

# University of Pretoria Yearbook 2022

## BSc (Food Science) (02133406)

**Department** Consumer and Food Sciences

**Minimum duration of study** 3 years

**Total credits** 435

**NQF level** 07

## Admission requirements

### Important information for all prospective students for 2022

- The admission requirements apply to students who apply for admission to the University of Pretoria with a **National Senior Certificate (NSC) and Independent Examination Board (IEB) qualifications.**
- Applicants with qualifications other than the abovementioned** should refer to:
  - Brochure:** Undergraduate Programme Information 2022: Qualifications other than the NSC and IEB, available at [click here](#).
- Citizens from countries other than South Africa (applicants who are not South African citizens)** should also refer to:
  - Brochure:** Newcomer's Guide 2021, available at [click here](#).
  - Website:** [click here](#).
- School of Tomorrow (SOT), Accelerated Christian Education (ACE) and General Education Development Test (GED):** The University of Pretoria no longer accepts qualifications awarded by these institutions.
- National Certificate (Vocational) (NCV) Level 4:** The University of Pretoria may consider NCV candidates, provided they meet the exemption for bachelor's status criteria and the programme requirements.

### Transferring students

A transferring student is a student who, at the time of application for a degree programme at the University of Pretoria (UP) –

- is a registered student at another tertiary institution, **or** was previously registered at another tertiary institution and did not complete the programme enrolled for at that institution, and is not currently enrolled at a tertiary institution, **or** has completed studies at another tertiary institution, but is not currently enrolled at a tertiary institution, **or** has started with tertiary studies at UP, then moved to another tertiary institution and wants to be readmitted at UP.

A transferring student will be considered for admission based on

- an NSC or equivalent qualification with exemption to bachelor's or diploma studies (whichever is applicable); **and** meeting the minimum faculty-specific subject requirements at NSC or tertiary level; **or** having completed a higher certificate at a tertiary institution with faculty-specific subjects/modules passed (equal to or more than 50%), as well as complying with faculty rules on admission;
- previous academic performance (must have passed all modules registered for up to the closing date of

- application ) or as per faculty regulation/promotion requirements;
- a certificate of good conduct.

**Note:** Students who have been dismissed at the previous institution due to poor academic performance, will not be considered for admission to UP.

### Returning students

A returning student is a student who, at the time of application for a degree programme –

- is a registered student at UP, and wants to transfer to another degree at UP, **or** was previously registered at UP and did not complete the programme enrolled for, and did not enrol at another tertiary institution in the meantime (including students who applied for leave of absence), **or** has completed studies at UP, but is not currently enrolled or was not enrolled at another tertiary institution after graduation.

A returning student will be considered for admission based on

- an NSC or equivalent qualification with exemption to bachelor's or diploma studies (whichever is applicable); **and** meeting the minimum faculty-specific subject requirements at NSC or tertiary level; **or** previous academic performance (should have a cumulative weighted average of at least 50% for the programme enrolled for);
- having applied for and was granted leave of absence.

**Note:** Students who have been excluded/dismissed from a faculty due to poor academic performance may be considered for admission to another programme at UP. The Admissions Committee may consider such students if they were not dismissed more than twice. Only ONE transfer between UP faculties will be allowed, and a maximum of two (2) transfers within a faculty.

### Important faculty-specific information on undergraduate programmes for 2022

- The closing date is an administrative admission guideline for non-selection programmes. Once a non-selection programme is full and has reached the institutional targets, then that programme will be closed for further admissions, irrespective of the closing date. However, if the institutional targets have not been met by the closing date, then that programme will remain open for admissions until the institutional targets are met.
- The following persons will be considered for admission: Candidates who have a certificate that is deemed by the University to be equivalent to the required National Senior Certificate (NSC) with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution, and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the Admission Point Score (APS).
- Grade 11 results are used for the conditional admission of prospective students. Final admission is based on the final NSC/IEB results.

**University of Pretoria website:** [click here](#)

#### Minimum requirements

##### Achievement level

##### English Home

##### Language or

##### English First

##### Additional

##### Language

NSC/IEB

5

##### Mathematics

NSC/IEB

5

##### Physical Sciences

NSC/IEB

5

##### APS

32

Candidates who do not comply with the minimum admission requirements for BSc (Food Science), may be considered for admission to the BSc – Extended programme – Biological and Agricultural Sciences, which requires an additional year of study.

## BSc - Extended Programme - Biological and Agricultural Sciences

### Minimum requirements

#### Achievement level

#### English Home

#### Language or

#### English First

#### Additional

#### Language

NSC/IEB

4

#### Mathematics

NSC/IEB

4

#### Physical Sciences

NSC/IEB

4

#### APS

26

### Note:

\*The BSc - Extended programmes are not available for students who meet all the requirements for the corresponding mainstream programme.

\*Please note that only students who apply in their final NSC or equivalent qualification year will be considered for admission into any of the BSc - Extended programmes.

