

BSc (Hons) Food Science and Technology - A304

1. Objectives

The programme is designed to develop the necessary competence for a career in the food industry. The training is broad-based so that graduates can also enter employment in other sectors of the food chain. The programme offers adequate background for specialisation through further studies/research at postgraduate level both locally and overseas.

Upon successful completion of this programme, learners will be able to:

- apply scientific principles to control the chemical, physical, microbiological, nutritional and sensory properties of food during manufacture and storage;
- specify raw food materials characteristics in relation to processing methods;
- apply methods of preservation and processing to control deterioration and spoilage mechanisms in foods and to produce safe foods;
- describe underlying engineering principles of food processing operations and relate process variables to food quality indicators;
- apply methods of food analysis to assess quality, nutritive value, safety and compliance with standards;
- relate the composition of foods to nutritional status and health;
- participate in the development, implementation and maintenance of comprehensive food safety management systems to protect consumer health;
- apply the steps involved in a research process;
- demonstrate both written and oral communication skills;
- work effectively both independently and in a team;
- contribute to the development and growth of small and medium food enterprises, and food industries.
- embark on training programmes at postgraduate level.

2. General Entry Requirements

In accordance with General Entry Requirements for Admission to the University for Undergraduate Degrees.

3. Programme Requirements

SC : Credit in Mathematics and Chemistry

2 GCE 'A' Levels passes in related approved Science subjects.

Preference will be given to candidates also holding an 'A' Level in Chemistry, Mathematics, Biology, Physics or Food Studies.

4. Programme Duration

	Normal (Years)	Maximum (Years)
Degree	3	5

5. **Credits per Year :** Minimum 18 credits, Maximum 48 credits subject to Regulation 4.

6. Minimum Credits Required For Award of Undergraduate Degree: 105

Breakdown as follows:

	Credits from			
	Core Taught Modules	Project	Electives	GEMs
Degree	83	9	6	6

Practical Training and the Scientific Communication module must be completed satisfactorily for the award of the degree.

Students may exit with

- (a) a Certificate after having earned 30 credits in core modules.
- (b) a Diploma after having earned 60 credits in core modules.

7. Assessment

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

Assessment will be based on a Written Examination of 2-3 hour duration, carrying a weighting of 70%, and Continuous Assessment carrying 30% of total marks for AGRI modules. Modules from other Faculties/Departments/Centres will carry weighting in the Written Examination and the Continuous Assessment as specified by the concerned Faculties/Departments/Centres. Continuous Assessment will be based on laboratory/field works, and/or assignments, and shall include at least 1 class test.

A minimum of at least 30% should be attained in each of Continuous Assessment and Written Examination, with an overall total of 40% 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.

Each module will carry either 3 or 6 credits and the Project will carry 9 credits.

Assessment of industrial training will be based on industry-based and academic supervisors' reports, and student's report. For satisfactory completion of the industrial training, a minimum of 40% should be attained. The 'Practical Training' will be offered either at the end of year 1/or at the end of year 2, depending on placement opportunities.

Assessment of the scientific communication module will be based on continuous assessment of students throughout the module and/or submission of a portfolio. For satisfactory completion of the module, a minimum of 40% should be attained.

Written examinations for all the modules will be carried out at the end of the year.

8. Important Note

The rules as stipulated in this Programme Structure and Outline Syllabus will replace all other rules and regulations.

