BSc (Hons)/MSc Nutritional Sciences – SC527

Specific Titles:

BSc (Hons) /MSc Nutritional Sciences
BSc (Hons) Nutritional Sciences (Specialisation: Dietetics)

1. Rationale and Objectives

Nutritional Sciences draws upon several disciplines, including biology, biochemistry and physiology to understand the relationships between food, nutrients and human health.

The economic success of the food industry and the nutritional quality and safety of the food supply are linked. In spite of progress in the food industry, technology and food production, nutrition related health problems, hunger and malnutrition continue to plague adults and children throughout the world.

Much remains to be learned about how optimal functioning of the body is influenced by diet. Addressing these problems requires nutritionists to work with specialists in agricultural economics, food policy, international development, development sociology, and the horticultural and animal sciences.

This new programme is a broad-based four-year course with a strong health and clinical oriented bias designed precisely for the need to prepare the student to be a nutritional scientist capable of working at these frontiers.

Beside a core of Nutritional Sciences modules, the re-orientation of the programme into two options enhances capacity building and offers wider prospects of career opportunities, further studies and research in the field.

Thus a wide variety of careers in the food industry, local and national government agencies, health promotion, public relations, journalism and scientific research become accessible.

There is an exit point at Diploma level after two years of study of a thorough grounding in Nutrition and Health Sciences where core topics emphasising human nutrition with areas of study in nutritional quality and safety of the food, fundamentals of biochemistry, human development and physiology essential to the understanding of the digestion, absorption, and metabolism of food components are covered.

Pursuing studies in the third year will allow students to learn much more about how optimal functioning of the body is influenced by diet. Advanced knowledge of biochemistry, food energy metabolism, physiology, and analytical chemistry provide new ways to study energy metabolism and the levels of contaminants in foods. Communication and health promotion and other related sciences are considered.

In the fourth year, students come across a choice of specialised fields such as sports nutrition, links between diet and disease, cancer and obesity. Advances in cell biology and physiology, developments in human genomics, and expanding knowledge of how people's genetic makeup affects their nutritional requirements are considered. The Masters program is thus designed to challenge academically talented students who have a strong interest in nutrition and health research. Tuition fees will be charged for students enrolling in the fourth year.

Students graduating from this programme can seek employment in Health Care Systems, Education, as Scientific and Environmental Officer in the public and private sectors. Adequate attention will also be paid towards the personal development of students in acquiring professional competence and a sense of community responsibility.

BSc (Hons) Nutritional Sciences (Specialisation: Dietetics) - 4 years F/T

Nutrition is the study of the influence of food intake on health and well-being, and dietetics is the application of nutritional knowledge tailored to individual needs in the prevention and management of disease.

Specialisation for this option starts at the end of year 2 and the student is required to undertake the first placement and training in a health care institution. A second placement and a research project preferably in the field of specialisation during Year 3 of study are required. The fourth year comprises of taught modules in the first semester, followed by 4 months of placement and training in a health care institution.

Special Note: The Programme is designed to be a professional course, like the BSc (Hons) Biomedical Sciences, the BSc (Hons) Occupational Therapy and the BSc (Hons) Physiotherapy Programmes currently run by the Department of Health Sciences. Accordingly, the degree of flexibility will differ from most BSc (Hons) Programmes being run by the Faculty.

For students choosing this option, as from the third year all electives will have to be chosen specifically in this specialisation. Assessment methods will be specific to the modules. The programme is designed so that a number of modules are taken jointly with students registered for BSc (Hons)/ MSc Nutritional Sciences, BSc (Hons) Occupational Therapy and BSc (Hons) Physiotherapy.

The programme design has taken into account the minimum requirements for the training and education of dietitians set by the EFAD (European Federation of the Association of Dietitians).
BSc (Hons) Nutritional Sciences (Specialisation: Dietetics) graduates will be eligible to apply for registration with professional bodies as dietitian if they satisfy all registration criteria.

However, graduates can also work in the food or pharmaceutical industries, research, and academia or in the media.

Details of Placement

Three blocks of placement are included:

Placement A: 4 weeks of placement in a recognised health care institution, hospital or clinic at the end of the second year after students have cleared 60 credits.

Placement B: 4 weeks of placement in a recognised health care institution, hospital or clinic.

Placement C: 16 weeks of placement in a recognised health care institution, hospital or clinic.