## Other programme-specific information

ZEN 161 may be replaced with FNH 121

(This should be read in conjunction with the curriculum for the first year of study)

(GTS 251 and GTS 261) may be replaced with (LEK 210 and LEK 220)

(This should be read in conjunction with the curriculum for the second year of study)

### 1.1 Requirements for specific modules

A candidate who:

- does not qualify for STK 110, must enrol for STK 113 and STK 123;
- registers for Mathematical Statistics (WST) and Statistics (STK) modules must take note that WST and STK modules, except for STK 281, may not be taken simultaneously in a programme; a student must take one and only one of the following options:
  - WST 111, WST 121, WST 212, WST 211, WST 221, WST 311, WST 312, WST 322, WST 321, and STK 353
  - or
  - WST 111, WST 121, WST 212, WST 211, WST 221, WST 311, WST 312, WST 322, STK320, STK353.
  - or
  - STK 110, STC 122, STK 210, STK 220, WST 212, STK 310, STK 320, STK 353.
- registers for a module presented by another faculty must take note of the timetable clashes, prerequisites for that module, subminimum required in examination papers, supplementary examinations, etc.

### 1.2 Fundamental modules

- It is compulsory for all new first-year students to satisfactorily complete the Academic orientation (UPO 102) and to take Academic information management modules (AIM 111 and AIM 121) and Language and study skills (LST 110). Please see curricula for details.
- Students who intend to apply for admission to MBChB or BChD in the second semester, when places become available in those programmes, may be permitted to register for up to 80 module credits and 4 core modules in the first semester during the first year provided that they obtained a final mark of no less than 70% for

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Grade 12 Mathematics and achieved an APS of 34 or more in the NSC.

## Promotion to next study year

A student will be promoted to the following year of study if he or she passed 100 credits of the prescribed credits for a year of study, unless the Dean on the recommendation of the relevant head of department decides otherwise. A student who does not comply with the requirements for promotion to the following year of study, retains the credit for the modules already passed and may be admitted by the Dean, on recommendation of the relevant head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

### **General promotion requirements in the faculty**

All students whose academic progress is not acceptable can be suspended from further studies.

- A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations, will be notified in writing by the Dean or Admissions Committee at the end of the relevant semester.
- A student who has been excluded from further studies may apply in writing to the Admissions Committee of the Faculty of Natural and Agricultural Sciences for re-admission.
- Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the student must comply with in order to proceed with his/her studies.
- Should the student not be re-admitted to further studies by the Admissions Committee, he/she will be informed in writing.
- Students who are not re-admitted by the Admissions Committee have the right to appeal to the Senate Appeals Committee.
- Any decision taken by the Senate Appeals Committee is final.

## Curriculum: Year 1

**Minimum credits: 142**

**Additional information:**

ZEN 161 may be replaced with FNH 121

### Fundamental modules

#### Academic information management 111 (AIM 111)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 4.00   |
| <b>NQF Level</b>              | 05   |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education<br>Faculty of Economic and Management Sciences<br>Faculty of Humanities<br>Faculty of Law<br>Faculty of Health Sciences<br>Faculty of Natural and Agricultural Sciences<br>Faculty of Theology and Religion |
| <b>Prerequisites</b>          | No prerequisites.  |
| <b>Contact time</b>           | 2 lectures per week  |
| <b>Language of tuition</b>    | Module is presented in English   |
| <b>Department</b>             | Information Science  |
| <b>Period of presentation</b> | Semester 1   |

#### Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

#### Academic information management 121 (AIM 121)

|                        |   |
|------------------------|---|
| <b>Module credits</b>  | 4.00  |
| <b>NQF Level</b>       | 05  |
| <b>Service modules</b> | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education<br>Faculty of Economic and Management Sciences<br>Faculty of Humanities<br>Faculty of Law<br>Faculty of Health Sciences<br>Faculty of Natural and Agricultural Sciences<br>Faculty of Theology and Religion<br>Faculty of Veterinary Science |
| <b>Prerequisites</b>   | No prerequisites.   |
| <b>Contact time</b>    | 2 lectures per week   |



**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 2

### Module content

Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

## Language and study skills 110 (LST 110)

**Module credits** 6.00

**NQF Level** 05

**Service modules** Faculty of Natural and Agricultural Sciences  
Faculty of Veterinary Science

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Unit for Academic Literacy

**Period of presentation** Semester 1

### Module content

The module aims to equip students with the ability to cope with the reading and writing demands of scientific disciplines.

## Academic orientation 102 (UPO 102)

**Module credits** 0.00

**NQF Level** 00

**Language of tuition** Module is presented in English

**Department** Natural and Agricultural Sciences Deans Office

**Period of presentation** Year

## Core modules

### Biometry 120 (BME 120)

**Module credits** 16.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Natural and Agricultural Sciences  
Faculty of Veterinary Science

**Prerequisites** At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123

|                               |   |
|-------------------------------|---|
| <b>Contact time</b>           | 1 practical per week, 4 lectures per week |
| <b>Language of tuition</b>    | Module is presented in English            |
| <b>Department</b>             | Statistics                                |
| <b>Period of presentation</b> | Semester 2                                |

#### Module content

Simple statistical analysis: Data collection and analysis: Samples, tabulation, graphical representation, describing location, spread and skewness. Introductory probability and distribution theory. Sampling distributions and the central limit theorem. Statistical inference: Basic principles, estimation and testing in the one- and two-sample cases (parametric and non-parametric). Introduction to experimental design. One- and twoway designs, randomised blocks. Multiple statistical analysis: Bivariate data sets: Curve fitting (linear and non-linear), growth curves. Statistical inference in the simple regression case. Categorical analysis: Testing goodness of fit and contingency tables. Multiple regression and correlation: Fitting and testing of models. Residual analysis. Computer literacy: Use of computer packages in data analysis and report writing.

