### Food Technology

**Practicum**
A written report on a period of practical work experience demonstrating an understanding of dairy product manufacture.

**Dairy Chemistry**

**Dairy Microbiology and Preservation**

**Dairy Processing**
Engineering principles underlying heat exchangers, pumping, centrifugal separation, homogenisation and ultra filtration. Application of these unit operations to dairy processing. An introduction to potable water and waste stabilisation treatments. A practical course.

**Dairy Engineering**
Engineering principles underlying refrigeration, evaporation and drying. Application of these unit operations to dairy processing. Plant utility systems, including steam and boilers, electrical energy and electric motors. An introduction to instrumentation and control of dairy product manufacturing plant. A practical course.

**Cheese Technology**
Technologies for manufacture of different types of cheeses: cheddar, cheshire, gouda and processed. Analysis of the manufacturing processes, including cheese starters, compositional factors, processing steps within the vat and processing steps post-vat. Fermented foods such as yoghurt. Manufacture of whey products. A practical course.

**Milk Powder Technology**
Technologies for manufacture of skim and whole milk powders, including reception and standardisation, preheating, evaporation, homogenisation, primary and secondary drying, blending and packing. Description of evaporators and dryers. A practical course.

**Casein Technology**

**Butter and Milkfat Technology**

**Introduction to Food Prod Manufacture**
An overview of the physical, chemical, biochemical and functional properties of major and minor food constituents (water, proteins, carbohydrates, lipids, vitamins, minerals, pigments, flavours, toxins) and food groups (dairy, meat, eggs and plants). Chemical and biochemical reactions causing deterioration in foods. New foods, functional foods, nutraceuticals, other innovative products and innovation practices.

**Food Preservation**
Significance of spoilage and pathogenic microorganisms in food and processing environments. Identifying potentially hazardous foods and other quality issues. Industrial hygiene and microbial preservation techniques to produce safe, wholesome foods. Hazard analysis and food safety programmes for industrial production and handling of food.
Conventional, new and anticipated methods for detection, identification and enumeration of microbes in foods and on premises.

141.221 15 credits S2 I AL
Unit Operations for Food Processing I
The second law of thermodynamics and its application; prediction of heat transfer coefficients; air psychrometrics; principles of mass transfer; analysis of process engineering operations including heat exchangers and drying; particle technology; instrumentation, data transfer and related aspects of factory services. A laboratory course.

141.222 15 credits S2 I AL
Food Microbiology and Human Health

141.292 15 credits S1 I AL
Food and Packaging Engineering I S1 I PN
An introduction to the physical properties of biological materials and packaging materials, including thermophysical properties of biological materials, the principles of rheology and the mass transfer and heat transfer properties of packaging materials. A practical course.

141.294 15 credits S1 I AL
Engineering Principles
Units and dimensional analysis; conservation (mass and energy) balances of steady and unsteady state processes, first law of thermodynamics and its application; principles of steady and unsteady state heat transfer; fluid mechanics. A laboratory course.

141.330 15 credits S2 I AL
Food Assessment and Characterisation
S2 I PN
An outline of the methodologies used for studying the properties of food by sensory analysis and instrumental methods. A study of the flavour, colour and rheological properties of food and their linkages with sensory measurements of flavour and aroma, colour and texture. Interpretation and understanding of sensory and instrumental data and the relationships between the two. A practical course.

141.339 15 credits * * *
Instrumental and Analytical Techniques
Studies of modern instruments and techniques used in food research, including theory and application of spectroscopic methods, e.g. ultraviolet, visible, infrared and atomic spectroscopy, NMR and mass spectrometry. Theory and application of chromatographic separation techniques in the analysis of food materials. A practical course.

141.343 15 credits * * *
Project Engineering
Techniques for execution of capital expenditure projects in the food industry, including procedures for feasibility and preliminary design studies, project costing, preparation of flowsheet and layout diagrams, hazard analysis, consideration of ethical, legal and social environments, tendering and contract administration. Case studies. A practical course.

141.355 15 credits S1 B1 PN
Added-Value Processing of Food Products
S1 E PN
An overview of food processing unit operations and their role in the industrial production of foods. A course designed to integrate food science, microbiology and food safety in the industrial environment with processing practices in order to offer novel methods to formulate foods and assure safety for the consumer.

141.356 15 credits S2 B1 PN
Food Formulation and Assessment
S2 E PN
A study of the industrial ingredients used in the formulation of foods along with the assessment techniques used to evaluate these ingredients and the resultant foods.

141.362 15 credits S2 I AL
Food Formulation Technology
S2 I PN

141.363 15 credits * * *
Food Packaging Technology and Plant Utilities

141.371 15 credits * * *
Food Plant Utilities
Provision of services in processing plant, including refrigeration, steam, water, electricity, instrumentation, lighting and ventilation. Selection of utility equipment. Provision for treatment of wastes. A practical course.