The fourth year of study is designed to meet the research, administrative and management needs of the profession of dietitians including exposure to a longer period of placement - Block C (16 weeks) - followed by debriefing sessions during the course of the practice.

Table 1: Programme breakdown

BSc (Hons)/MSc Nutritional Sciences
BSc (Hons) Nutritional Sciences (Specialisation: Dietetics) (4 years F/T)

OPTIONS	Year	Core Modules	Elective Modules	Mandatory Dietetics Specialisation modules	Project	Placement	Credits Earned	Total
COMMON TO ALL	Year 1	Six (3 credits each)	At least four (3 credits each)		-	-	18 12	30
	Year 2	Six (3 credits each)	At least four (3 credits each)		One (6 credits)		18 12 6	36
Exit with a Diploma in Nutritional Sciences Min 66 credits								
BSc (Hons)/ MSc Nutritional Sciences	Year 3	Six	Four (3 credits each)		One (10 credits)		18 12 10	40
	Year 4	Five (3 credits each)	Four (3 credits each)		MSc Project (12 credits)		15 12 12	39
Exit MSc Nutritional Sciences Min 139 credits								
BSc (Hons) Nutritional Sciences (Specialisation: Dietetics)	1 month placement at the end of first 2 years					Block A (2 credits)	2	2
	Year 3	Six		Four (3 credits each)	One (10 credits)	Block B (2 credits)	18 12 10 2	42
	Year 4	Five (3 credits each)		Four (3 credits each)		Block C (8 credits)	15 12 8	35
Exit BSc (Hons) Nutritional Sciences (Specialisation: Dietetics) Min 139 credits								

2. General Entry Requirements

As per General Entry Requirements for admission to the University for undergraduate degrees.

3. Programme Requirements

Credit in at least five subjects (School Certificate) including English, Biology, Chemistry, and Mathematics.

Pass at GCE 'A' Level in three science subjects including Chemistry. Mathematics counts as a Science subject. Those not holding Biology at 'A' level will need to take Foundation Course in Biology prior to the start of the course.

4. Programme Duration

	Normal	**Maximum**
Diploma in Nutritional Sciences:	2 Years	3 Years
BSc (Hons) Nutritional Sciences:	3 Years	5 Years
BSc (Hons) Nutritional Sciences (Specialisation: Dietetics):	4 Years	7 Years
MSc Nutritional Sciences:	4 Years	7 Years

5. Minimum Credits Required for Awards

Breakdown as shown in table 1.

Diploma in Nutritional Sciences:	66 credits
BSc (Hons) Nutritional Sciences:	100 credits
BSc (Hons) Nutritional Sciences (Specialisation: Dietetics):	139 credits
MSc Nutritional Sciences:	139 credits

6. Credits per Year

Minimum 18, Maximum 48, subject to regulation 4.

7. Assessment

Each module will be assessed over 100 marks (i.e. expressed as %) with details as follows (unless otherwise specified):

Assessment of a module will be based on a written examination (2-hour duration for 3 credit modules and 3-hour duration for 6 credit modules) and on continuous assessment done during the semester/year. The continuous assessment will count for 25% of the overall percentage mark for the module, except for a programme where the structure makes for other specific provision(s). Continuous assessment may be based on laboratory work, and/or assignments and should include at least 1 class test.

Written examinations for all modules, whether taught in semester 1 or in semester 2 or both, will be carried out at the end of the academic year except for the following modules which will be assessed at the end of semester 1: NTS 3104(5), NTS 3105(5), NTS 3106(5), NTS 4102(5).

The following modules will be assessed jointly at the end of the year:

Year 1: NTS 1201(1)/NTS 1202(1)

Year 2: NTS 2101(3)/NTS 2201(3); NTS 2102(3)/NTS 2202(3)

Year 3: NTS 3101(5)/NTS 3201(5); NTS 3103(5)/NTS 3202(5)

Year 4: NTS 4101(5)/NTS 4105(5); NTS 4201(5)/NTS 4202(5)

A minimum of at least 30% should be attained in each of continuous assessment and written examination, with an overall total of 50% for a candidate to pass a module. Modules will carry the weightings of 1, 3 or 5 depending on their status (Introductory, Intermediate or Advanced). Weighting for a particular module is indicated within parentheses in the module code.

Projects will be carried out normally in the area of specialisation.