### Plants and society 161 (BOT 161)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 8.00   |
| <b>NQF Level</b>              | 05   |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education |
| <b>Prerequisites</b>          | MLB 111 GS   |
| <b>Contact time</b>           | 2 lectures per week, fortnightly practicals  |
| <b>Language of tuition</b>    | Module is presented in English   |
| <b>Department</b>             | Department of Plant and Soil Sciences  |
| <b>Period of presentation</b> | Semester 2   |

#### Module content

Botanical principles of structure and function; diversity of plants; introductory plant systematics and evolution; role of plants in agriculture and food security; principles and applications of plant biotechnology; economical and valuable medicinal products derived from plants; basic principles of plant ecology and their application in conservation and biodiversity management.

This content aligns with the United Nation's Sustainable Development Goals of No Poverty, Good Health and Well-being, Climate Action, Responsible Consumption and Production, and Life on Land.

### General chemistry 117 (CMY 117)

|                        |   |
|------------------------|---|
| <b>Module credits</b>  | 16.00   |
| <b>NQF Level</b>       | 05  |
| <b>Service modules</b> | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education<br>Faculty of Health Sciences<br>Faculty of Veterinary Science |

|                               |   |
|-------------------------------|---|
| <b>Prerequisites</b>          | A candidate must have Mathematics for at least 60% and 60% for Physical Sciences. |
| <b>Contact time</b>           | 1 practical per week, 4 lectures per week   |
| <b>Language of tuition</b>    | Module is presented in English  |
| <b>Department</b>             | Chemistry   |
| <b>Period of presentation</b> | Semester 1  |

#### Module content

General introduction to inorganic, analytical and physical chemistry. Atomic structure and periodicity. Molecular structure and chemical bonding using the VSEOR model. Nomenclature of inorganic ions and compounds. Classification of reactions: precipitation, acid-base, redox reactions and gas-forming reactions. Mole concept and stoichiometric calculations concerning chemical formulas and chemical reactions. Principles of reactivity: energy and chemical reactions. Physical behaviour gases, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to chemical kinetics.

### General chemistry 127 (CMY 127)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 16.00   |
| <b>NQF Level</b>              | 05  |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education<br>Faculty of Health Sciences<br>Faculty of Veterinary Science |
| <b>Prerequisites</b>          | Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none   |
| <b>Contact time</b>           | 1 practical per week, 4 lectures per week   |
| <b>Language of tuition</b>    | Module is presented in English  |
| <b>Department</b>             | Chemistry   |
| <b>Period of presentation</b> | Semester 2  |

#### Module content

Theory: General physical-analytical chemistry: Chemical equilibrium, acids and bases, buffers, solubility equilibrium, entropy and free energy, electrochemistry. Organic chemistry: Structure (bonding), nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds and biological compounds, i.e. carbohydrates and aminoacids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

### Introduction to food, nutrition and health 121 (FNH 121)

|                       |  |
|-----------------------|--|
| <b>Module credits</b> | 8.00                                       |
| <b>NQF Level</b>      | 05   |
| <b>Prerequisites</b>  | Natural and Agricultural Sciences students |
| <b>Contact time</b>   | 1 practical per week, 2 lectures per week  |



**Language of tuition** Module is presented in English

**Department** Consumer and Food Sciences

**Period of presentation** Semester 2

### Module content

By 2050 the world will have to feed more than 8 billion people. This module provides the initial science base in Food, Nutrition and Health and introduces some scientific principles and fundamental concepts.

Lectures: Introduction to food choice as affected by social factors, religious influences, ethnicity, health, safety, economics, food sensory properties; Introduction to the food supply chain with special emphasis on the nutritional, environmental, ethical and safety issues that are of importance to consumers; Hunger – food needs, including food and nutrition security, nature of nutritional problems, approaches to combat over- and undernutrition; Introduction to nutrition: Nutrients in foods; nutrient composition of foods; bioavailability of nutrients; diet and chronic diseases; the keys to healthy eating; Introduction to functional chemical components of food; Introduction to food processing and preservation; Introduction to food safety, hazards and risks; Introduction to food quality and consumer preferences; Importance of food legislation to ensure a healthy and safe food supply including nutritional labelling; health and nutrition claims; Food, Nutrition and Health issues in the News.

Practical work: Principles and practice of basic concepts in food, nutrition and health.

All lectures and practical discussion sessions focus on the role of food science and nutrition in addressing the UN Sustainable Development Goals of achieving food security and improving good health and well-being (#1, 2, 3 and 6).

