



 **DUT**  
**DURBAN**  
UNIVERSITY OF  
TECHNOLOGY

 **FACULTY OF**  
**APPLIED**  
**SCIENCES**

# **2019 HANDBOOK**

## **BIOTECHNOLOGY & FOOD TECHNOLOGY**

# HANDBOOK FOR 2019

## FACULTY OF APPLIED SCIENCES

### DEPARTMENT of BIOTECHNOLOGY and FOOD TECHNOLOGY

The above Department offers programmes in

### BIOTECHNOLOGY and FOOD SCIENCE & TECHNOLOGY

This handbook offers information on programmes offered

#### **IMPORTANT NOTICES**

Your registration is in accordance with all current rules of the Institution. If, for whatever reason, you do not register consecutively for every year/semester of your programme, your existing registration contract with the Institution will cease. Your re-registration anytime thereafter will be at the discretion of the institution and, if permitted, will be in accordance with the rules applicable at that time.

The rules in this departmental handbook must be read in conjunction with the General Rules (G Rules) contained in the DUT General Handbook for students as well as the relevant study guides.

With respect to an appeal, your attention is specifically drawn to Rules GI(8) and (9), and to the process of dealing with students issues.

## STRATEGIC DIRECTION (2015-2019)

### FACULTY OF APPLIED SCIENCES

Educate. Engage. Innovate.

#### VISION

Leading innovation through science and technology

#### MISSION STATEMENT

- Educate students
- Generate new scientific knowledge
- Engage communities

#### VALUES

1. **Accountability:** We take ownership of all activities, resources and tasks required of us. We deliver on our promises and responsibilities.
2. **Integrity:** We adhere to moral standards and principles. We are transparent and consistent in all our actions and lead by example.
3. **Dedication:** We are committed to achieving our goals and expectations.
4. **Professionalism:** We operate within clear boundaries with respect to our code of conduct.
5. **People Oriented:** We are committed to sustaining the morale and the holistic development of staff and student's. We value diversity in all forms.

## DEPARTMENT OF BIOTECHNOLOGY AND FOOD TECHNOLOGY

#### VISION

LiVe Science

#### MISSION STATEMENT

Transforming everyday lives through academic excellence, research and innovation in Biotechnology and Food Science.

#### VALUES

**Integrity :** Our behaviour is guided by sound moral and ethical principles.  
**Accountability :** We take full responsibility for what we do, and what we don't do.  
**Respect :** We treat all people with dignity.  
**Excellence :** we are constantly seeking ways to improve service delivery.

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## I. DEPARTMENT & FACULTY CONTACT DETAILS

### **All Department and Biotechnology Programme queries to:**

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Email: phillipp@dut.ac.za  
Location: Steve Biko Campus, S9, Level 1

### **All Department and Food Technology Programme queries to:**

Administrative Assistant: Ms S Ranglal  
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### **All Faculty queries to:**

Faculty Officer: Ms G Shackleford  
General Enquiries No: 031 373 2506  
Facsimile No: 031 373 2175  
Email: dutfas@dut.ac.za  
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Faculty Assistant: Ms J Nagan  
General Enquiries No: 031 373 2717  
Facsimile No: 031 373 2175  
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Executive Dean: Professor S Singh  
Executive Dean's Secretary: Ms N Naidoo  
Telephone No: 031 373 2720  
Facsimile No: 031 373 2724  
Email: dutfas@dut.ac.za  
Location: Between Block S6 and S7, Level 4,  
Steve Biko Campus



## 2. DEPARTMENT STAFF

<b>Head of Department / Associate Professor</b>	Prof. FM Swalaha D.Tech. (DUT)
<b>Professor</b>	Prof. K Permaul, Ph.D. (UKZN)
<b>Associate Professors</b>	Prof. T Kudanga, Ph.D. (TUGRAZ) Prof. EO Amonsou, Ph.D. (UP) Prof. OA Ijabadeniyi, Ph.D. (UP)
<b>Senior Lecturers</b>	Dr V Mohanlall, D.Tech. (DUT) Dr JJ Mellem, D.Tech. (DUT) Dr SK Pillai, D.Tech. (DUT) Ms S Juglal, M.Tech. (MLST)
<b>Lecturers</b>	Ms S Beekrum, M.Tech. (DUT)
<b>Secretary</b> Administrative Assistant	Ms P Phillips, NHD (DUT) Ms S Ranglal, ND (DUT)
<b>Senior Technicians</b>	Ms R Brijlal, B.Tech. (DUT) Ms S Govender, M.Tech. (DUT) Mr GM Makolomakwa MAppSc (DUT)
<b>Technicians</b>	Mr V Dilraj, NHD (DUT) Ms S Govender, M.Tech. (DUT) Ms P Naicker, B.Tech. (DUT) Ms K Mellem, M.Tech. (DUT) Ms SKS Mbamali, B.Tech. (DUT) Ms RL Mohanlall, B.Tech. (DUT)
<b>Technical Assistant</b>	Mr ZE Ncayiyana, B.Tech. (DUT), Post Graduate Diploma (UKZN)
<b>Laboratory Assistant</b>	Mr AA Mudzanani B.Tech. (TUT)

### 3. QUALIFICATIONS OFFERED BY THE DEPARTMENT

Programmes are offered in this Department which will, upon successful completion, lead to the award of the following BIOTECHNOLOGY AND FOOD TECHNOLOGY qualifications:

- Bachelor of Applied Science (BAppSc)
- National Diploma (ND)
- National Diploma (ND) (ECP)
- Bachelor of Technology (BTech)
- Master of Applied Science (MAppSc)
- Doctor of Philosophy (PhD)

Qualification	Qualification Code	Important dates	SAQA NLRDID
<b>A. BIOTECHNOLOGY</b>			
Bachelor of Applied Science in Biotechnology	BSBTC1	1 <sup>st</sup> offering January 2018	97809
National Diploma: Biotechnology	NDBIO2		72213
ND: Biotechnology (ECP)	NDBTF1	1 <sup>st</sup> offered Jan 2013	72213
Bachelor of Technology: Biotechnology	BTBIO1		72115
Master of Applied Science in Biotechnology	MSBTC1	1 <sup>st</sup> offered 2015	72168
Doctor of Philosophy in Biotechnology	DPBTC1	1 <sup>st</sup> offered 2015	72090
<b>B. FOOD TECHNOLOGY</b>			
Bachelor of Applied Science in Food Science and Technology	BSFST1	1 <sup>st</sup> offering January 2018	Pending
National Diploma: Food Technology	NDFDT2		72236
ND: Food Technology (ECP)	NDFTF1	1 <sup>st</sup> offered Jan 2013	72236
Bachelor of Technology: Food Technology	BTFDT1		72137
Master of Applied Science in Food Science and Technology	MSFST1	1 <sup>st</sup> offered 2015	72184
Doctor of Food Science and Technology	DFSCT1	1 <sup>st</sup> offered 2015	72102

## A. BIOTECHNOLOGY

### 4. BACHELOR OF APPLIED SCIENCE IN BIOTECHNOLOGY (BSBTC1)

#### Purpose of Qualification

The degree prepares applicants with focused knowledge, practical skills, attitudes and values necessary for the technological application of biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use in the biotechnology workplace whilst contributing to environmental sustainability. Graduates may seek employment in industrial and research laboratories such as Drug and pharmaceutical research, public funded laboratories, chemicals, environmental control, water and waste management, energy, food processing and bioprocessing industries.