Specifications for BSc (Hons) Nutritional Sciences (Specialisation: Dietetics)

Clinical Placement and Training in the form of clinical practice in recognised health care public/private institutions, homes for the elderly will form an essential part of the Professional Programme. Clinical practice will be undertaken in three blocks: A, B and C.

8. Programme Plan – BSc (Hons) / MSc Nutritional Sciences (L = Lectures; P = Practical; NA = Not Applicable)

Code	Module Name	L/P	Credits
YEAR 1			
CORE			
HLS 1011(1)	Foundation Course in Biology	60/30	0
HLS 1261(1)	Biochemistry for Health Sciences I	45/0	3
HLS 1131(1)	Introduction to Human Anatomy and Physiology	45/0	3
HLS 1141(1)	Molecular and Cell Biology for Health Sciences	40/10	3
CSE 1010e(1)	Introduction to Information Technology	O.E.	3
NTS 1201(1)	Food and Analytical Chemistry	30/30	3
NTS 1202(1)	Human Nutritional Needs	45/0	3
ELECTIVES			
HLS 1111(1)	Health in Society I	30/30	3
NTS 1101(1)	Food for Contemporary Living	45/0	3
HLS 1242(1)	Psychology for Health Professionals	45/0	3
HLS 1211(1)	Health in Society II	30/30	3
NTS 1203(1)	Nutritional Problems of Developing Nations & Food Policy	45/0	3
NTS 1204(1)	Communication and Health Promotion	45/0	3
YEAR 2			
CORE			
NTS 2101(3)	Nutrition and Metabolism	45/0	3
NTS 2102(3)	Nutrition Through Life Cycle	45/0	3
HLS 2141(3)	Biology of Disease I	45/0	3
NTS 2201(3)	Physiological Systems	40/10	3
NTS 2202(3)	Health Consequences of Under and Over Nutrition	45/0	3
NTS 2203(3)	Nutritional Assessment and Food Habits	45/0	3
NTS 2000Y(3)	Diploma project (only for those exiting at Diploma)	-	6
NTS 2001	Clinical Practice Block A (Four weeks placement at the end of Year 2 for students opting for BSc (Hons) Nutritional Sciences (Specialisation: Dietetics))	-	2
ELECTIVES			
HLS 2111(3)	Health in Society 3	30/30	3
NTS 2103(3)	Maternal and Child Nutrition	45/0	3

NTS 2104(3)	Physicochemical and Biological Aspects of Foods	30/30	3
NTS 2204(3)	Nutrition Related Diseases	45/0	3
NTS 2205(3)	Nutrition Education and Diet change	45/0	3
NTS 2206(3)	Food Processing and Safety	30/30	3
YEAR 3			
CORE			
NTS 3101(5)	Macronutrients and Micronutrients in Human Health	60/0	4
NTS 3102(5)	Current Nutrition Issues	15/30	2
NTS 3103(5)	Nutrition Science Laboratory	15/60	3
HLS 2241(5)	Biology of Disease II (Pathophysiology)	45/0	3
NTS 3201(5)	Endocrine Regulation and Physiological Control	30/0	2
NTS 3202(5)	Food Microbiology	45/30	4
NTS 3000Y(5)	Project (normally in specialisation field)	-	10
NTS 3001(5)	Clinical Practice Block B (Four weeks placement for students opting for BSc (Hons) Nutritional Sciences (Specialisation: Dietetics))	-	2
ELECTIVES (BSc (Hons)/MSc Nutritional Sciences)			
NTS 3107(5)	Social Science Perspectives on Food and Nutrition	45/0	3
NTS 3108(5)	Herbals, Homeopathy and Dietary Supplements	45/0	3
NTS 3203(5)	Public Health Nutrition	45/0	3
NTS 3204(5)	Sports Nutrition, Lifestyle and Diet	45/0	3
ELECTIVES (BSc (Hons) Nutritional Sciences (Specialisation: Dietetics))			
NTS 3104(5)	Dietetics Professional Practice	45/0	3
NTS 3105(5)	Dietetics	45/0	3
NTS 3106(5)	Art and Science of Food Preparation	15/60	3
NTS 3204(5)	Sports Nutrition, Lifestyle and Diet	45/0	3
NTS 3203(5)	Public Health Nutrition	45/0	3
YEAR 4			
CORE			
NTS 4101(5)	Nutrigenomics	45/0	3
NTS 4102(5)	Neuroendocrine Regulation of Food Intake	45/0	3
NTS 4105(5)	Functional Foods	45/0	3
NTS 4201(5)	Growth and Ageing	45/0	3
NTS 4202(5)	Nutrition and Immunology	30/30	3
NTS 4000Y(5)	Project (for MSc Nutritional Sciences students only)	-	12
NTS 4001(5)	Clinical Practice Block C (Sixteen weeks placement for students opting for BSc (Hons) Nutritional Sciences (Specialisation: Dietetics))	-	8
ELECTIVES (MSc Nutritional Sciences)			
NTS 4103(5)	Obesity, Diabetes and Adverse Effects	45/0	3
NTS 4104(5)	Nutrition and Metabolism of Lipids	40/10	3
PHAR 1121(5)	Environmental Health and Toxicology	45/0	3
NTS 4202(5)	Ethics and Nutrition	45/0	3
ELECTIVES (BSc (Hons) Nutritional Sciences (Specialisation: Dietetics))			
NTS 4103(5)	Obesity, Diabetes and Adverse Effects	45/0	3
NTS 4106(5)	Therapeutic Dietetics	45/0	3
NTS 4107(5)	Management and Food Service	30/60	4
NTS 4203(5)	Nutritional Epidemiology	45/0	3
NTS 4204(5)	Consumer Problems and Influences	45/0	3