## Introductory genetics 161 (GTS 161)

**Module credits** 8.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** MLB 111 GS

**Contact time** 2 lectures per week, fortnightly tutorials

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 2

### Module content

Chromosomes and cell division. Principles of Mendelian inheritance: locus and alleles, dominance interactions, extensions and modifications of basic principles.. Probability studies. Sex determination and sex linked traits. Pedigree analysis. Genetic linkage and chromosome mapping. Chromosome variation.

## Introduction to microbiology 161 (MBY 161)

**Module credits** 8.00

**NQF Level** 05



|                               |  |
|-------------------------------|--|
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology |
| <b>Prerequisites</b>          | No prerequisites.  |
| <b>Contact time</b>           | 2 lectures per week, fortnightly tutorials                           |
| <b>Language of tuition</b>    | Module is presented in English                                       |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology                              |
| <b>Period of presentation</b> | Semester 2   |

#### Module content

The module will introduce the student to the field of Microbiology. Basic Microbiological aspects that will be covered include introduction into the diversity of the microbial world (bacteria, archaea, eukaryotic microorganisms and viruses), basic principles of cell structure and function, microbial nutrition and microbial growth and growth control. Applications in Microbiology will be illustrated by specific examples i.e. bioremediation, animal-microbial symbiosis, plant-microbial symbiosis and the use of microorganisms in industrial microbiology. Wastewater treatment, microbial diseases and food will be introduced using specific examples.

### Molecular and cell biology 111 (MLB 111)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 16.00   |
| <b>NQF Level</b>              | 05  |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education<br>Faculty of Health Sciences<br>Faculty of Veterinary Science |
| <b>Prerequisites</b>          | A candidate who has passed Mathematics with at least 60% in the Grade 12 examination  |
| <b>Contact time</b>           | 1 practical/tutorial per week, 4 lectures per week  |
| <b>Language of tuition</b>    | Module is presented in English  |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology   |
| <b>Period of presentation</b> | Semester 1  |

#### Module content

Introduction to the molecular structure and function of the cell. Basic chemistry of the cell. Structure and composition of prokaryotic and eukaryotic cells. Ultrastructure and function of cellular organelles, membranes and the cytoskeleton. General principles of energy, enzymes and cell metabolism. Selected processes, e.g. glycolysis, respiration and/or photosynthesis. Introduction to molecular genetics: DNA structure and replication, transcription, translation. Cell growth and cell division.

### Physics for biology students 131 (PHY 131)

|                       |       |
|-----------------------|-------|
| <b>Module credits</b> | 16.00 |
| <b>NQF Level</b>      | 05    |



|                               |  |
|-------------------------------|--|
| <b>Service modules</b>        | Faculty of Education<br>Faculty of Health Sciences<br>Faculty of Veterinary Science    |
| <b>Prerequisites</b>          | A candidate must have passed Mathematics with at least 60% in the Grade 12 examination |
| <b>Contact time</b>           | 1 discussion class per week, 1 practical per week, 4 lectures per week                 |
| <b>Language of tuition</b>    | Module is presented in English   |
| <b>Department</b>             | Physics  |
| <b>Period of presentation</b> | Semester 1   |

#### Module content

Units, vectors, one dimensional kinematics, dynamics, work, equilibrium, sound, liquids, heat, thermodynamic processes, electric potential and capacitance, direct current and alternating current, optics, modern physics, radio activity.

### Mathematics 134 (WTW 134)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 16.00   |
| <b>NQF Level</b>              | 05  |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology<br>Faculty of Education<br>Faculty of Veterinary Science |
| <b>Prerequisites</b>          | 50% for Mathematics in Grade 12   |
| <b>Contact time</b>           | 1 tutorial per week, 4 lectures per week  |
| <b>Language of tuition</b>    | Module is presented in English  |
| <b>Department</b>             | Mathematics and Applied Mathematics   |
| <b>Period of presentation</b> | Semester 1  |

#### Module content

*\*Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 134 does not lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 is offered as WTW 165 in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.*

Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Matrices, solutions of systems of equations. All topics are studied in the context of applications.

### Animal diversity 161 (ZEN 161)

|                       |      |
|-----------------------|------|
| <b>Module credits</b> | 8.00 |
| <b>NQF Level</b>      | 05   |

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**Service modules** Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week, fortnightly practicals

**Language of tuition** Module is presented in English

**Department** Zoology and Entomology

**Period of presentation** Semester 2

**Module content**

Animal classification, phylogeny organisation and terminology. Evolution of the various animal phyla, morphological characteristics and life cycles of parasitic and non-parasitic animals. Structure and function of reproductive, respiratory, excretory, circulatory and digestive systems in various animal phyla. In-class discussion will address the sustainable development goals #3, 12, 13, 14 and 15 (Good Health and Well-being. Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land).