141.393 15 credits S1 I AL
Food Microbiology and Safety
S1 I PN
The interaction of microorganisms of spoilage and public health significance with food and with the processing environment. Industrial hygiene and food processing techniques for controlling microbial activity to produce safe, wholesome foods. Conventional and automated methods for detection, identification and enumeration of microbial populations in foods and premises. Predictive microbiology. Hazard analysis and formulation of a food safety programme for industrial production and handling of food; consideration of relevant food legislation. A practical course.

141.395 15 credits S1 I AL
Food Chemistry
S1 I PN
A practical approach to the physical, chemical, biochemical and functional properties of major and minor food constituents (water, proteins, carbohydrates, lipids, vitamins, minerals, pigments, flavours, toxins) and food groups (dairy, meat, eggs and plants). Chemical and biochemical reactions causing deterioration in foods and some methods of control (including packaging). A laboratory course.

141.422 15 credits * * *
Advanced Food Structures
The integrative understanding of structures and interactions of food components in natural food systems, e.g. milk, meat, horticultural products, and the restructuring of foods and food products from component parts (e.g. carbohydrates, proteins) to mimic natural structures. A practical course.

141.423 15 credits * * *
Advanced Topics in Food Science
An advanced study of current issues and recent advances in food science. Topics covered include consumer nutrition, with emphasis on diet and degenerative diseases, food allergies, diet and behaviour; genetic engineering of foods, evaluation of new technologies and techniques. A project.

141.424 15 credits S1 I AL
Technologists and Business
Interpersonal skills and tools required for teamwork, project management and leadership in the workplace. Awareness of different management styles, organisational climates and organisational structures especially
as they relate to R&D and production management. Ability to do product costings and understand a range of accounting and financial tools. Strategy and business planning and links to technology, R&D and product development.

141.425 15 credits S2 I PN 
**Advanced Instrumental and Analytical Techniques**
Studies of modern instruments and techniques used in food science research, including advanced studies of the application of spectroscopy, e.g. ultraviolet, visible, infrared and atomic spectroscopy, NMR and mass spectrometry, chromatographic and other separation techniques in the analysis of food materials. A practical course.

141.429 30 credits S2 I PN 
**Food Science Project**
An original investigation on some aspect of food science. The student works under academic supervision and learns skills in problem-solving, research methods and communication. This project integrates the knowledge the student has already acquired.

141.444 15 credits S1 I PN 
**Advanced Food Engineering**
Mechanical properties of packaging, including compression and shear under static and dynamic loading conditions. Impact loading and vibration. Assessment of transportation hazards and their laboratory simulation; assessment of product fragility and design of packages to withstand transportation hazards. Design and performance testing of complete packages; test result evaluation. Case studies of advanced food process engineering operations. A practical course.

141.449 30 credits S12 I PN 
**Food Engineering Project**
A preliminary design study incorporating both team and individual components in which possible processes and equipment for manufacture of a food product are assessed on both technical and economic grounds. Preliminary design of an equipment system. A research component seeking necessary data for the design.

141.457 15 credits S1 I AL 
**Food Product Development**
Qualitative and quantitative techniques used in development of new food products; generation and screening of ideas/concepts, formulation of products using computer packages, sensory methods for product development, instrumental evaluation of products, nutrition evaluation of products, consumer and market testing, process development, pilot plant testing and product launch. A laboratory course.

141.458 15 credits S2 I AL 
**Nutrition and Food Choice**
S2 I PN
Nutrient requirements, nutrition and disease, functional properties of foods, New Zealand diet, influences on food choice including relevant models, role of nutrition within the New Zealand food industry.

141.459 30 credits S12 I AL 
**Food Technology Project**
An original investigation of a food industry problem or opportunity. The student works under academic supervision within an industrial research brief and learns from practice, systematic skills in problem analysis, research and communication. Consideration of ethical, legal and social environments. This major project integrates knowledge the student has already acquired.

141.461 15 credits S2 I PN 
**Food Characterisation**
An outline of the methodologies used for studying the properties of food by sensory analysis and instrumental methods. A study of the flavour, colour and rheological properties of food and their linkages with sensory measurements of flavour and aroma, colour and texture. Interpretation and understanding of sensory and instrumental data and the relationships between the two. A practical course.

141.471 15 credits S2 I AL 
**Food Process Design and Safety**
S2 I PN
The development and design of a product formulation and production process for a defined food product concept, and the production and marketing of the product at pilot scale. A study of the requirements and feasibility of factory scale manufacture, including financial analysis. Consideration of ethical, legal and social issues, including product and plant safety and environmental impact. A study of food manufacture in a variety of food processing companies. A study of essential services, including water and wastewater treatment. A practical course.

141.489 30 credits S12 I AL 
**Industrial Bioscience Project**
An original investigation into some aspect of biopharmaceutics and natural products. The student works under academic supervision and develops skills in problem solving, research methods and communications. This project integrates the knowledge that the student has already acquired.