NOTE:

(i) PROJECTS

NTS 2000Y(3)	Project at Diploma level	6
NTS 3000Y(5)	Project (normally in specialisation field)	10
NTS 4000Y(5)	Project (normally in specialisation field)	12

The project at Diploma level will be run over both semesters of year 2. Topics will be selected from any field relevant to Nutrition and Health Sciences. Applicable only to students exiting with a Diploma.

For BSc (Hons)/MSc Nutritional Sciences, the project normally has to be in the area of specialisation on an approved topic and should be of about 8000-12000 words excluding figures and tables. It is designed to test the ability of the student to undertake a piece of independent scientific research under guidance and demonstrate analytical capabilities.

(ii) PLACEMENT

Three blocks of placement in hospital and clinics (satisfactory portfolio 50%) accounting for 12 (2+2+8) credits. Applicable only to students opting for BSc (Hons) Nutritional Sciences (Specialisation: Dietetics).

9. Outline Syllabus

This outline syllabus is not prescriptive and is intended to serve as a guide only.

CSE 1010e(1) - INTRODUCTION TO INFORMATION TECHNOLOGY
Information Technology and Computers; Stepping in the Computer; Input and Output Devices; Secondary Storage; Programming; Systems Software; Applications Software; Systems Development; Computer Networks; The Internet; Computer Security; Software Utilities; Issues and Trends in IT.

HLS 1011(1) - FOUNDATION COURSE IN BIOLOGY
This module will be equivalent in level to Biology 'A' level and will be compulsory for students not holding 'A' level in Biology. The 'A' level syllabus (Core subjects + relevant electives) prevailing at the time the module is being taught will be adopted. INCLUDES A PRACTICAL COMPONENT.

HLS 1111(1) - HEALTH IN SOCIETY I
This module focuses on the "family" and includes Family study project work on pregnancy, birth, and the impact of a baby in a family setting, human development from infancy to adolescence, and sociological and psychological perspectives of families. Communication and research skills will be developed in the module.

HLS 1131(1) - INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY
Introduction to human anatomy: anatomical terminology and topography. The endocrine system. The central and peripheral nervous system. The gastrointestinal system: nutrition and digestion. Structure and function of circulatory system: heart, blood vessels, lymphatics, lymph nodes, spleen. Control of Heart Beat and the Cardiac cycle. Structure and function of kidneys: excretion and osmoregulation. Mechanism and control of breathing. Control of growth and reproduction in man. Support, movement and muscle contraction: major muscle groups, ultrastructure of skeletal muscle, contractile mechanisms, skeleton, hard connective tissue. Integument: structure and function of skin, buccal cavity, teeth. General principles and social aspects of human health and disease: diet, gaseous exchange, exercise, drugs, infectious diseases. Fundamentals of the immune system and immune responses. Immune regulation. Autoimmune diseases.

HLS 1141(1) - MOLECULAR AND CELL BIOLOGY FOR HEALTH SCIENCES
Comparison of eukaryotes and prokaryotes. Cell ultrastructure and function of cellular components. Cell and nuclear division. Genetic control of inheritance. Mendelian genetics. Mutations. Pedigree analysis, Quantitative genetics. Population genetics. Gene structure. Transcription and translation. Post translational modifications. Applications of genetics: variation, genetic diversity, genetic engineering, mammalian cell biotechnology.