## Curriculum: Year 2

**Minimum credits: 149**

### Additional information:

GTS 251 and GTS 261 may be replaced with LEK 210 and LEK 220

## Core modules

### Introduction to proteins and enzymes 251 (BCM 251)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00                                    |
| <b>NQF Level</b>              | 06                                       |
| <b>Service modules</b>        | Faculty of Health Sciences               |
| <b>Prerequisites</b>          | CMY 117 GS and CMY 127 GS and MLB 111 GS |
| <b>Contact time</b>           | 1 tutorial per week, 2 lectures per week |
| <b>Language of tuition</b>    | Module is presented in English           |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology  |
| <b>Period of presentation</b> | Semester 1                               |

#### Module content

Structural and ionic properties of amino acids. Peptides, the peptide bond, primary, secondary, tertiary and quaternary structure of proteins. Interactions that stabilise protein structure, denaturation and renaturation of proteins. Introduction to methods for the purification of proteins, amino acid composition, and sequence determinations. Enzyme kinetics and enzyme inhibition. Allosteric enzymes, regulation of enzyme activity, active centres and mechanisms of enzyme catalysis. Examples of industrial applications of enzymes and in clinical pathology as biomarkers of diseases. Online activities include introduction to practical laboratory techniques and Good Laboratory Practice; techniques for the quantitative and qualitative analysis of biological molecules; enzyme activity measurements; processing and presentation of scientific data.

### Carbohydrate metabolism 252 (BCM 252)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00  |
| <b>NQF Level</b>              | 06   |
| <b>Service modules</b>        | Faculty of Education<br>Faculty of Health Sciences |
| <b>Prerequisites</b>          | BCM 251 GS and BCM 257 GS.                         |
| <b>Contact time</b>           | 1 tutorial per week, 2 lectures per week           |
| <b>Language of tuition</b>    | Module is presented in English                     |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology            |
| <b>Period of presentation</b> | Semester 2   |



## Module content

Carbohydrate structure and function. Blood glucose measurement in the diagnosis and treatment of diabetes. Bioenergetics and biochemical reaction types. Glycolysis, gluconeogenesis, glycogen metabolism, pentose phosphate pathway, citric acid cycle and electron transport. Total ATP yield from the complete oxidation of glucose. A comparison of cellular respiration and photosynthesis. Online activities include techniques for the study and analysis of metabolic pathways and enzymes; PO ratio of mitochondria, electrophoresis, extraction, solubility and gel permeation techniques; scientific method and design.

## Introductory biochemistry 257 (BCM 257)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00                                    |
| <b>NQF Level</b>              | 06                                       |
| <b>Prerequisites</b>          | CMY 117 GS and CMY 127 GS and MLB 111 GS |
| <b>Contact time</b>           | 1 tutorial per week, 2 lectures per week |
| <b>Language of tuition</b>    | Module is presented in English           |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology  |
| <b>Period of presentation</b> | Semester 1                               |

## Module content

Chemical foundations. Weak interactions in aqueous systems. Ionisation of water, weak acids and weak bases. Buffering against pH changes in biological systems. Water as a reactant and function of water. Carbohydrate structure and function. Biochemistry of lipids and membrane structure. Nucleotides and nucleic acids. Other functions of nucleotides: energy carriers, components of enzyme cofactors and chemical messengers. Introduction to metabolism. Bioenergetics and biochemical reaction types. Online activities include introduction to laboratory safety and Good Laboratory Practice; basic biochemical calculations; experimental method design and scientific controls, processing and presentation of scientific data.

## Lipid and nitrogen metabolism 261 (BCM 261)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00                                    |
| <b>NQF Level</b>              | 06                                       |
| <b>Service modules</b>        | Faculty of Health Sciences               |
| <b>Prerequisites</b>          | BCM 251 GS and BCM 257 GS.               |
| <b>Contact time</b>           | 1 tutorial per week, 2 lectures per week |
| <b>Language of tuition</b>    | Module is presented in English           |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology  |
| <b>Period of presentation</b> | Semester 2                               |



## Module content

Biochemistry of lipids, membrane structure, anabolism and catabolism of lipids. Total ATP yield from the complete catabolism of lipids. Electron transport chain and energy production through oxidative phosphorylation. Nitrogen metabolism, amino acid biosynthesis and catabolism. Biosynthesis of neurotransmitters, pigments, hormones and nucleotides from amino acids. Catabolism of purines and pyrimidines. Therapeutic agents directed against nucleotide metabolism. Examples of inborn errors of metabolism of nitrogen containing compounds. The urea cycle, nitrogen excretion. Online activities include training in scientific reading skills; evaluation of a scientific report; techniques for separation analysis and visualisation of biological molecules; hypothesis design and testing, method design and scientific controls.