141.491 15 credits S1 I AL 
**Advanced Food Technology**
S1 I PN
An integrative study of food systems. Problem based learning is used to understand political, economic, societal and technological forces shaping the food industry. Topics include consumer preferences, legislation, food ingredient composition, modes of preservation, packaging and storage technologies, and emerging technologies in the design of food products for national and international markets. Case studies to emphasise the relevance of theoretical food research to the realities of the food industry today.

141.702 30 credits S1 I AL 
**Food Product and Process Development**
S1 I PN
Techniques used in product development, S2 I AL product formulation including use of quantitative techniques. The principles of product and process development, risk management in new product introductions, causes of success and failure of products. The principles and practices of quantitative market and consumer research, sensory evaluation in commercial environment, market research tools and their use and understanding. Specific applications of sensory evaluation techniques and correlation with instrument assessment. Product costing, practices and tools involved in market segmentation and niche marketing.

141.703 30 credits S1 I AL 
**Food Chemistry and Physics**
S1 I PN
Applied chemical, physical and structural properties of food materials. Integrative S2 I AL aspects of structures and interactions of food components in natural and restructured food products. A study of biophysical properties of foods and their measurement, including rheology and texture. A study of selected modern instrumental methods for food component analysis.

141.704 30 credits S1 I AL 
**New Technologies for the Food Industry**
S1 I PN
The physical principles and kinetic modelling S2 I AL of novel preservation processes and a study of their advantages and disadvantages compared with established processes. Novel technologies in the application of established preservation processes, conversion processes, solids handling, solid-liquid separation, pumping and in-line inspection and sensing operations, and packaging, packaging operations and storage techniques.

141.705 30 credits S1 I AL 
**Advanced Nutrition**
S1 I PN
Advanced nutrition including current issues in nutrition and health, nutrition topics rele- vant to the food industry. Nutrition and food legislation.

141.706 30 credits S1 I AL 
**Food Process Engineering**
S1 I PN
Advanced rheology, unit operations, transport dynamics and reaction engineering and their application to the evaluation and design of food processes and equipment including thermal separation, preservation and packaging processes and
equipment. A practical course with tutorials, pilot plant assignments and case studies.

141.707 30 credits  S1  I  AL
Food Preservation, Packaging and Storage  S1  I  PN
Application of a multi-disciplinary approach, S2  I  AL with emphasis on mathematical modelling, S2  I  PN
drawing from the disciplines of food microbiology, food chemistry, food reaction kinetics, food process engineering and packaging technology to the development, evaluation and optimisation of preservation processes, packaging systems and storage systems for manufacturing food products with required shelf lives.

141.714 15 credits  S12  B1  PN
Practical Rheology
A study of the theoretical framework and practical training for the reliable measurement and interpretation of rheological data in complex solid and fluid liquid systems.

141.716 30 credits  S1  I  AL
Research Report (Food)  S1  I  PN
Research in a defined area of Food Science, Technology or Engineering.

141.717 60 credits  S1  I  AL
Research Report (Food)  S1  I  PN
Research in a defined area of Food Science, Technology or Engineering.

141.745 30 credits  S12  I  PN
Dairy Science, Technology and Engineering

141.746 30 credits  S12  I  PN
Dairy Products Technology
Case studies in which the technology and control of the manufacture of appropriate dairy products such as cheese, butter, milk powder, casein and whey protein are examined. A practical course.

141.747 30 credits  S12  I  PN
Dairy Products Research Projects
Research projects in the technology of appropriate dairy products such as cheese, milk powder, casein and whey protein. A practical course.

141.748 30 credits  S12  I  PN
Dairy Science and Technology Research Project
An original research project that encourages integration of knowledge and practice of skills gained in the other papers. A rigorous scientific investigation applied to solution of real industrial problems.

141.794 15 credits  S1  I  AL
Special Topic  S1  I  PN  S1  I  AL  S2  I  PN

141.795 15 credits  S1  I  AL
Special Topic  S1  I  PN  S1  I  AL  S2  I  PN

141.796 15 credits  S1  I  AL
Advanced Topics in Food Engineering  S1  I  PN  S2  I  AL  S2  I  PN

141.800 120 credits  S12  I  AL
MPhil – Food Tech  S12  I  PN

141.801 15 credits  S2  I  AL
Special Topic: Food  S1  I  AL
Research in a defined area of Food Science, Technology or Engineering.

141.802 30 credits  S1  I  AL
Research Report: Food  S1  I  PN
Research in a defined area of Food Science, Technology or Engineering.

141.803 60 credits  S1  I  AL
Research Report: Food  S1  I  PN
Research in a defined area of Food Science, Technology or Engineering.

141.805 120 credits  S12  I  AL
Thesis: Food  S12  I  PN
Research in a defined area of Food Science, Technology or Engineering.

141.806 60 credits  S1  I  AL
Thesis (Year 1)  S1  I  PN  S1  I  AL  S1  I  PN

141.807 60 credits  S1  I  AL
Thesis (Year 2)  S1  I  PN  S1  I  AL  S1  I  PN

141.900 120 credits  S12  I  AL
PhD Food Technology  S12  I  PN