9. List of Modules

CORE MODULES

Module Code		Module Name	Hr / Yr L+P	Credits
COMS 1010	(1)	Communication Skills	45+0	3
CSE 1010e	(1)	Introduction to Information Technology	45+0	3
AGRI 1010Y	(1)	Basic Food Engineering	60+60	6
AGRI 1011Y	(1)	Food Microbiology	60+60	6
AGRI 1012Y	(1)	Biochemistry & Nutrition	75+30	6
AGRI 1014Y	(1)	Food Chemistry & Food Analysis I	60+60	6
AGRI 1041Y	(1)	Introduction to Agricultural Production	45+0	3
AGRI 2015Y	(3)	Food Chemistry & Food Analysis II	75+30	6
AGRI 2016Y	(3)	Principles of Food Preservation & Agricultural Produce Processing	75+30	6
AGRI 2017Y	(3)	Food Quality Assurance & Food Safety	90+0	6
AGRI 2018Y	(3)	Unit Operations in Food Processing	30+30	3
AGRI 2019Y	(3)	Molecular Biology	30+30	3
AGRI 2039Y	(3)	Statistics and Research Methodology	60+45	5
AGRI 2053Y	(3)	Applied Economics, Management, Systems and Extension to Agro-Industries	60+60	6
AGRI 2054Y	(3)	Packaging of Foods	45+0	3
AGRI 3000Y	(5)	Project	-	9
AGRI 3014Y	(5)	Food Legislation	45+0	3
AGRI 3017Y	(5)	Developments in Food Science & Technology	45+0	3
AGRI 3021Y	(5)	Instrumentation and Process Control in the Food Industries	45+0	3
AGRI 3063Y	(5)	Water and Waste Management in Food Industries	45+0	3
AGRI 3100		Scientific Communication	20+0	-

AGRI2000 - Practical Training can be done in either Year 1 or Year 2

AGRI3100 - Scientific Communication will be done in year 3

ELECTIVES (CHOOSE 2)

AGRI 3016Y	(5)	Food Biotechnology	45+0	3
AGRI 3018Y	(5)	Advanced Nutrition	45+0	3
AGRI 3064Y	(5)	Sensory Evaluation of Foods	30+30	3

GEMs

-	()	(2 Modules)	-	6
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10. Programme Plan – BSc (Hons) Food Science and Technology

YEAR 1

Module Code	Module Name	Hr / Yr L+P	Credits
CORE			
COMS 1010 (1)	Communication Skills	45+0	3
CSE 1010e (1)	Introduction to Information Technology	45+0	3
AGRI 1010Y (1)	Basic Food Engineering	60+60	6
AGRI 1011Y (1)	Food Microbiology	60+60	6
AGRI 1012Y (1)	Biochemistry and Nutrition	75+30	6
AGRI 1014Y (1)	Food Chemistry and Food Analysis I	60+60	6
AGRI 1041Y (1)	Introduction to Agricultural Production	45+0	3

GEM

-	()	(1 Module)	3
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YEAR 2

Module Code	Module Name	Hr / Yr L+P	Credits
CORE			
AGRI 2015Y (3)	Food Chemistry and Food Analysis II	75+30	6
AGRI 2016Y (3)	Principles of Food Preservation and Agricultural Produce Processing	75+30	6
AGRI 2017Y (3)	Food Quality Assurance and Food Safety	90+0	6
AGRI 2018Y (3)	Unit Operations in Food Processing	30+30	3
AGRI 2019Y (3)	Molecular Biology	30+30	3
AGRI 2039Y (3)	Statistics and Research Methodology	60+45	5
AGRI 2053Y (3)	Applied Economics, Management, Systems and Extension to Agro-Industries	60+60	6
AGRI 2054Y (3)	Packaging of Foods	45+0	3

YEAR 3

Module Code	Module Name	Hr / Yr L+P	Credits
CORE			
AGRI 3000Y (5)	Project	-	9
AGRI 3014Y (5)	Food Legislation	45+0	3
AGRI 3017Y (5)	Developments in Food Science and Technology	45+0	3
AGRI 3021Y (5)	Instrumentation and Process Control in the Food Industries	45+0	3
AGRI 3063Y (5)	Water and Waste Management in Food Industries	45+0	3

AGRI 3100 Scientific Communication 20+0 -

ELECTIVES (Choose Two from)

AGRI 3018Y (5)	Advanced Nutrition	45+0	3
AGRI 3016Y (5)	Food Biotechnology	45+0	3
AGRI 3064Y (5)	Sensory Evaluation of Foods	30+30	3

GEM

-	()	(1 Module)	3
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Total Number of Credits: 104

11. Outline Syllabus

COMS 1010 (1) - COMMUNICATION SKILLS (DE)

Theory and models of communication. Effective use of English. Written communication. Oral presentation. Communication flow in organisations. Using media.