#### 4.1 Programme Structure – 3 years

Code	Module	Assessment	Semester of Study	SAQA Credits	Prerequisite Module	Co-requisite Module
CSRY101	Chemistry 1	EX	1a	16		
BIOL101	Biology 1	EX	1a	16		
MMTS101	Mathematics	CA	1a	12		
CSTN101	Cornerstone 101	CA	1a	12		
BCTY201	Bacteriology 2	EX	1b	16	Biology 1	
BCHS201	Biochemistry 2	EX	1b	16	Chemistry 1	
PHYS104	Physics	EX	1b	12		
MYCL101	Mycology	EX	1b	12	Biology 1	
	Institutional General Education Elective 1 (IGE 1)	CA	1b	8		
FMIC101	Food Microbiology 1	EX	2a	16	Bacteriology 2	
MCRB301	Microbial Biochemistry 3	EX	2a	16	Biochemistry 2	
VRIM201	Virology and Immunology 2	EX	2a	16	Bacteriology 2	
FSCT201	Fermentation Science and Technology 2	EX	2a	16	Bacteriology 2	
	Institutional General Education Elective 2 (IGE 2)	CA	2a	8		
ANBC301	Analytical Biochemistry 3	EX	2b	16	Biochemistry 2	
MCLB301	Molecular Biology 3	EX	2b	16	Virology and Immunology 2, Bacteriology 2	
BCTY301	Bacteriology 3	EX	2b	16	Bacteriology 2	

	Faculty General Education Elective (FGE 1)	CA	2b	12		
INDB301	Industrial Biotechnology	EX	3a	16	Bacteriology 3	
RDNT301	Recombinant DNA Technology 3	EX	3a	16	Bacteriology 3, Molecular Biology 3	
PLTB301	Plant Biotechnology 3	EX	3a	8	Molecular Biology 3, Bacteriology 3	
MDLB301	Medical Biotechnology	EX	3a	8	Molecular Biology 3, Bacteriology 3	
RESP101	Research Project 1	CA	3a	8	All 1st and 2nd year modules excluding general education modules.	
	Institutional General Education Elective (IGE 3)	CA	3a	8		
RESP201	Research Project 2	CA	3b	16	Research Project 1	
FDBT101	Food Biotechnology	EX	3b	8	Food Microbiology and Bacteriology 3	
BRMD101	Bioremediation	EX	3b	16	Industrial Biotechnology Bacteriology 3	
INDM101	Industry Management	EX	3b	8		
	Faculty General Education Elective 2 (FGE 2)	CA	3b	12		

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment; TBC = To be confirmed upon approval by HEQC.

Numbers 1 to 3 indicates the year of study, “a”= Semester 1, “b”=Semester 2 (e.g. 2b=Second year, Semester 2)

A Pre-Req (prerequisite) means this module must be passed prior to registration for the subsequent module.

## 4.2 Programme Information

### 4.2.1 Academic Integrity

Refer to the DUT General Rules pertaining to academic integrity G13(1)(o) –

covering falsification of academic records, plagiarism and cheating. These will be enforced wherever necessary to safeguard the worthiness of our qualifications, and the integrity of the Faculty of Applied Sciences at DUT.

#### **4.2.2 Code of Conduct for Students**

A Professional code of conduct pertaining to behaviour, appearance, personal hygiene and dress shall apply to all students registered with the Faculty of Applied Sciences, at all times. Refer to Programme Rule [4.3.8](#) below.

#### **4.2.3 Attendance**

Students are expected to achieve 100% attendance for all planned academic activities as these are designed to provide optimal support for the required competency. Students are expected to be punctual for all academic activities. Penalties may be invoked for late attendance. Refer to Programme Rule [4.3.9](#) below.

#### **4.2.4 Assessment and Moderation**

Students are expected to work steadily through the period of registration in order to achieve the highest results possible.

Assessment details are listed under each module at the back of this handbook.

Assessments could include a variety of testing methods including, but not limited to, written tests, oral tests, theoretical and/or practical examinations, group work and assignments.

Assignments must be handed personally to the lecturer who will record their receipt. Late submission will be penalised.

In the case of a continuous assessment module (a module that has no final examination/s or supplementary examination/s), opportunities for reassessment are provided for students who fail assessments. These are stipulated in the relevant study guide.

Moderation follows the DUT Assessment Policy stipulations.

Refer to Programme Rule [4.3.9](#) below.

##### **4.2.4.1 Continuous Assessment**

Certain module/modules in this department are assessed through Continuous Assessment. As such, they do not have a final examination, and there are no supplementary examinations. The results for these modules are determined through a weighted combination of assessments. Applicants are encouraged to work steadily through the period of registration in order to achieve the highest results possible. Assessment details are listed under each module at the back of this handbook. Assessments could include a variety of testing methods including, but not limited to, written tests, oral tests, practical examinations, group work and assignments. Moderation follows the DUT requirements.

##### **4.2.4.2 Eligibility for Exams**

In accordance with Rule G12 (1), to gain entrance to an examination in a particular module, a sub-minimum of a 40% course mark is required. In modules where there is a practical component, a sub-minimum of 40% applies to the practical component. Attendance at practicals are compulsory. A applicant who, for any reason, is absent from a particular practical or theory test, must provide proof of his/her absence to the particular lecturer concerned, within a period of five working days after the practical or theory test. On his/her return to class the applicant shall be prepared to attend a make-up test/practical as determined by the lecturer. Refusal to accept this will result in a zero mark for the missed practical or test. In the case of module with continuous assessment, i.e. 100% coursework and no final examination, any applicant failing to obtain a final result of at least 50% will have to repeat that module.

The final examination for each of the examinable module consists of a three-hour written examination. The examination mark contributes 60% of the year mark. The remaining 40% comprises the course mark, which is obtained by assessment of the work done by the applicant during the course [refer to G12 (9)]. Refer to Rules G13(2) and G13(3) for supplementary and special examinations, respectively.

#### 4.2.5 Employment Opportunities?

Biotechnologists or microbiologists work in the following industries or research labs: food and beverage, agriculture, medical and veterinary, forensic, pharmaceutical and water and waste management. Opportunities exist for graduates to pursue further educational qualifications.

### 4.3 Programme Rules

#### 4.3.1 Minimum Admission Requirements

In addition to Rule G7, the following minimum entrance requirements and the selection criteria outlined in 4.3.2 (below) apply for applicants with:

##### 4.3.1.1. Academic Achievement (Programme Rule)

4.3.1.1.1 A National Senior Certificate (NSC) with endorsement for a degree :

4.3.1.1.2 A Senior Certificate (SC) with the following module :

4.3.1.1.3 A National Certificate Vocational (NCV) Level 4 with statutory requirements for a degree:

Compulsory Subjects	NSC	SC		NCV
	Rating	HG	SG	
English	4	D	B	50%
Mathematics	4	D	B	50%
Physical Science	4	D	B	60%
Life Sciences (or Biology)	4	D	B	60%

##### 4.3.1.1.4 Scoring System

Applicants must have a minimum of 28 points in either the National Senior Certificate (NSC) or 30 points the Senior Certificate (SC). Use the tables below to calculate points. No points are allocated for ten (10) credit modules.

National Senior Certificate (NSC)	Senior Certificate (SC)		
	Symbol	HG	SG
7 = 80-100%	A	8	6
6 = 70-79%	B	7	5
5 = 60-69%	C	6	4
4 = 50-59%	D	5	3
3 = 40-49%	E	4	2

#### Learning assumed to be in place

It is assumed that the applicant wishing to enter the Bachelor of Applied Science degree in Biotechnology is competent in literacy, numeracy, life sciences and communication skills gained at the further education and training band.

**Admission requirements based on Work Experience, Age and Maturity and Recognition of Prior Learning** - The DUT General Rules G7(3), and G7(8) respectively, will apply.

