3.3.3.3 Food Science and Technology

A safe and adequate food supply is one of man's basic needs and the food industry today has grown into a multi-billion dollar industry to service this need. The modern food industry increasingly operates within the global market and requires academically well-qualified graduates to be its future researchers and managers. Such professionals will need to understand the science and technology of food, the market needs and be capable of operating within the international food industry. In this increasingly competitive market, graduates will have to be technically competent, to grasp market opportunities and be able to transfer technology creatively and appropriately in different regions of the world. They need to be capable of dealing with change and be responsive to challenges whilst working and communicating effectively in a multi-cultural society. The Food Science and Technology (FST) programme at NUS aims to produce highly motivated, numerate and responsible food scientists and technologists who are able to demonstrate effective leadership, excellent data analysis and problem-solving skill to improve food products and processes, and identify and exploit new business opportunities for the food industry of the 21st century. The predecessor of the FST BSc and BSc (Hons) degrees i.e. the FST BApplSc and BApplSc (Hons) degrees at NUS were accredited by the International Union of Food Science and Technology (IUFoST) in September 2013. The FST BSc and BSc (Hons) degrees have successfully achieved reaccreditation in August 2016.

Programme Structure and Curriculum Rationale

Food Science is the study of the nature of foods, the causes of their deterioration, and the principles underlying food processing. The food scientist is an important link in the chain of events which ensures the widespread availability of nutritious, safe, and reasonably priced foods to the general population. Scientific principles are also applied to develop technological processes designed to produce sophisticated products. Food Technology is the application of physical, chemical and microbiological sciences to food processing and preservation, and in the development of new improved food products. The food technologist is primarily concerned with problems related to production of safe, nutritious and attractive food, using more efficient and less costly techniques.

By its very nature, the subject of Food Science and Technology is wide ranging and students need to understand not only the chemistry of foods (i.e., how the components of food might react together), but also nutrition, toxicology, food legislation, microbiology and process engineering. Many food products are potentially "high-risk" and unless they are handled and stored correctly, they could be the source of food poisoning and infection in man.

This programme, therefore, involves the study of the relevant sciences, including chemistry, biochemistry, microbiology, mathematics and engineering and of the application of these sciences to food systems. The curriculum also includes the study of the relationship of food to man in terms of nutrition, health, safety, food acceptability and consumer protection.

Career Prospects

The course prepares students for food research and careers related to food and related industries. The opportunities for graduates in this programme are good. Graduates in Food Science and Technology (FST) may work in basic and applied research, quality control, production supervision, technical sales, food inspection or product development. This undergraduate programme also prepares students to pursue graduate studies in food science or related fields of physical and biological science. Graduates are well equipped to find employment in food and allied industries, government and non-government organisations, and in education.

Module Level	Major Requirements	Cumulative Major MCs
1000 (24 MCs)	Pass • CM1501 Organic Chemistry for Engineers • CM1191 Experiments in Chemistry 1 • FST1101 Science and Technology of Foods • FST1103 Fundamentals of Food Engineering • LSM1106 Molecular Cell Biology • ST1232 Statistics for Life Sciences For students without H2/A-level equivalent Biology, pass: • LSM1301 General Biology	24
2000 (20 MCs)	Pass • FST2102B Chemistry of Food Components • FST2106 Post Harvest Food Processing • FST2107 Food Analysis and Lab • FST2108 Food Safety Assurance • LSM2211 Metabolism and Regulation	44

3000 (20 MCs)	Pass • FST3101 Food Microbiology and Fermentation • FST3103 Advanced Food Engineering • FST3105 Food Product Development and Packaging • FST3106 Sensory and Flavour Science At least 4 MCs from the following: • FST3201 Independent Study (Food Science & Technology) • FST3202 Nutrition and Disease Prevention • FST3203 Vitamins & Minerals in Health & Diseases • FST3288 Advanced UROPS (Food Sc. & Tech) I • DSC3202 Purchasing & Materials Management **or** DOS3702 Purchasing & Materials Management • CM3242 Instrumental Analysis II • CM3267 Computational Thinking and Programming in Chemistry	64

4000 (32 MCs)	Pass • FST4199 Honours Project in Food Science & Technology **or** FST4299 Applied Project in Food Science & Technology • FST4102 Advanced Food Processing Technologies • FST4103 Food Colloids and Components Science At least 8 MCs from following: • FST4201 Current Topics in Food Science and Technology • FST4202 Nutritional Biochemistry • FST4203 Food Forensics • CM4241 Trace Analysis • CM4242 Advanced Analytical Techniques • CM4267 Current Topics in Analytical Techniques • FST5201 Rheology and Textural Properties of Biomaterials • FST5202 Advanced Food Fermentation • FST5203 Advanced Food Microbiology and Safety • FST5301 Evidence-based Functional Foods • FST5303 Modern Human Nutrition • FST5225 Advanced Current Topics in Food Science • FST5226 Advanced Current Topics in Food Science II • FST5227 Advanced Current Topics in Food Science III • CM5241 Modern Analytical Techniques	96

In addition to the above modules, the department also recommends that students read the following modules to fulfil the unrestricted elective requirement :

MKT1003 Principles of Marketing or MKT1705 Principles of Marketing

DSC2006 Operations Management or DAO2703 Operations and Technology Management

DSC3218 Physical Distribution Management or DOS3712 Physical Distribution Management

FST2201 Introduction to Human Nutrition

Summary of Requirements	**BSc (FST)**	**BSc Hons (FST)**
University Requirements	20 MCs	20 MCs
Faculty Requirements	8 MCs†	8 MCs ††

Major Requirements	64 MCs	96 MCs
Unrestricted Elective Modules	28 MCs†††	36 MCs†††
TOTAL	120 MCs	160 MCs

† 12 MCs of Faculty requirements are partially fulfilled through 4 MCs from ST1232 within the major. The remaining 8 MCs are fulfilled through (i) 4 MCs from FST3181 Professional Placement; and (ii) 4 MCs from any one of the following subject groups: Computing Sciences, Physical Sciences, Multidisciplinary & Interdisciplinary Sciences.

†† 16 MCs of Faculty requirements are partially fulfilled through 8 MCs from ST1232 and CM/LSM modules within the major. The remaining 8 MCs are fulfilled through (i) 4 MCs from FST3181 Professional Placement; and (ii) 4 MCs from any one of the following subject groups: Computing Sciences, Physical Sciences, Multidisciplinary & Interdisciplinary

††† The remaining 8MCs from FST3181 (after fulfilling 4MCs of Faculty Requirements) would fulfil the Unrestricted Electives requirements.