HLS 1211(1) - HEALTH IN SOCIETY II
In this module people will be considered in “populations and societies”. Epidemiological science will be introduced: causes, spread, measurement, determinants and prevention of disease will be closely examined. The life cycle strand which addresses adulthood includes work on sexuality. Ways people behave in groups, communities and societies are considered in the psychology and sociology sessions.

HLS 1242(1) - PSYCHOLOGY FOR HEALTH PROFESSIONALS
Introduces students to some of the major theoretical perspectives in Psychology on the nature of human beings, and to the concept of psychological development, with emphasis placed on the cultural contexts of human development.

HLS 1261(1) - BIOCHEMISTRY FOR HEALTH SCIENCES I
Physico-chemical principles of biochemistry. Introduction to major classes of biomolecules. Introduction to enzymology. Biochemical basis of diseases and biochemical investigations in clinical diagnosis and treatment: Specimen collection, handling and general quality control procedures: blood, urine, faeces and other tissue and body fluids. Physiological factors affecting the composition of body fluids and long term biological influences on body fluids.

HLS 2111(3) - HEALTH IN SOCIETY 3
This module focuses on “people as patients” and patients as people. It includes a Patient Study based on the impact of a chronic condition on the life of a person, and his immediate family or carers. There will also be sessions on ageing, which is a continuing part of the life cycle strand.

HLS 2141(3) - BIOLOGY OF DISEASE I (BASIC PATHOLOGY)
Review of basic cell biology. Introduction to pathology. Characteristics of disease. Nomenclature and classification of disease. Genetic and environmental causes of disease. Diagnostic pathology. Sublethal and lethal injury. Toxic and hypoxic injury. Agents causing injury. Apoptosis and necrosis. Abnormal tissue deposits. Acute inflammation: basic mechanisms and sequelae. Chronic inflammation. Healing and repair, including skin repair. Overview of: cardiovascular disease, urinary and reproductive system disease, respiratory disease, gastrointestinal and liver disease.

HLS 2241(5) - BIOLOGY OF DISEASE II (PATHOPHYSIOLOGY)
This module will involve a study of the pathology of diseases of various systems including cardiovascular, respiratory, blood, endocrine, urinogenital, immune system and gastrointestinal. Aspects of the pathophysiology of infection and developmental pathology will also be covered.

NTS 1101(1) - FOOD FOR CONTEMPORARY LIVING
The understanding of food ingredients and techniques of food preparation is applied to positive nutritional practices and health promotion goals. Content includes food science and nutrition principles, food safety and sanitation, sensory evaluation, and social-cultural influences on food choices. Novel foods and the use of biotechnology in food production are considered. The safety and ethical aspects of GM foods are also discussed.

NTS 1201(1) - FOOD AND ANALYTICAL CHEMISTRY
Chemical behaviour of food constituents including proteins, lipids, carbohydrates, minerals, vitamins and water. Emphasis is laid on changes during processing and storage. Overview of physiological characteristics of animal tissues postmortem and plant tissues post harvest. Application of quantitative techniques to the determination of composition and quality of food products are addressed.

NTS 1202(1) - HUMAN NUTRITIONAL NEEDS
Domestic and international factors affecting the availability of a safe, nutritious food supply. Strong interest is laid on the science of nutrition as related to health, an exposure to and appreciation of the relationship of food choices and nutrition to health, performance, and disease. Social and cultural dimensions of the production, preparation and consumption of food are treated. Psychological and societal factors are discussed.

NTS 1203(1) - NUTRITIONAL PROBLEMS OF DEVELOPING NATIONS & FOOD POLICY
Overview of the most important nutrition problems facing developing countries today and an in-depth understanding of the nutrition problems of one country, chosen as a case study for the module. Module uses the health/care/food framework to analyse the causes of these nutrition problems. Instruction is through lectures and readings. Evaluation is through individual assignments, a group project, and exams.

NTS 1204(1) - COMMUNICATION AND HEALTH PROMOTION
Students learn the theoretical basis of effective health promotion communications and develop effective nutrition communication skills through application in a variety of settings. Provides hands-on experiences in counselling, educational program development, awareness campaigns and oral and written communications.