**Admission of transferring applicants** - In addition to the relevant DUT Rules a transferring applicant will only be accepted if there are places available and the applicant has met the applicable entrance requirements of the University.

**Admission of International applicants** - The DUT's Admissions Policy for International Students

and General Rules G4 and G7(5) will apply.

#### **4.3.2 Selection Criteria**

In addition to the Minimum Admission Requirements (Rule 4.3.1) above, the following selection process will determine placement in the programme:

All applicants must apply through the Central Applications Office (CAO).

Initial shortlisting for selection is based on the applicant's academic performance in Grade 12 (Grade 11 or Grade 12 trial marks will be used for current matriculants).

Applicants who meet the above criteria may be:

- a) invited to undergo placement testing
- b) ranked based on performance

Provisional acceptance is given to selected applicants awaiting National Senior Certificate\* (NSC) results. If the final Grade 12 NSC\* results do not meet the minimum entrance requirements, this provisional acceptance will be withdrawn.

Final selection for placement will be based on results of the above ranking process, as well as available places (refer to DUT Rule G5) \*(or SC / NC(V)) (Approved by Senate Rules Comm wef [2017/09](#))

#### **4.3.3 Pass Requirements**

In addition to the DUT Rules G12, G14 and G15, the following programme rule applies:

4.3.3.1 Notwithstanding DUT Rule G12(1) a sub-minimum of 40% is required for the practical component of all modules in which the semester mark is made up of theory and practical components. These are indicated in Table [4.1](#) Programme Structure. (Approved by Senate Rules Comm wef [2017/09](#))

#### **4.3.4 Re-registration Rules**

**Promotion to a Higher Level/Progression Rules (Previously Reregistration Rules)**

**(Programme Rule)**

In accordance with Rule G16, the pre-requisite module must be passed before an applicant will be admitted to the next level of study. The pre-requisites are shown below: Students may proceed from one semester to the next according to the following rules of progression

4.3.4.1 **Semester 1 to semester 2:** Student must have passed a minimum of two modules (excluding Cornerstone).

4.3.4.2 **Semester 2 to semester 3:** Student must have passed a minimum of two modules [excluding Institutional General Elective (IGE)].

4.3.4.3 **Semester 3 to semester 4:** Student must have passed a minimum of two modules [excluding Institutional General Elective (IGE)].

4.3.4.4 **Semester 4 to semester 5:** Student must have passed a minimum of two modules [excluding Faculty General Elective (FGE)].

4.3.4.5 **Semester 5 to semester 6:** Student must have passed a minimum of two modules [excluding Institutional General Elective (IGE)].



#### **4.3.5 Exclusion Rules (*Programme Rule*)**

In addition to DUT Rule G17, a student in study period I who fails three or more modules with an average of less than 40% in each module is not permitted to reregister in this programme. Deregistration from any module is subject to the provision of DUT Rule G6.

#### **4.3.6 Interruption of Studies (*Programme Rule*)**

Should a student interrupt their studies by more than three (3) years, the applicant will need to apply to the department for permission to re-register and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

#### **4.3.7 Code of Conduct**

In addition to the Student Code of Conduct in the DUT General Handbook for Students, and the relevant requirements as stated in the appropriate Study Guides, the following rules apply:

##### **4.3.7.1 Conduct of Students in Practical Facilities**

Strict adherence to instructions issued by technical, supervisory or academic staff is required due to the need to ensure effective and safe practice in these facilities. Misconduct or disregard for instructions will be referred to the relevant disciplinary procedure.

##### **4.3.7.2 Uniforms**

Students must adhere to instructions issued by technical, supervisory or academic staff regarding the specific dress code required during practicals. Non-compliance will result in the student being denied access to the venue. (Approved by Senate Rules Comm wef 2014/10)

#### **4.3.8 Attendance and Assessment**

4.3.8.1 A student who, for any valid reason (Refer to Programme Rule 4.3.9.2 below), is absent from a particular practical or test, must provide written proof of the reason for the absence to the lecturer concerned, within five (5) working days of returning to the institution in order to be considered for a special assessment.

4.3.8.2 The DUT Rule G13(3)(a) which refers to special examinations also refers to special assessments set within departments for students who have missed coursework assessments. In these cases the department will determine the validity of the student's reason for not taking the assessment, and the nature of the special assessment. (Approved by Senate Rules Comm wef 2014/10)

#### **4.3.9 Health and Safety**

Students must adhere to all Health and Safety regulations both while at DUT and in WIL placements. Failure to do so will be treated as a breach of discipline. Refer to the appropriate Health and Safety policies.

(Approved by Senate Rules Comm wef 2014/10)

### **5. NATIONAL DIPLOMA: BIOTECHNOLOGY (NDBIO2)**

**NOTE: THIS PROGRAMME IS BEING PHASED OUT AND NO NEW REGISTRATIONS ARE POSSIBLE.**

#### **Purpose of Qualification**

Persons achieving this qualification will be competent to apply theoretical and practical fundamental knowledge and skills in the fields of biotechnology, microbiology and biochemistry to the relevant biotechnology industries and research institutions. Graduates may apply for registration with the South African Council for Natural Scientific Professions

as Certificated Natural Scientists.

## 5.1 PROGRAMME STRUCTURE (3 YEAR)

Code	Modules	Level of Study	Assessment Method	NATED Credits	Pre-requisite
MICR101*	Microbiology I	1a	EX	0.150	
CHMB102*	Chemistry I	1a	EX	0.150	
BIOD101	Biodiversity & Ecology I	1a	EX	0.120	
QMTH101*	Quantitative Methods I	1a	EX	0.080	
MICR202*	Microbiology II	1b	EX	0.130	Microbiology I
BCHM202	Biochemistry II	1b	EX	0.130	Chemistry I
ACBL201*	Analytical Chemistry: Biological II	1b	EX	0.130	Chemistry I
SASH101	Sanitation, Safety & Hygiene I	1b	EX	0.110	
MICR301#	Microbiology: Biological III	2a	EX	0.125	Microbiology II
DIMR201	Disease and Immune Response II	2a	EX	0.125	Microbiology I
MIBC301#	Microbial Biochemistry III	2a	EX	0.125	Biochemistry II
FERT202	Fermentation Technology II	2a	EX	0.125	Microbiology II
FMIC302*#	Food Microbiology III	2b	EX	0.140	Microbiology II
ABIC301#	Analytical Biochemistry III	2b	EX	0.125	Biochemistry II
PRTM101	Process Technology & Management I	2b	EX	0.110	
BIOP301#	Bioprocessing III	2b	EX	0.125	Fermentation Technology II
BIPR101	Biotechnology Industry Practice I	3	CA	0.5	ALL 16 MODULE
BIPR201	Biotechnology Industry Practice II	3	CA	0.5	

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment  
Numbers 1 to 3 indicates the year of study, "a"= Semester 1, "b"=Semester 2 (eg 2b=Second year, Semester 2)

A Pre-requisite means this module must be passed prior to registration for the subsequent module.

\*These modules are common to both the ND: Biotechnology and the ND: Food Technology.

#These modules are final level module.

The module content for each module is found under section 16 of this handbook. This content must be read in conjunction with the relevant Study Guide.

## 5.2 PROGRAMME INFORMATION

### 5.2.1 Academic Integrity

Refer to the DUT General Rules pertaining to academic integrity G13(1)(o) - covering falsification of academic records, plagiarism and cheating. These will be enforced wherever necessary to safeguard the worthiness of our qualifications, and the integrity of the Faculty of Applied Sciences at DUT.

### 5.2.2 Code of Conduct for Students

A Professional code of conduct pertaining to behaviour, appearance, personal hygiene and dress shall apply to all students registered with the Faculty of Applied Sciences, at all times. Refer to Programme Rule 5.3.8 below.