CSE 1010e (1) - INTRODUCTION TO INFORMATION TECHNOLOGY (OE)

Introduction to computers. Hardware and Software. Input/output devices and storage. Introduction to word processing. Introduction to systems analysis design. Introduction to spreadsheets. Organisation of data. Data communications and emerging applications. Workplace issues and your future in computing.

AGRI 1010Y (1) - BASIC FOOD ENGINEERING

Basic engineering principles of food processing operations: units, dimensions and system conversions. Material and energy balance. Thermodynamics. Heat and mass transfer. Heat exchangers. Solid and fluid rheology. Fluid flow. Pumps.

AGRI 1011Y (1) - FOOD MICROBIOLOGY

Microbial diversity, structures and functions. Microbial physiology. Growth and survival. Control of microorganisms.

Food spoilage. Food-borne illness. Useful micro-organisms. Microbiological examination of foods. Specifications and standards. New technologies in the detection of micro-organisms.

AGRI 1012Y (1) - BIOCHEMISTRY AND NUTRITION

Basic concepts of biochemistry and cell biology. Structure and function of biological molecules. Enzymes and reaction kinetics. Metabolic pathways. Essential principles and processes of cell and molecular biology.

Sources and functions of nutrients. Major Diet-related diseases. Nutritional requirements. Concept of Healthy eating. Energy balance and weight control. Digestion and absorption of food. The effect of processing on nutrients.

AGRI 1014Y (1) - FOOD CHEMISTRY AND FOOD ANALYSIS I

Colloid chemistry of food systems. The chemistry of food constituents: water, carbohydrates, lipids, proteins, vitamins and minerals. Browning in foods.

Sampling and errors in food analysis. Sample preparation. Instrumental methods of food analysis.

AGRI 1041Y (1) - INTRODUCTION TO AGRICULTURAL PRODUCTION

Fundamentals of animal management and production: nutrition; feeds and feeding; reproduction and breeding; animal welfare and health; housing and equipment; Introduction to farm animal industries, their products and by-products: matching production of quality and safe food with protection and care of the environment.

Classification of food crops and their economic importance. Fundamentals of food crop production: agro-climatic requirements; planting materials; crop establishment; plant nutrition; irrigation; crop protection; harvesting and postharvest practices. Good Agricultural Practices and sustainable crop production. Introduction to food crop production enterprises. Processed products from commercial food crops.

AGRI 2015Y(3) - FOOD CHEMISTRY AND FOOD ANALYSIS II

The chemistry of natural pigments, flavours, food additives and major food products including dairy products, fat products, meat, egg, cereals, fruits and vegetables.

Measurement of food colour. Rheological methods and immunological methods. The analysis of food constituents.

AGRI 2016Y (3) - PRINCIPLES OF FOOD PRESERVATION and AGRICULTURAL PRODUCE PROCESSING

Principles of food preservation using low and high temperatures, reduced water activity, chemicals, radiation. Modified atmospheres in food preservation. Post harvest technology. Processing of agricultural produce including milk, egg, meat, poultry, fish, fruits and vegetables, and cereals.

AGRI 2017Y (3) - FOOD QUALITY ASSURANCE AND FOOD SAFETY

The principles of quality assurance for the food industry. The use of statistical tools in quality assurance.

Food safety issues. Safety evaluation of food additives. Contaminants in foods. Food hygiene. Hazards associated with foods. Hazard Analysis Critical Control Point (HACCP).

AGRI 2018Y (3) - UNIT OPERATIONS IN FOOD PROCESSING

Engineering principles behind selected unit operations used in food processing including refrigeration, freezing, evaporation, dehydration and comminution.

AGRI 2019Y (3) - MOLECULAR BIOLOGY

Gene structure and organisation. DNA replication, repair and recombination. Gene expression and modification processes. Modification of genetic content. Principles of gene cloning. Recombinant DNA technology and genetically modified organisms.

AGRI 2039Y(3) - STATISTICS AND RESEARCH METHODOLOGY

Introducing statistics in food science. Descriptive statistics – summarising and displaying data. Probability distributions. Point and Interval Estimation. Hypothesis Testing. Analysis of Categorical data. Regression Analysis. Design and Analysis of Experiments. Data entry and analysis using EXCEL & MINITAB.