NTS 2101(3) - NUTRITION AND METABOLISM
Emphasis is laid on biochemical and physiological fundamentals of nutrition. Discussion of protein, fat, carbohydrate, energy, minerals and vitamins and their roles and interrelationships in nutrition and metabolism. Presents the principles of biochemistry and explores the possible aetiologies of major chronic diseases, and the postulated nutritional involvement of the disease mechanisms.

NTS 2102(3) - NUTRITION THROUGH LIFE CYCLE
Biology of the life cycle including development, growth, maturation and ageing and its impact on nutritional requirements of humans from the zygote to the elderly is considered. How to meet these nutritional requirements is discussed relative to the feeding issues and context of each major life stage. Module emphasizes the critical analyses of beneficial and adverse outcomes of various nutrient intakes and dietary patterns on the nutritional status and well-being through integration of nutrition and other health sciences in understanding nutritional needs during the life cycle.

NTS 2103(3) - MATERNAL AND CHILD NUTRITION
This module focuses on the biological bases of nutritional requirements in pregnancy, lactation, infancy, and childhood through adolescence. The beneficial and adverse outcomes of diverse nutrient intakes and dietary patterns are critically analysed. The assessment of nutritional status, and the integration of nutrition, other life sciences, and social conditions in understanding nutritional needs during these life stages are stressed. Topics include oral contraception and health; relationships between maternal diet and pregnancy outcomes; breast- and formula feeding; childhood and adolescent obesity; and the nutritional needs of young children and adolescents.

NTS 2104(3) - PHYSICOCHEMICAL AND BIOLOGICAL ASPECTS OF FOODS
This module provides a comprehensive introduction to the physical, chemical, and nutritional properties of foods and to the principles and practice of food science and technology. Topics include chemistry and functionality of commodities and ingredients, chemical and physical phenomena that affect food quality, techniques of processing and preservation, microbiology and fermentations, food safety and regulation.

NTS 2201(3) - PHYSIOLOGICAL SYSTEMS
This module covers human anatomy and physiology with particular emphasis on aspects of relevance to the nutritional sciences and medicine. It examines the biochemical and physiological bases of human nutritional requirements. An integrated approach to cover the digestion and metabolism of nutrients (carbohydrates, proteins, lipids, vitamins, and minerals) is used. Metabolic and chronic diseases related to nutrition are discussed throughout. Discussion sections and problem sets provide an opportunity to examine in greater depth selected topics from lectures.

NTS 2203(3) - NUTRITIONAL ASSESSMENT AND FOOD HABITS
This module provides an overview of the basic concepts of nutritional assessment in health and disease. Emphasis is laid on dietary, nutritional, anthropometrical, clinical, biochemical, health and social indicators essential for adequate nutrition intervention. Direct and indirect measures of food intake are considered and the various sources of error in dietary studies are also surveyed.

NTS 2204(3) - NUTRITION RELATED DISEASES
This module studies the anatomical, physiological, and metabolic abnormalities in acute and chronic illness and the role of nutritional therapy in their prevention and care. Topics include nutritional assessment,

nutritional pharmacology, starvation, infection, trauma, cancer, diabetes mellitus, and renal, cardiovascular, pulmonary, skeletal, neurological, liver, and gastrointestinal disorders.

NTS 2205(3) - NUTRITION EDUCATION AND DIET CHANGE
This module addresses nutrition education, including process and philosophy, theories and behavioural change, theories of learning and education as well as principles of adult education. Particular emphasis will be laid on team work, assessment of educational needs and development of programme goals. The development of educational materials, planning of programmes and implementation will be covered. The evaluation programme process and impact will also be treated.

NTS 2206(3) - FOOD PROCESSING AND SAFETY
Principles of food preservation and processing by different techniques such as heating, chilling, freezing, dehydration, canning, salting, etc. for meat, vegetables and dairy products. Methods used in prolonging the shelf life of foods and their effects on the quality and safety of food. Food additives. Post harvest technology and management. Food hygiene and sanitation. Health risks associated with foods.

NTS 3101(5) - MACRO AND MICRONUTRIENTS IN HUMAN HEALTH
Food sources of nutrients. Nutrient interrelationships. Factors affecting bioavailability and stability of nutrients. Energetics and metabolism of carbohydrates, proteins, and lipids as related to dietary requirements and disease processes in humans. Recommended dietary allowances. Metabolism of vitamins and minerals in relation to dietary requirements and disease processes in humans. Evaluation of the importance of dietary calcium, sodium, and iron in the development of osteoporosis, hypertension, and anemia, respectively.