### 5.2.3 Attendance

Students are expected to achieve 100% attendance for all planned academic activities as these are designed to provide optimal support for the required competency. Students are

expected to be punctual for all academic activities. Penalties may be invoked for late attendance. Refer to Programme Rule 5.3.9 below.

## 5.2.4 Work Integrated Learning (WIL)

This programme requires the student to undergo a twelve month period of work-integrated learning (WIL) during the third year of the diploma. All modules must be passed in order to qualify for WIL placement in a suitable industry. Students must adhere to the requirements stated in the Department's WIL Study Guide. Refer to Programme Rule 5.3.7 below.

## 5.2.5 Assessment and Moderation

Students are expected to work steadily through the period of registration in order to achieve the highest results possible.

Assessment details are listed under each module at the back of this handbook.

Assessments could include a variety of testing methods including, but not limited to, written tests, oral tests, theoretical and/or practical examinations, group work and assignments.

Assignments must be handed personally to the lecturer who will record their receipt. Late submission will be penalised.

In the case of a continuous assessment module (a module that has no final examination/s or supplementary examination/s) opportunities for reassessment are provided for students who fail assessments. These are stipulated in the relevant study guide.

Moderation follows the DUT Assessment Policy stipulations.

Refer to Programme Rule 5.3.9 below.

## 5.2.6 Employment Opportunities

Biotechnologists or microbiologists work in the following industries or research labs: food and beverage, agriculture, medical and veterinary, forensic, pharmaceutical and water and waste management. Opportunities exist for graduates to pursue further educational qualifications.

## 5.3 PROGRAMME RULES

### 5.3.1 Minimum Admission Requirements

In addition to DUT Rule G7, the following minimum entrance requirements and selection criteria outlined in 5.3.2 apply for applicants with reference to:

#### 5.3.1.1 Academic Achievement

In line with the above, applicants' school leaving academic achievement must comply with one of the following:

- i) a National Senior Certificate (NSC) with endorsement for diploma/degree entry with the following subjects at the stated minimum ratings:

Compulsory Module	NSC Rating
English	4
Mathematics	4
Physical Science	4
Life Sciences (or Biology)	4

- ii) a Senior Certificate matriculation exemption with the following module at the stated minimum ratings:

Compulsory Module	HG	SG
English	D	B
Mathematics	D	B
Physical Science	D	B
Life Sciences (or Biology)	D	B

- iii) a National Certificate (Vocational) Level 4 with statutory requirements for a diploma entrance and the following module at the stated minimum ratings:

Compulsory Module	Minimum
English	50%
Mathematics	50%



Physical Science	60%
Life Sciences (or Biology)	60%

**5.3.1.2 Admission Requirements based on Work Experience, Age and Maturity; and Recognition of Prior Learning**

The DUT Rules G7(3), and G7(8) respectively, will apply. *(Approved by Senate Rules Comm wef 2014/10)*

**5.3.1.3 Admission of International Students**

The DUT's Admissions Policy for International Students and DUT Rules G4 and G7(5) will apply.

International students must meet the equivalent programme minimum entrance requirements as stated above.

*(Approved by Senate Rules Comm wef 2014/10)*

**5.3.1.4 Admission of Students from other Institutions**

In addition to the relevant DUT Rules a transferring student will only be accepted if there are places available and the student has met the applicable entrance requirements of the university.

*(Approved by Senate Rules Comm wef 2014/10)*

**5.3.2 Selection Criteria**

In addition to the Minimum Admission Requirements (Rule 5.3.1), the following selection process will determine placement in the programme:

All applicants must apply through the Central Applications Office (CAO).

Initial shortlisting for selection is based on the applicant's academic performance in Grade 12 (Grade 11 or Grade 12 trial marks will be used for current matriculants).

Applicants who meet the above criteria may be:

- a) invited to undergo placement testing
- b) ranked based on performance

Provisional acceptance is given to selected applicants awaiting National Senior Certificate\* (NSC) results. If the final Grade 12 NSC\* results do not meet the minimum entrance requirements, this provisional acceptance will be withdrawn.

Final selection for placement will be based on results of the above ranking process, as well as available places (refer to DUT Rule G5) \*(or SC / NC(V)) *(Approved by Senate Rules Comm wef 2014/10)*

**5.3.3 Pass Requirements**

In addition to the DUT Rules G12, G14 and G15, the following programme rule applies:

- 5.3.3.1 Notwithstanding DUT Rule G12(1) a sub-minimum of 40% is required for the practical component of all modules in which the semester mark is made up of theory and practical components. These are indicated in Table 5.1 Programme Structure. *(Approved by Senate Rules Comm wef 2014/10)*

**5.3.4 Re-registration Rules**

In addition to the DUT Rule G16, and all prerequisite module as identified in the Programme Structure (5.1), the following programme rules apply:-

**5.3.4.1 Promotion from Semester 1 to Semester 2:**

Students must pass a minimum of two modules, one of which must be Chemistry I or Microbiology I

**5.3.4.2 Promotion from Semester 2 to Semester 3:**

Students must pass two second semester modules.

**5.3.4.3 Promotion from Semester 3 to Semester 4:**

Students must pass two third semester modules.

**5.3.4.4 Promotion from Semester 4 to Semester 5:**

Students must pass all of the preceding 16 modules.

*(Approved by Senate Rules Comm wef 2014/10)*

### 5.3.5 Exclusion Rules

In addition to DUT Rule G17, a first semester student who fails three or more modules with a final result of less than 40% in each module is not permitted to reregister in this programme. Deregistration from any module is subject to the provision of DUT Rule G6. *(Approved by Senate Rules Comm wef 2014/10)*

### 5.3.6 Interruption of Studies

In accordance with DUT Rule G21A(b), the minimum duration for this programme will be 3 years of registered study and the maximum duration will be 5 years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration. *(Approved by Senate Rules Comm wef 2014/10)*

### 5.3.7 Work Integrated Learning Rules

The DUT Rule G28 applies. *(Approved by Senate Rules Comm wef 2014/10)*

### 5.3.8 Code of Conduct

In addition to the Student Code of Conduct in the DUT General Handbook for Students, and the relevant requirements as stated in the appropriate Study Guides, the following rules apply:

#### 5.3.8.1 Conduct of Students in Practical Facilities

Strict adherence to instructions issued by technical, supervisory or academic staff is required due to the need to ensure effective and safe practice in these facilities. Misconduct or disregard for instructions will be referred to the relevant disciplinary procedure.

#### 5.3.8.2 Uniforms

Students must adhere to instructions issued by technical, supervisory or academic staff regarding the specific dress code required during practicals. Non-compliance will result in the student being denied access to the venue.

*(Approved by Senate Rules Comm wef 2014/10)*

### 5.3.9 Attendance and Assessment

5.3.9.1 A student who, for any valid reason (Refer to Programme Rule 5.3.9.2 below), is absent from a particular practical or test, must provide written proof of the reason for the absence to the lecturer concerned, within five (5) working days of returning to the institution in order to be considered for a special assessment.

5.3.9.2 The DUT Rule G13(3)(a) which refers to special examinations also refers to special assessments set within departments for students who have missed coursework assessments. In these cases the department will determine the validity of the student's reason for not taking the assessment, and the nature of the special assessment.

*(Approved by Senate Rules Comm wef 2014/10)*

### 5.3.10 Health and Safety

Students must adhere to all Health and Safety regulations both while at DUT and in WIL placements. Failure to do so will be treated as a breach of discipline. Refer to the appropriate Health and Safety policies.