Elements of Research Methodology. Qualitative and Quantitative Research. Sampling Methods. Questionnaire development, design and administration. Data coding and processing using SPSS. Elements of scientific and technical writing.

AGRI 2053Y(3) - APPLIED ECONOMICS, MANAGEMENT, SYSTEMS AND EXTENSION TO AGRO-INDUSTRIES

Agricultural economics: Demand and supply; principles of production economics. Agricultural management fundamentals. Agricultural marketing: Marketing functions; marketing channels and costs.

Introduction to agricultural systems concepts: holistic approach to agriculture. Farming systems. Introduction to agricultural extension. Research and Extension linkages. Technology Innovation process.

Agro-industry and economic development. Agro-industrial development strategies. Scale issues. Agro-industrial project analysis. Marketing of agro-industry products. Entrepreneurship and setting up of small/medium food enterprises. Business plan development for a small/medium food enterprise.

Food policy: definition, scope, policy-making and evaluation process.

AGRI 2054Y (3) - PACKAGING OF FOODS

Chemical and physical properties of package materials. Interaction between package and food. Selection and evaluation of packaging materials. Package design. Printing. Computers in packaging.

AGRI 3000Y (5) - PROJECT

This is a very important component of the programme, allowing students to develop high level skills and cognitive abilities. Every student will be allocated a research topic and the research work will be carried out under supervision. The student is required to investigate a topic/problem, plan and execute the research work, and present and discuss the results. The project may be industry based and may address a research problem in the food industry. The student will have to submit a dissertation

not exceeding 8000 words from “Introduction” to “List of References”. Students should demonstrate good practice in using skills and knowledge acquired and follow guidelines as laid down in the document *Dissertation guidelines BSc (Hons) Degree* prepared by the Faculty.

AGRI 3014Y (5) - FOOD LEGISLATION

National food legislation systems. The role of regional and international organisations. Food laws and regulations.

AGRI 3016Y (5) - FOOD BIOTECHNOLOGY

Applications of the principles of biotechnology to food processing. Modification of food through fermentation technology. Transgenic plants and animals. Enzymes in food industries. Genetic engineering of enzymes. Production of food components. New developments in food biotechnology. Ethical aspects.

AGRI 3017Y (5) - DEVELOPMENTS IN FOOD SCIENCE AND TECHNOLOGY

Reviews on current research and development in food science and technology.

AGRI 3018Y (5) - ADVANCED NUTRITION

Dietary intolerance. Diet related diseases and eating disorders. Nutritional research methods.

AGRI 3021Y (5) - INSTRUMENTATION AND PROCESS CONTROL IN THE FOOD INDUSTRIES

Measurements systems. Automation and process control. Introduction to Proportional Integral Derivative (PID) control. Process flow sheeting with Process Instrumentation Diagrams.

AGRI 3063Y (5) - WATER AND WASTE MANAGEMENT IN FOOD INDUSTRIES

Treatment of water for domestic and industrial applications. Effects of waste discharges into the environment. Origin, composition, treatment, disposal and utilisation of wastes from food processing operations. Legal and economic aspects of waste disposal.

AGRI 3064Y (3) - SENSORY EVALUATION OF FOODS

Physiology and psychology of perception. The senses. Sensory characteristics of foods. Types of sensory evaluation methods. Establishment of sensory panels. Setting up sensory facilities. Experimental design and analysis of sensory data.

AGRI 3100 - SCIENTIFIC COMMUNICATION

Avenues of communication in science. Scientific and technical writing. Oral and poster presentations. Ethics of scientific publishing.

The dissertation guidelines. Planning and managing the dissertation writing up process – effective literature search and review, introduction, methodology, results, discussion, conclusions, referencing rules and plagiarism.

This module does not carry any credit, but training must be completed satisfactorily for the award of the degree.

AGRI 2000 - PRACTICAL TRAINING

Student is required to undergo a practical training of 6-8 weeks duration during winter vacation either in Year 1 or Year 2. The aim is to expose the student to the real work environment, acquaint him/her of what employers would expect of a graduate. Student is required to submit a report on her/his training placement.

This module does not carry any credit, but training must be completed satisfactorily for the award of the degree.

25 January 2008