## Introduction to food science and technology 250 (FST 250)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00  |
| <b>NQF Level</b>              | 06   |
| <b>Prerequisites</b>          | CMY 117 and CMY 127 and PHY 131 and WTW 134 or WTW 165 or permission from the HOD. |
| <b>Contact time</b>           | 1 practical per week, 2 lectures per week  |
| <b>Language of tuition</b>    | Module is presented in English   |
| <b>Department</b>             | Consumer and Food Sciences   |
| <b>Period of presentation</b> | Semester 1   |

## Module content

Lectures: Food Science as a discipline. Activities of Food Scientists and Nutritionists. How food is produced, processed and distributed (food pipeline). World food problem. Human nutrition and human food requirements. Constituents of foods: Functional properties. Food quality. Food deterioration and control (food preservation). Unit operations in food processing. Food safety, risks and hazards. Principles of food packaging. Food legislation and labelling. Food processing and the environment. The aforementioned lectures focus on the role of Food Science in addressing the UN Sustainable Development Goals (#1, 2, 3, 6 and 7). Practicals: Group assignments applying the theory in practice; practical demonstrations in pilot plants; guest lecturers on the world of food scientists and nutritionists; factory visit/videos of food processing.

## Principles of food processing and preservation 260 (FST 260)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 12.00   |
| <b>NQF Level</b>              | 06  |
| <b>Prerequisites</b>          | CMY 117, CMY 127, MBY 161, PHY 131 and WTW 134 or WTW 165 or permission from the HOD. |
| <b>Contact time</b>           | 1 practical per week, 2 lectures per week   |
| <b>Language of tuition</b>    | Module is presented in English  |
| <b>Department</b>             | Consumer and Food Sciences  |
| <b>Period of presentation</b> | Semester 1 and Semester 2   |

### Module content

Lectures: Food preservation technologies: concept of hurdle technology; heat (blanching, pasteurisation and sterilisation); cold (refrigeration and freezing); concentration and dehydration; food irradiation; fermentation; preservatives; new methods of food preservation. Effect of various food preservation technologies on the microbiological (shelf-life and safety issues), sensory and nutritional quality of foods. Practicals: Practical applications of above processes. Physical, chemical and sensory evaluation of processed foods. Assignment: Application of hurdle technology concept to a specific food product.

## Molecular genetics 251 (GTS 251)

**Module credits** 12.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education

**Prerequisites** GTS 161 GS

**Contact time** 2 lectures per week, fortnightly tutorials

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 1

### Module content

The chemical nature of DNA. The processes of DNA replication, transcription, RNA processing, translation. Control of gene expression in prokaryotes and eukaryotes. Recombinant DNA technology and its applications in gene analysis and manipulation.

## Genetic diversity and evolution 261 (GTS 261)

**Module credits** 12.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education

**Prerequisites** GTS 251 GS

**Contact time** 2 lectures per week, fortnightly tutorials

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 2

### Module content

Chromosome structure and transposable elements. Mutation and DNA repair. Genomics and proteomics. Organelle genomes. Introduction to genetic analysis of populations: allele and genotypic frequencies, Hardy Weinberg Law, its extensions and implications for different mating systems. Introduction to quantitative and evolutionary genetics.



## Introduction to agricultural economics 210 (LEK 210)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 14.00  |
| <b>NQF Level</b>              | 06   |
| <b>Service modules</b>        | Faculty of Economic and Management Sciences        |
| <b>Prerequisites</b>          | No prerequisites.                                  |
| <b>Contact time</b>           | 1 practical/tutorial per week, 3 lectures per week |
| <b>Language of tuition</b>    | Module is presented in English                     |
| <b>Department</b>             | Agricultural Economics Extension and Rural Develo  |
| <b>Period of presentation</b> | Semester 1   |

### Module content

Introduction to the world of agricultural economics: where to find practising agricultural economics services, overview of South African Agricultural Economy, scope of agricultural economics. Introduction to consumption and demand: utility theory, indifference curves, the budget constraint, consumer equilibrium, the law of demand, consumer surplus, tastes and preferences, and measurement and interpretation of elasticities. Introduction to production and supply: condition for perfect competition, classification of inputs, important production relationships, assessing short-run business costs, economics of short-run decisions. Isoquants, iso-cost line, least cost combination of inputs, long-run expansion of inputs, and economics of business expansion, production possibility frontier, iso-revenue line and profit maximising combination of products. Introduction to market equilibrium and product prices: market equilibrium in a perfectly competitive market, total economic surplus, changes in welfare, adjustments to market equilibrium, market structure characteristics, market equilibrium in an imperfectly competitive market, government regulatory measures. Introduction to financial management in agriculture: Farm management and agricultural finance, farm management information; analysis and interpretation of farm financial statements; risk and farm planning. Budgets: partial, break-even, enterprise, total, cash flow and capital budgets. Elements of business plan, marketing planning and price risk. Financial structuring and sources of finance for farm business. Time value of money.

## Agricultural economics 220 (LEK 220)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 12.00   |
| <b>NQF Level</b>              | 06  |
| <b>Service modules</b>        | Faculty of Economic and Management Sciences       |
| <b>Prerequisites</b>          | No prerequisites.                                 |
| <b>Contact time</b>           | 3 lectures per week                               |
| <b>Language of tuition</b>    | Module is presented in English                    |
| <b>Department</b>             | Agricultural Economics Extension and Rural Develo |
| <b>Period of presentation</b> | Semester 2  |

## Module content

The agribusiness system; the agricultural value chain, the unique characteristics of agricultural products; marketing functions and costs; historical evolution of agricultural marketing in South Africa. The marketing environment. Consumer behaviour and consumer trends. Introduction to supply and demand analysis. Developing a marketing plan and strategies for agricultural commodities; market analysis; product management; distribution channels for agricultural commodities, the agricultural supply chain. Introduction to the agricultural futures market. Marketing in the 21st century. Online marketing, social media. Market structure.