*(Approved by Senate Rules Comm wef 2014/10)*

## 6. NATIONAL DIPLOMA: BIOTECHNOLOGY

**NOTE: THIS PROGRAMME IS BEING PHASED OUT AND NO NEW REGISTRATIONS ARE POSSIBLE.**

### (EXTENDED CURRICULUM) (NDBTFI)

#### Purpose of Qualification

Persons achieving this qualification will be competent to apply theoretical and practical fundamental knowledge and skills in the fields of biotechnology, microbiology and biochemistry to the relevant biotechnology industries and research institutions. Graduates may apply for registration with the South African Council for Natural Scientific Professions as Certificated Natural Scientists.

This qualification is offered through a three year programme (refer to item 4 above), or through an augmented curriculum - offered over a minimum of four years of study - which is devised to enhance student development and to improve the student's chances of successful completion.

## 6.1 PROGRAMME STRUCTURE (4 YEAR)

Code	Modules	Year/Sem of Study	Assessment Method	NATED Credits	Pre-requisite
IIBTC101**	Introduction to Biotechnology I	a	CA	TBA	
QMYH101	Quantitative Methods I	1a	EX	0.080	
CHMB102	Chemistry I	1a	EX	0.150	
ACBL201	Analytical Chemistry: Biological II	1b	EX	0.130	Chemistry I
SASH101	Sanitation, Safety & Hygiene I	1b	EX	0.110	
CSBT101**	Computer Skills I	1b	CA	TBA	
MICR 101	Microbiology I	2a	EX	0.150	
BIOD101	Biodiversity & Ecology I	2a	EX	0.120	
SCMT101**	The Scientific Method I	2a	CA	TBA	
MICR202	Microbiology II	2b	EX	0.130	Microbiology I
BCHM202	Biochemistry II	2b	EX	0.130	Chemistry I
BIST101**	Biostatistics I	2b	CA	TBA	
MICR301#	Microbiology: Biological III	3a	EX	0.125	Microbiology II
DIMR201	Disease and Immune Response II	3a	EX	0.125	Microbiology I
MIBC301#	Microbial Biochemistry III	3a	EX	0.125	Biochemistry II
FERT202	Fermentation Technology II	3a	EX	0.125	Microbiology II
FMIC302#	Food Microbiology III	3b	EX	0.140	Microbiology II
ABIC301#	Analytical Biochemistry III	3b	EX	0.125	Biochemistry II
PRTM101	Process Technology & Management I	3b	EX	0.110	
BIOP301#	Bioprocessing III	3b	EX	0.125	Fermentation Technology II
BIPR101	Biotechnology Industry Practice I	4	CA	0.5	All 20 modules
BIPR201	Biotechnology Industry Practice II	4	CA	0.5	

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment

Numbers 1 to 4 indicates the year of study, "a"= Semester 1, "b"=Semester 2 (eg 2b=Second year, Semester 2)  
A prerequisite means this module must be passed prior to registration for the subsequent module.

\*\*These modules are specific to either/both the ND(ECP): Biotechnology and the ND(ECP): Food Technology.

# These modules are final level modules.

The module content for each module is found under section 16 of this handbook. This content must be read in conjunction with the relevant study guide.

### 6.2 PROGRAMME INFORMATION

Refer to 6.2 Programme Information under the ND: Biotechnology.

### 6.3 PROGRAMME RULES

Refer to 6.3 Programme Rules under the ND: Biotechnology and the following rules that apply specifically to ND: Biotechnology (ECP).

#### 6.3.1 Minimum Admission Requirements

Refer to Rule 6.3.1 which is applicable to both the ND and ND(ECP).

#### 6.3.2 Selection Criteria

Refer to Rule 6.3.2 which is applicable to both the ND and ND(ECP).

In addition to the above, on the basis of the selection process, successful applicants for study towards the National Diploma will be accepted into either the three (3) year, or four (4) year (Extended Curriculum) programme of study.

#### 6.3.3 Pass Requirements

Refer to Rule 6.3.3 which is applicable to both the ND and ND(ECP).

#### 6.3.4 Re-registration Rules

In addition to the DUT Rule G16, and all prerequisite modules as identified in the Programme Structure (6.1), the following programme rules apply:-

- 6.3.4.1 **Promotion from Year 1 Semester 1 (ECP) to Year 1 Semester 2 (ECP):**  
An ECP student is required to pass Chemistry 1 and one other module in order to be permitted to register for the next semester.
- 6.3.4.2 **Promotion from Year 1 Semester 2 (ECP) to Year 2 Semester 1 (ECP):**  
An ECP student is required to pass two modules in order to be permitted to register for the next semester.
- 6.3.4.3 **Promotion from Year 2 Semester 1 (ECP) to Year 2 Semester 2 (ECP):**  
An ECP student is required to pass two modules in order to be permitted to register for the next semester.
- 6.3.4.4 **Promotion from Year 2 Semester 2 (ECP) to Year 3 Semester 1 (ECP):**  
An ECP student is required to pass two modules in order to be permitted to register for the next semester.
- 6.3.4.5 **Promotion from Year 3 Semester 1 (ECP) to Year 3 Semester 2 (ECP):**  
An ECP student is required to pass two modules in order to be permitted to register for the next semester.
- 6.3.4.6 **Promotion to Year 3 Semester 2 to Year 4 Semester 1:**  
Students must pass all of the preceding 20 modules.  
*(Approved by Senate Rules Comm wef 2014/10)*
- 6.3.5 **Exclusion Rules**  
Refer to Rule 6.3.5 which is applicable to both the ND and ND(ECP).
- 6.3.6 **Interruption of Studies**  
In accordance with Rule G21A(b), the minimum duration for this programme will be 4 years of registered study and the maximum duration will be 5 years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration. *(Approved by Senate Rules Comm wef 2014/10)*
- 6.3.7 **Work Integrated Learning Rules**  
Refer to Rule 6.3.7 which is applicable to both the ND and ND(ECP).
- 6.3.8 **Code of Conduct**  
Refer to Rule 6.3.8 which is applicable to both the ND and ND(ECP).
- 6.3.9 **Attendance and Assessment**  
Refer to Rule 6.3.9 which is applicable to both the ND and ND(ECP).
- 6.3.10 **Health and Safety**  
Refer to Rule 6.3.10 which is applicable to both the ND and ND(ECP).

## 7. BACHELOR OF TECHNOLOGY: BIOTECHNOLOGY (BTBIO1)

### Purpose of Qualification

Students achieving this qualification will be competent to adopt a critical and innovative approach to contribute to the field of biotechnology. They will be able to pursue careers as senior technical managers and/or entrepreneurs in biotechnology industries.

### 7.1 PROGRAMME STRUCTURE

Code	Modules	Assessment Method	NATED Credits
RMNS201	Research Methodology: Natural Sciences	CA	0.100
ENSB101	Entrepreneurial Skills I	EX	0.100
INBT401	Industrial Biotechnology IV	EX	0.125
ENBT401	Environmental Biotechnology IV	EX	0.125
PLBT401	Plant Biotechnology IV	EX	0.125
DNAT401	Recombinant DNA Technology IV	EX	0.125
RESP411	Research Project IV	CA	0.300
RESP421	Research Project IV (Part-Time / D3 only)	CA	0.300

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment

**NOTE : Research Methodology and Research Project must be done concurrently.**

The module content for each module is found under section 17 of this handbook. This content must be read in conjunction with the relevant study guide.

### 7.2 PROGRAMME INFORMATION

B Tech students can register full-time and complete all modules in one year, or part-time and complete their studies over two years. The appropriate sequence of registration for the part-time module is available from the Department.