NTS 3102(5) - CURRENT NUTRITION ISSUES
Special topics in Nutrition will be covered amongst which: Myths and fallacies about food and nutrition, Pesticides and food additives, Alcohol consumption, Osteoporosis. Nutrition during Pregnancy and Lactation: Nutrient and energy needs, weight gain, nutrition concerns, practices to avoid. Nutrition for Lactation. Misleading advertisements, novel food and genetically modified foods.

NTS 3103(5) - NUTRITION SCIENCE LABORATORY
The principles and methods used in nutrient analyses and nutritional assessment are covered. Laboratory introduction to principles and analytical techniques of nutritional research. Emphasizes analytical concepts and skills required to determine nutrient function and nutritional status of individuals. Topics include methods of nutrient, metabolite, and enzyme analysis in body fluids; methods for assessing individual food intake and nutritional status; and methods for assessing the composition of foods.

NTS 3104(5) - DIETETICS PROFESSIONAL PRACTICE
This is an essential part of the preparation for clinical placement. Dietetic professional issues and regulatory structures, the food service system in health care institutions and clinics, management and communication principles, reflective practice and keeping a professional portfolio are discussed in this module.

NTS 3105(5) - DIETETICS
An integrated study of the role of diet therapy in the treatment of disease. It builds upon concepts developed in earlier modules to explore the rationale for the application of dietary modifications for patients with specific disease states and the means of evaluating dietary treatment. This knowledge is integrated with an understanding of the medical aspects of common disease states.

NTS 3106(5) - ART AND SCIENCE OF FOOD PREPARATION
This module explores basic food science principles through food preparation, recipe modification, and sensory evaluation (taste testing required). Students are introduced to basic cooking skills, techniques, and recipe modification. Assigned recipes are prepared during each lab. Assignments and projects introduce students to basic menu planning and meeting nutritional requirements while restricted to a budget.

NTS 3107(5) - SOCIAL SCIENCE PERSPECTIVES ON FOOD AND NUTRITION
Uses theories, concepts, and methods from the social sciences to examine food, eating, and nutrition. Uses the food choice process as a conceptual model for examining the scope of social science aspects of nutrition.

NTS 3108(5) - HERBALS, HOMEOPATHY AND DIETARY SUPPLEMENTS
Covers regulations and clinical science regarding the use of herbals, homeopathic remedies, and dietary supplements, focusing on peer reviewed studies and integration with allopathic drugs. Includes discussion of marketing issues.

NTS 3201(5) - ENDOCRINE REGULATION AND PHYSIOLOGICAL CONTROL
Review the molecular processes that are involved in the homeostasis of nutrients, minerals and the recommendations for daily nutrient intakes. Class discussion of key research articles is conducted and evaluated.

NTS 3202(5) - FOOD MICROBIOLOGY
Students will be introduced to the microbial world and made aware of existing tools to explore it. Starting from a historical perspective, the central role that microbes play in health will be investigated. Aspects of taxonomic relationships, safe laboratory practice and general techniques in culturing, staining and quantification will be covered. The role of microorganisms in the spoilage of food. Food poisoning and food borne diseases. Modification of food through fermentation. Microbial examination of foods. Prevention of microbial contamination and growth of microorganisms in food. Environmental changes on microbial growth. Specifications and standards.

NTS 3203(5) - PUBLIC HEALTH NUTRITION
An appreciation of the organisation and management of the Ministry of Health. Critical evaluation of the impact of the promotion of good health through primary prevention of nutrition related illness in the population. Major public health activities, surveillance and assessment of the population's health and well being with respect to nutrition. Policy and strategy development and implementation.

NTS 3204(5) - SPORTS NUTRITION, LIFESTYLE AND DIET
An introduction to the biochemical principles of exercise and sport, the role of nutrition and exercise in the prevention of disease and the importance of nutrition in enhancing athletic performance. Lectures cover current research on nutritional needs in response to exercise, including fluids, energy nutrient requirements and caloric distribution, supplementation, pre-/post- event recommendations.

NTS 4101(5) - NUTRIGENOMICS
This module reviews briefly the core concepts of molecular biology and focuses mainly on how the genome determines nutritional requirements and metabolic responses at cellular and organismal level. The impact of a changing nutrient environment will also be covered. Introduction to molecular diagnostics: some important research tools to investigate molecular aspects of nutrition, examine how the genome influences the response to nutrients will be discussed.