## Bacteriology 251 (MBY 251)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00  |
| <b>NQF Level</b>              | 06   |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology |
| <b>Prerequisites</b>          | MBY 161 GS   |
| <b>Contact time</b>           | 2 lectures per week, fortnightly practicals                          |
| <b>Language of tuition</b>    | Module is presented in English                                       |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology                              |
| <b>Period of presentation</b> | Semester 1   |

## Module content

Growth, replication and survival of bacteria, Energy sources, harvesting from light versus oxidation, regulation of catabolic pathways, chemotaxis. Nitrogen metabolism, iron-scavenging. Alternative electron acceptors: denitrification, sulphate reduction, methanogenesis. Bacterial evolution, systematic and genomics. Biodiversity; bacteria occurring in the natural environment (soil, water and air), associated with humans, animals, plants, and those of importance in foods and in the water industry.

## Mycology 261 (MBY 261)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 12.00  |
| <b>NQF Level</b>              | 06   |
| <b>Service modules</b>        | Faculty of Engineering, Built Environment and Information Technology |
| <b>Prerequisites</b>          | MBY 161 GS   |
| <b>Contact time</b>           | 2 lectures per week, Fortnightly practicals/tutorials                |
| <b>Language of tuition</b>    | Module is presented in English                                       |
| <b>Department</b>             | Biochemistry, Genetics and Microbiology                              |
| <b>Period of presentation</b> | Semester 2   |



## Module content

Organisation and molecular architecture of fungal thalli, chemistry of the fungal cell. Chemical and physiological requirements for growth and nutrient acquisition. Mating and meiosis; spore development; spore dormancy, dispersal and germination. Fungi as saprobes in soil, air, plant, aquatic and marine ecosystems; role of fungi as decomposers and in the deterioration of materials; fungi as predators and parasites; mycoses, mycetisms and mycotoxicoses; fungi as symbionts of plants, insects and animals. Applications of fungi in biotechnology.

### Food microbiology 262 (MBY 262)

**Module credits** 12.00

**NQF Level** 06

**Prerequisites** MBY 251 GS.

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 2

## Module content

Primary sources of microorganisms in food. Factors affecting the growth and survival of microorganisms in food. Microbial quality, spoilage and safety of food. Different organisms involved, their isolation, screening and detection. Conventional approaches, alternative methods rapid methods. Food fermentations: fermentation types, principles and organisms involved.

### Nutrition (Capita Selecta from HNT 210) 310 (VDG 310)

**Module credits** 17.00

**NQF Level** 07

**Prerequisites** No prerequisites.

**Contact time** 1 practical per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Consumer and Food Sciences

**Period of presentation** Semester 1

## Module content

The study of nutrients and water regarding their chemical composition, characteristics, basic digestion, absorption, metabolism, functions, food sources and symptoms of deficiency and toxicity. Energy metabolism. Dietary recommendations and guidelines, dietary guides and meal planning. The use and application of food composition tables in dietary analysis.



## Curriculum: Final year

Minimum credits: 144

### Core modules

#### Integrated food science 350 (FST 350)

|                        |   |
|------------------------|---|
| Module credits         | 18.00   |
| NQF Level              | 07  |
| Prerequisites          | Second-year status, FST 250 and FST 260 or permission from the HOD. |
| Contact time           | 2 lectures per week   |
| Language of tuition    | Module is presented in English                                      |
| Department             | Consumer and Food Sciences  |
| Period of presentation | Semester 2  |

##### Module content

Literature studies and seminar presentations on topics in food science, nutrition and health. The proposed seminar topics cover aspects of food science, nutrition and health that are of relevance in addressing the UN Sustainable Development Goals (#1, 2, 3, 6 and 7).

#### Food chemistry 351 (FST 351)

|                        |   |
|------------------------|---|
| Module credits         | 18.00   |
| NQF Level              | 07  |
| Prerequisites          | BCM 251 and BCM 252 and BCM 261 and BCM 257 or permission of the HOD. |
| Contact time           | 1 practical per week, 2 lectures per week                             |
| Language of tuition    | Module is presented in English  |
| Department             | Consumer and Food Sciences  |
| Period of presentation | Semester 1  |

##### Module content

Lectures - Chemistry of major food components: Carbohydrates. Proteins. Lipids. Water. Chemical and nutritional aspects of food processing: implications of different processing techniques on the major food components. Functional properties of the major food components. Modification of functional properties of the major food components. Food analysis methodology. Practical work: Food analysis.