### 7.3 PROGRAMME RULES

#### 7.3.1 Minimum Admission Requirements

In addition to Rule G7, applicants must be in possession of a ND: Biotechnology or equivalent with a minimum 60% in the final level module (refer to 5.1 Programme Structure) and minimum 60% overall aggregate. Part-time students must have adequate laboratory facilities at their places of employment to conduct their Research Project.

#### 7.3.2 Pass Requirements

In addition to the DUT Rules (G12, G14 and G15), the following programme rules apply:

- 1) The final examination for each of the examinable module in the B Tech: Biotechnology consists of one three-hour written examination. The examination mark contributes 60% of the final mark. The remaining 40% is constituted by a course mark which is obtained by assessment of the work done by the student during the year. Theory tests, practical tests, assignments, projects and tutorials may be used to calculate the course mark.
- 2) The examinations for first semester modules will be held in the May/June examination period; the examinations for the remaining module will be held in the October/November examination period.
- 3) For modules assessed by means of continuous assessment, the pass mark is 50%. These comprise:
  - Research Project IV - assessed by the submission of a research proposal and presentation (20%), submission of a mini-dissertation (60%) and a final project presentation (20%).  
**Part time students must complete this module over two years.**
  - Research Methodology - assessed by means of class tests and assignments



- 4) A student who is absent from a test or scheduled assessment must provide acceptable proof of the reason for absence to the lecturer concerned, upon returning to lectures.

### **7.3.3 Re-registration Rules**

The DUT Rule G16 applies.

### **7.3.4 Exclusion Rules**

The DUT Rules G17 and G23A(a)(4) apply.

### **7.3.5 Interruption of Studies**

In accordance with Rule G23A(a), the minimum duration for this programme will be 1 year of registered study and the maximum duration will be 2 years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

## **8. MASTER OF APPLIED SCIENCE IN BIOTECHNOLOGY (MSBTC I)**

### **8.1 PROGRAMME INFORMATION**

Students achieving this qualification will be able to conduct scientific research under minimal guidance in a chosen field, and to contribute to knowledge production in that field. The research problem, its justification, process and outcome are reported in a dissertation that complies with the generally accepted norms for research at this level.

### **8.2 PROGRAMME RULES**

#### **8.2.1 Minimum Admission Requirements**

In addition to Rule G7 and G24, an applicant must have a BT: Biotechnology (or equivalent).

#### **8.2.2 Duration of Programme**

In accordance with G24(2)(a), the minimum duration of the MAppSci is one year and the maximum is three years.

#### **8.2.3 Instructional Programme**

This qualification is offered by means of a full research project (Refer to Rule G24).

#### **8.2.4 Proposal**

Students are required to submit and present a research proposal to the Department within 3 months of registration.

#### **8.2.5 Progress Reports**

Students must present a progress report to the Department at least once annually.

#### **8.2.6 Publications**

Students are required to have ONE publication submitted to a DHET approved journal prior to completion of the degree.

## **9. DOCTOR OF PHILOSOPHY IN BIOTECHNOLOGY (DPBTC I)**

### **9.1 PROGRAMME INFORMATION**

Persons achieving this qualification will be competent scientific researchers who can work independently in developing and applying knowledge and skills to make an original contribution to the global knowledge or technology in the particular field chosen for study.

### **9.2 PROGRAMME RULES**

#### **9.2.1 Minimum Admission Requirements**

In addition to Rule G7 and G24, an applicant must have a MAppSci (Biotechnology) (or equivalent).

#### **9.2.2 Duration of Programme:**

In accordance with G25(2)(a), the minimum duration of the Ph.D is two years and the maximum is four years.

### **9.2.3 Instructional Programme**

This qualification is offered by means of a full research project (Refer to Rule G25).

### **9.2.4 Proposal**

Students are required to submit and present a research proposal to the Department within 3 months of registration.

### **9.2.5 Progress Reports**

Students must present a progress reports to the Department at least once annually.

### **9.2.6 Publications**

Students are required to have ONE publication accepted and ONE publication submitted to a DHET approved journal prior to completion of the degree.

## B. FOOD TECHNOLOGY BSFST I

### 10. Bachelor of Applied Science in Food Science and Technology

#### Purpose of Qualification

The purpose of the programme is to focus on generation of knowledge and expertise in the emerging areas of science and technology by developing state-of-the-art knowledge and skills to produce quality manpower needed within the field of food science for societal and industrial benefit. The Food Science and Technology program is driven by the development of theoretical knowledge base as well as the business needs of the biotechnology sector. It involves a flexible model where the course content would continuously evolve with the rapid changes occurring within the field of Food Science without compromising on the basic tools in the area.

#### 10.1 Programme Structure

Code	Modules	Assessment	Semester of Study	SAQA Credits	Prerequisite Module	Co-requisite Module
CSRY101	Chemistry 1	EX	1a	16		
BIOL101	Biology 1	EX	1a	16		
MMTS101	Mathematics	CA	1a	12		
CSTN101	Cornerstone 101	CA	1a	12		
	Institutional General Education Elective 1 (IGE 1)	CA	1a	8		
BCTY201	Bacteriology 2	EX	1b	16	Biology 1	
BCHS201	Biochemistry 2	EX	1b	16	Chemistry 1	
PHYS104	Physics	EX	1b	12		
MYCL201	Mycology 2	EX	1b	12	Biology 1	
FSTC101	Food Science and Technology 1	EX	2a	12		
FDCH201	Food Chemistry 2	EX	2a	12	Biochemistry 2	
FMCB301	Food Microbiology 3	EX	2a	16	Bacteriology 2	
FQMN101	Food Quality Management	EX	2a	8		
HNTR101	Human Nutrition	EX	2a	8		
FSTC201	Food Science and Technology 2	EX	2b	16	Food Science and Technology 1	
MOLB301	Molecular Biology 3	EX	2b	16	Bacteriology 2	
FDLG102	Food Legislation	EX	2b	8		
FPEN101	Food Process Engineering	EX	2b	8	Physics	
	Faculty General Education Elective (FGE 1)	CA	2b	12		
TBC	Institutional General Education Elective 2 (IGE 2)	CA	2b	8		
FSTC301	Food Science and Technology 3	EX	3a	16	Food Science and Technology 2	
RESP101	Research Project 1	CA	3a	8	All 1 <sup>st</sup> and 2 <sup>nd</sup> year modules excl. General Education modules	
FDCH301	Food Chemistry 3	EX	3a	16	Food Chemistry 2	
FDPD101	Food Product Development	EX	3a	12	Food Science and Technology 2	Research Project 1
FBPK101	Food and Beverage	EX	3a	12		

	Packaging					
	Institutional General Education Elective 3 (IGE 3)	CA	3a	8		
	Research Project 2	CA	3b	16	Research Project 1	
INDM101	Industry Management	EX	3b	8		
FSTX101	Food Safety and Toxicology	EX	3b	12	Food Microbiology; Food Chemistry 3	
FDBT101	Food Biotechnology	EX	3b	12	Molecular Biology 3, Food Microbiology 3	
TBC	Faculty General Education Elective (FGE 2)	CA	3b	12		

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment; TBC = To be confirmed upon approval by HEQC.

Numbers 1 to 3 indicates the year of study, “a”= Semester 1, “b”=Semester 2 (eg 2b=Second year, Semester 2)

A Pre-Req (prerequisite) means this module must be passed prior to registration for the subsequent module.

The module content for each module is found under section 14.1 and 14.3 of this handbook. This content must be read in conjunction with the relevant study guide.

## 10.2 PROGRAMME INFORMATION

### 10.2.1 Academic Integrity

Refer to the DUT General Rules pertaining to academic integrity G13 (I)(o) covering falsification of academic records, plagiarism and cheating. These will be enforced wherever necessary to safeguard the worthiness of our qualifications, and the integrity of the Faculty of Applied Sciences at DUT.

