Unit 7: Research report dissemination

a. Oral presentation
b. Poster presentation
c. Publication

Part F: Pedagogical methods

1. **Objectives**

   At the end of the course, the learners will be able to:
   1. Discuss the objectives and philosophies of pedagogy
   2. Explain the required qualities for teaching in higher education
   3. Discuss various pedagogical approaches used in education
   4. Describe the relationship between curriculum and pedagogy
   5. Describe the methods of student evaluation and assessment

2. **Contents**

   a. Objectives and philosophies of pedagogy
   b. Required qualities for teaching in higher education: individual, social and occupational/professional
   c. Pedagogical approaches (teaching methods and media) in education
   d. Curriculum and Pedagogy
   e. Balanced model of curriculum
   f. Methods of student evaluation and assessment: formative, summative and diagnostic