#### Food chemistry (2) 352 (FST 352)

|                |   |
|----------------|---|
| Module credits | 18.00   |
| NQF Level      | 07  |
| Prerequisites  | BCM 251 and BCM 252 and BCM 261 and BCM 257 or permission from the HOD. |
| Contact time   | 1 practical per week, 2 lectures per week                               |

**Language of tuition** Module is presented in English

**Department** Consumer and Food Sciences

**Period of presentation** Semester 1

#### Module content

Lectures - Basic food analysis and chemistry of the minor food components: Basic food analysis, vitamins, minerals, additives, contaminants. Chemical and nutritional aspects of food processing: implications of different processing techniques on minor food components. Functional properties of the minor food components. Food analysis methodology. Practical work: Food analysis.

### Food engineering 353 (FST 353)

**Module credits** 18.00

**NQF Level** 07

**Prerequisites** FST 260 or permission from the HOD.

**Contact time** 1 practical per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Consumer and Food Sciences

**Period of presentation** Semester 1

#### Module content

Lectures: Mass and energy balance. Heat transfer theory: Convection, conduction and radiation. Energy for food processing. Fluid flow and rheology. Unit operations: materials handling, cleaning, sorting, grading, peeling, disintegration, separation (e.g. membrane technology), pumping, mixing and forming, heating, concentration, drying, extrusion, refrigeration, freezing. Tutorials/practicals: Calculations on mass and energy balances, psychrometry, refrigeration and freezing. The principles of food engineering, particularly mass and energy balance are applied to provide relevance in addressing the UN Sustainable Development Goals (#3 and 7).

### Principles of the science and technology of plant food 360 (FST 360)

**Module credits** 18.00

**NQF Level** 07

**Prerequisites** FST 250, FST 260, FST 351 and FST 352 or permission from the HOD.

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Consumer and Food Sciences

**Period of presentation** Semester 2

## Module content

Cereal and legume grains, oilseeds and fruits and vegetables: Composition and structure. Quality assessment and grading. Post-harvest storage and physiology. Cleaning and sorting principles and technologies. Milling – principles and technologies, and their effects on product functionality and nutrient composition. Juice and oil extraction – principles and technologies, and their effects on product functionality and nutrient composition. Bread and baked goods making – principles and technologies, and their effects on product functionality and nutrient composition. Practical work: Laboratory analyses of components and products of cereals, oilseeds, legumes and fruits and vegetables; Determination of quality; Factory visits.

## Animal food science 361 (FST 361)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 18.00   |
| <b>NQF Level</b>              | 07  |
| <b>Prerequisites</b>          | FST 250, FST 260, FST 351 and FST 352 or permission from the HOD. |
| <b>Contact time</b>           | 1 practical per week, 2 lectures per week                         |
| <b>Language of tuition</b>    | Module is presented in English                                    |
| <b>Department</b>             | Consumer and Food Sciences  |
| <b>Period of presentation</b> | Semester 2  |

## Module content

Dairy science: Composition of milk; some physical properties of milk; factors affecting composition of milk; microbiological aspects of milk production; lactation; mechanical milking; milk defects; nutritive value of milk and milk products. Practical work: Chemical and microbiological tests of milk. Demonstration of the cheese-making process. Meat, poultry, fish and egg science: The composition, nutritional value and quality of meat, poultry, fish and eggs; factors affecting quality from slaughter or harvesting to consumption. Practical work: Visits to red meat and poultry abattoirs; quality determinations, egg quality and protein functionality.

## Advanced animal and plant foods microbiology 362 (FST 362)

|                               |  |
|-------------------------------|--|
| <b>Module credits</b>         | 18.00  |
| <b>NQF Level</b>              | 07   |
| <b>Prerequisites</b>          | FST 260, MBY 251, MBY 261, MBY 262                 |
| <b>Contact time</b>           | 180 minute practical per week, 2 lectures per week |
| <b>Language of tuition</b>    | Module is presented in English                     |
| <b>Department</b>             | Consumer and Food Sciences                         |
| <b>Period of presentation</b> | Semester 1   |

## Module content

With an integrated focus on animal and plant food commodities, this module considers food properties and processing operations that impact on the growth, survival and biochemical activity of microorganisms as they relate to spoilage, safety and fermentation. Temperature effects on microbial growth and survival including thermal destruction and cell and spore injury. Microbial stress response (adaptation) during processing. Selection for stress resistant and more virulent pathogenic variants and virulence mechanisms (toxin structure/function) of food-borne pathogens during food processing. Theory and practice of new advances in microbial detection and identification methods. Tools for the production of safe foods including food safety objectives (FSOs) and risk analysis. Practicals will include advanced microbial detection and identification methods applied to animal and plant foods as well as the food supply chain.

## Food composition and applied nutritional programmes 364 (VWV 364)

**Module credits** 18.00

**NQF Level** 07

**Prerequisites** FST 351 and FST 352 or permission from the HOD.

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Consumer and Food Sciences

**Period of presentation** Semester 2

## Module content

Generation, interpretation and application of food composition data in nutrition programmes. Chemical composition of foods: sampling for food analysis, assessing methods of food analysis for inclusion in food composition data. Interpretation of food composition data. Nutritional labeling of food. Use of nutritional data in food formulations. Dietary supplementation, enrichment and fortification of foods.

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