### 10.2.2 Code of Conduct for Students

A Professional code of conduct pertaining to behaviour, appearance, personal hygiene and dress shall apply to all students registered with the Faculty of Applied Sciences, at all times. Refer to Programme Rule 10.3.8 below.

### 10.2.3 Attendance

Students are expected to achieve 100% attendance for all planned academic activities as these are designed to provide optimal support for the required competency. Students are expected to be punctual for all academic activities. Penalties may be invoked for late attendance. Refer to Programme Rule 10.3.9 below.

### 10.2.4 Assessment and Moderation

Certain modules in this department are assessed through continuous assessment. As such they do not have a final examination, and there are no supplementary examinations. The results for these modules are determined through a weighted combination of assessments. Students are encouraged to work steadily through the period of registration in order to achieve the highest results possible. Assessment details are listed under each module at the back of this handbook. Assessments could include a variety of testing methods including, but not limited to, written tests, oral tests, practical examinations, group work and assignments. Moderation follows the DUT requirements.

#### Eligibility for Exams

In accordance with Rule G12 (I), to gain entrance to an examination in a particular

module, a sub-minimum of a 40% course mark is required. In modules where there is a practical component, a sub-minimum of 40% applies to the practical component. Attendance at practicals is compulsory. A student who, for any reason, is absent from a particular practical or theory test, must provide proof of his/her absence to the particular lecturer concerned, within a period of five working days after the practical or theory test. On his/her return to class the student shall be prepared to attend a make-up test/practical as determined by the lecturer. Refusal to accept this will result in a zero mark for the missed practical or test.

In the case of modules with continuous assessment, i.e. 100% coursework and no final examination, any student failing to obtain a final result of at least 50% will have to repeat that module. The final examination for each of the examinable modules consists of a three-hour written examination. The examination mark contributes 60% of the year mark. The remaining 40% comprises the course mark, which is obtained by assessment of the work done by the student during the course [refer to G12 (9)]. Refer to Rules G13(2) and G13(3) for supplementary and special examinations, respectively.

### 10.2.5 Employment Opportunities

Food Technologists work predominantly in a laboratory or industrial environment and may be employed as quality inspectors, laboratory analysts, researchers, product development technologists, packaging technologists, auditors of food factories and suppliers. Food technologists may eventually specialize in one of the following areas: quality assurance or control; product re-search and development, production management and quality management.

Promotion opportunities to supervisory or management positions are good, provided students are prepared to work hard, possess leadership ability and are willing to study further. Some food technologists travel extensively to inspect factories and food suppliers. Overtime and night shift work are sometimes required by those involved in production and quality control. The Degree allows students to subsequently pursue a pursue further educational qualifications.

## 10.3 PROGRAMME RULES

### 10.3.1 Minimum Admission Requirements

In addition to Rule G7, the following minimum entrance requirements and the selection criteria outlined in 10.3.2 apply for applicants with:

- 10.3.1.1. Academic Achievement (Programme Rule)
  - 10.3.1.1.1. A National Senior Certificate (NSC) with endorsement for a degree:
  - 10.3.1.1.2. A Senior Certificate (SC) with the following module:
  - 10.3.1.1.3. A National Certificate Vocational (NCV) Level 4 with statutory requirements for a degree:

Compulsory Subjects	NSC	SC		NCV
	Rating	HG	SG	
English	4	D	B	50%
Mathematics	4	D	B	50%
Physical Science	4	D	B	60%
Life Sciences (or Biology)	4	D	B	60%

- 10.3.1.1. Scoring System:

Applicants must have a minimum of 28 points in either the National Senior Certificate (NSC) or 30 points the Senior Certificate (SC). Use the tables

below to calculate points. No points are allocated for ten (10) credit module.

National Senior Certificate (NSC)	Senior Certificate (SC)		
	Symbol	HG	SG
7 = 80-100%	A	8	6
6 = 70-79%	B	7	5
5 = 60-69%	C	6	4
4 = 50-59%	D	5	3
3 = 40-49%	E	4	2

### Learning assumed to be in place

It is assumed that the applicant wishing to enter the Bachelor of Applied Science degree in Food Science and Technology is competent in literacy, numeracy, life sciences and communication skills gained at the further education and training band.

Admission requirements based on Work Experience, Age and Maturity; and Recognition of Prior Learning - The DUT General Rules G7(3), and G7(8) respectively, will apply.

Admission of transferring students - In addition to the relevant DUT Rules a transferring student will only be accepted if there are places available and the student has met the applicable entrance requirements of the university.

Admission of International students - The DUT's Admissions Policy for International Students and General Rules G4 and G7(5) will apply.

### 10.3.2 Selection Criteria

In addition to the Minimum Admission Requirements (Rule 10.3.1), the following selection process will determine placement in the programme:

- All applicants must apply through the Central Applications Office (CAO).
- Initial shortlisting for selection is based on the applicant's academic performance in Grade 12 (Grade 11 or Grade 12 trial marks will be used for current matriculants).
- Applicants who meet the above criteria may be
  - a) invited to undergo placement testing
  - b) ranked based on performance
- Provisional acceptance is given to selected applicants awaiting National Senior Certificate\* (NSC) results. If the final Grade 12 NSC\* results do not meet the minimum entrance requirements, this provisional acceptance will be with Dr.awn.
- Final selection for placement will be based on results of the above ranking process, as well as available places (refer to DUT Rule G5) \*(or SC / NC(V)) (Approved by Senate Rules Comm wef 2017/09)

### 10.3.3 Pass Requirements

In addition to the DUT Rules G12, G14 and G15, the following programme rule applies:

11.3.3.1 Notwithstanding DUT Rule G12(1) a sub-minimum of 40% is required for the practical component of all modules in which the semester mark is made up of theory and practical components. These are indicated in Table 10.1 Programme Structure. (Approved by Senate Rules Comm wef [2017/09](#))

### 10.3.4 Re-registration Rules

In accordance with Rule G16, the pre-requisite modules must be passed before a student will be admitted to the next level of study. The pre-requisites are shown below:

Students may proceed from one semester to the next according to the following rules of progression:

- 10.3.4.1. Semester 1 to semester 2 : Student must have passed a minimum of two modules [excluding Cornerstone and Institutional General Elective (IGE)].
- 10.3.4.2. Semester 2 to semester 3 : Student must have passed a minimum of two modules.
- 10.3.4.3. Semester 3 to semester 4 : Student must have passed a minimum of two modules.
- 10.3.4.4. Semester 4 to semester 5 : Student must have passed a minimum of two modules [excluding Institutional General Elective (IGE) and Faculty General Elective (FGE)].
- 10.3.4.5. Semester 5 to semester 6 : Student must have passed a minimum of two modules [excluding Institutional General Elective (IGE)].

### 10.3.5 Exclusion Rules

In addition to DUT Rule G17, a student in study period I who fails three or more modules with an average of less than 40% in each module is not permitted to reregister in this programme. Deregistration from any modules is subject to the provision of DUT Rule G6.