NTS 4102(5) - NEUROENDOCRINE REGULATION OF FOOD INTAKE
Study of the interactions between peripheral signals and central neuronal pathways, as well as analysis of current research work in the field which provide a better understanding of the regulation of food intake, satiety, the pathogenesis of eating disorders, obesity, and associated metabolic disorders.

NTS 4103(5) - OBESITY, DIABETES AND ADVERSE EFFECTS
Multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behaviour, the genetics of obesity, the role of activity and energy metabolism. The link between overweight and obesity-associated Type 2 diabetes is also explored as well as the importance of its management through diet change. Overview of adverse effects is explored. Psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination will also be considered.

NTS 4104(5) - NUTRITION AND METABOLISM OF LIPIDS
This module introduces the history of lipids in human nutrition and stresses on advances in lipidology. Importance of dietary lipids in food industry as well as their significant roles as risk factors for obesity and other chronic and degenerative diseases are covered. Emphasis is laid on the importance of lipids as precursors to hormones, structures and metabolism of circulating lipids. Their regulation and control are treated.

NTS 4105(5) - FUNCTIONAL FOODS
The definition of “Functional Foods” as dietary components that may provide a health benefit beyond basic nutrition will be discussed. This emerging field in food science, in which such “functional” foods are usually accompanied by health claims for marketing purposes will be addressed. The general categories of processed foods made from functional food ingredients, or fortified with health-promoting additives, will be discussed. “Enriched" products, and also, fresh foods (e.g. vegetables) that have specific claims attached will also be considered.

NTS 4106(5) - THERAPEUTIC DIETETICS
Anatomical, physiological and biochemical changes associated with diseases. Emphasis is laid on nutritional assessment and the use of modified diets as adjuncts to other therapies for patients with specific disease states are considered. This knowledge is integrated with an understanding of the medical aspects of some common disease states.

NTS 4107(5) - MANAGEMENT AND FOOD SERVICE
Gain experience in facility design; equipment selection, use, and care; job analysis and evaluation; human resources planning; management of financial resources; recipe development and volume food production; computer-assisted management; employee training; and applied safety and sanitation standards. Through planning and executing a themed event, students develop other skills required to operate/manage a food service program. Application of quality management in food service operations and facility management is stressed. Completion of a professional portfolio is required. Commercial menu planning.

NTS 4202(5) - NUTRITION AND IMMUNOLOGY
This module focuses on some mechanisms involving antibody and cell mediated responses. The response of the immune system to activation, particularly in relation to nutrition. Effects of pro-inflammatory cytokines and the related control. Damaging and life threatening effects of cytokines. Discussion of the occurrence of degenerative diseases as the direct result of immune dysfunction and relationship to poor dietary habits.

NTS 4202(5) - ETHICS AND NUTRITION
This module incorporates a comprehensive introduction to the basics of ethics. It will consider the nature of health itself and will explore the complexities of a health care system that corresponds to our values and ethics particularly in therapeutic nutrition and nutritional sciences. Impacts of ethics of new emerging technologies will be addressed.

NTS 4203(5) - NUTRITIONAL EPIDEMIOLOGY
Techniques used to evaluate relationships of diet to health and disease in human populations; integration of knowledge gained with results of animal and clinical studies toward understanding dietary risks or protective factors for disease. Includes advanced diet assessments and epidemiologic approaches. Study of circumstantial evidence of associations between dietary factors and diseases. Types of study as well as study design will be considered.

NTS 4206(5) - CONSUMER PROBLEMS AND INFLUENCES
The nature of society and factors affecting strata of societies. Food habits of ethnic and cultural groups. Factors influencing attitudes and behaviour to food and health. Environmental and psychosocial influences on life style development through the life cycle. The role of public health authorities, industries, media and NGOs in communicating nutritionally sound, scientific and consumer information. Community expectations and human rights of individuals and families.

PHAR 1121(5) - ENVIRONMENTAL HEALTH AND TOXICOLOGY
This module deals holistically with how exposure and health effects of foods and nutrients of diverse origin: organic, inorganic are related to their sources, behaviour, and fate in various environmental media (air, water, soil and food). Environmental pollution, environmental health management, hazardous waste, radiation biology, risk assessment, and water quality are covered.