#### 10.3.6 Interruption of Studies

Should a student interrupt their studies by more than three (3) years, the student will need to apply to the department for permission to re-register and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

#### 10.3.7 Code of Conduct

In addition to the Student Code of Conduct in the DUT General Handbook for Students, and the relevant requirements as stated in the appropriate Study Guides, the following rules apply:

##### 10.3.7.1 Conduct of Students in Practical Facilities

Strict adherence to instructions issued by technical, supervisory or academic staff is required due to the need to ensure effective and safe practice in these facilities. Misconduct or disregard for instructions will be referred to the relevant disciplinary procedure. (Approved by Senate Rules Comm wef [2014/10](#))

##### 10.3.7.2 Uniforms

Students must adhere to instructions issued by technical, supervisory or academic staff regarding the specific Dress code required during practicals. Non-compliance will result in the student being denied access to the venue. (Approved by Senate Rules Comm wef [2014/10](#))

### 10.3.8 Attendance and Assessment

- 10.3.8.1 A student who, for any valid reason (Refer to Programme Rule 10.2.3 above), is absent from a particular practical or test, must provide written proof of the reason for the absence to the lecturer concerned, within five (5) working days of returning to the institution in order to be considered for a special assessment. ***(Approved by Senate Rules Comm wef 2014/10)***
- 10.3.8.2 **The DUT Rule G13(3)(a) which refers to special examinations also** refers to special assessments set within departments for students who have missed coursework assessments. In these cases the department will determine the validity of the student's reason for not taking the assessment, and the nature of the special assessment. ***(Approved by Senate Rules Comm wef 2014/10)***
- 10.3.9 Health and Safety**  
Students must adhere to all Health and Safety regulations both while at DUT and in WIL placements. Failure to do so will be treated as a breach of discipline. Refer to the appropriate Health and Safety policies. ***(Approved by Senate Rules Comm wef 2014/10)***

## **11. NATIONAL DIPLOMA: FOOD TECHNOLOGY (NDFDT2)**

**NOTE: THIS PROGRAMME IS BEING PHASED OUT AND NO NEW REGISTRATIONS ARE POSSIBLE**

### **Purpose of Qualification**

Graduates of this qualification will be able to perform and organise operations in laboratories and factories of food processing organisations in compliance with statutory requirements for ethics, safety and quality assurance. Supervisory, management and research skills are developed. The diploma programme aims to develop the ability to critically evaluate and interpret experimental data. The student must be able to work independently in prioritizing, planning and executing work programmes. The student should be able to supervise the development, production and quality control of food manufacturing processes.



## 11.1 PROGRAMME STRUCTURE (3 YEAR)

Code	Modules	Level of Study	Assessment Method	NATED Credits	Pre-requisite
MICR101*	Microbiology I	1a	Ex	0.148	
CHMB102*	Chemistry I	1a	Ex	0.148	
PHYS 103	Physics I	1a	Ex	0.125	
QMTH101*	Quantitative Methods I	1a	Ex	0.125	
MICR202*	Microbiology II	1b	Ex	0.125	Microbiology I
FCHM202	Food Chemistry II	1b	Ex	0.125	Chemistry I
ACBL201*	Analytical Chemistry: Biological II	1b	Ex	0.125	Chemistry I
FDTE102	Food Technology I	1b	Ex	0.150	
FDTE201	Food Technology II	2a	Ex	0.160	Food Tech I
FDIM101	Food Industry Management I	2a	Ex	0.080	
FDPE101	Food Process Engineering I	2a	Ex	0.150	
FCHM302#	Food Chemistry III	2a	Ex	0.140	Food Chemistry II
FMIC302*#	Food Microbiology III	2b	Ex	0.140	Microbiology II
FDTE301#	Food Technology III	2b	Ex	0.160	Food Technology II
FDQA101	Food Quality Assurance I	2b	Ex	0.100	
FDPE201	Food Process Engineering II	2b	Ex	0.125	Food Process Engineering I
FIPR101	Food Industry Practice I	3	CA	0.5	All 16 modules
FIPR201	Food Industry Practice II	3	CA	0.5	

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment

Numbers 1 to 3 indicates the year of study, "a"= Semester 1, "b"=Semester 2 (eg 2b=Second year, Semester 2)

A Pre-Req (prerequisite) means this module must be passed prior to registration for the subsequent module.

\*These modules are common to both the ND: Biotechnology and the ND: Food Technology.

#These module are final level module.

The module content for each module is found under section 16 of this handbook. This content must be read in conjunction with the relevant Study Guide.

## 11.2 PROGRAMME INFORMATION

### 11.2.1 Academic Integrity

Refer to the DUT General Rules pertaining to academic integrity G13 (1)(o) covering falsification of academic records, plagiarism and cheating. These will be enforced wherever necessary to safeguard the worthiness of our qualifications, and the integrity of the Faculty of Applied Sciences at DUT.

### 11.2.2 Code of Conduct for Students

A professional code of conduct pertaining to behaviour, appearance, personal hygiene and dress shall apply to all students registered with the Faculty of Applied Sciences, at all times. Refer to Programme Rule 11.9.3.8 below.

### **11.2.3 Attendance**

Students are expected to achieve 100% attendance for all planned academic activities as these are designed to provide optimal support for the required competency. Students are expected to be punctual for all academic activities. Penalties may be invoked for late attendance. Refer to Programme Rule 11.3.9 below.

### **11.2.4 Work Integrated Learning (WIL)**

This programme requires the student to undergo a twelve month period of work-integrated learning (WIL) during the third year of the diploma. All modules must be passed in order to qualify for WIL placement. Students must adhere to the requirements stated in the Department's WIL Study Guide. Refer to Programme Rule 11.3.7 below.

### **11.2.5 Assessment and Moderation**

Students are expected to work steadily through the period of registration in order to achieve the highest results possible.

- Assessment details are listed under each module at the back of this handbook.
- Assessments could include a variety of testing methods including, but not limited to, written tests, oral tests, theoretical and/or practical examinations, group work and assignments.
- Assignments must be handed personally to the lecturer who will record their receipt. Late submission will be penalised.
- In the case of a continuous assessment modules (a module which has no final examination/s or supplementary examination/s) opportunities for reassessment are provided for students who fail assessments. These are stipulated in the relevant study guide.
- Moderation follows the DUT Assessment Policy stipulations.  
Refer to Programme Rule 11.3.9 below.

### **11.2.6 Employment Opportunities**

Food Technologists work predominantly in a laboratory or industrial environment and may be employed as quality inspectors, laboratory analysts, researchers, product development technologists, packaging technologists, auditors of food factories and suppliers. Food technologists may eventually specialize in one of the following areas: quality assurance or control; product research and development, production management and quality management.

Promotion opportunities to supervisory or management positions are good, provided students are prepared to work hard, possess leadership ability and are willing to study further. Some food technologists travel extensively to inspect factories and food suppliers. Overtime and night shift work are sometimes required by those involved in production and quality control. The National Diploma allows students to subsequently pursue a BT: Food Technology. Opportunities exist for graduates to pursue further educational qualifications.

## **11.3 PROGRAMME RULES**

### **11.3.1 Minimum Admission Requirements**

In addition to DUT Rule G7, the following minimum entrance requirements and the selection criteria outlined in 11.3.2 apply for applicants with reference to:-

## Academic Achievement

In line with the above, applicants' school leaving academic achievement must comply with one of the following:

- i) a National Senior Certificate (NSC) with endorsement for diploma/degree entry with the following subjects at the stated minimum ratings:

Compulsory Subjects	NSC Rating
English	4
Mathematics	4
Physical Science	4
Life Sciences (or Biology)	4

- ii) a Senior Certificate matriculation exemption with the following module at the stated minimum ratings:

Compulsory Subjects	HG	SG
English	D	B
Mathematics	D	B
Physical Science	D	B
Life Sciences (or Biology)	D	B

- iii) a National Certificate (Vocational) Level 4 with statutory requirements for a diploma entrance and the following subject at the stated minimum ratings:

Compulsory Subjects	Minimum
English	50%
Mathematics	50%
Physical Science	60%
Life Sciences (or Biology)	60%

## Admission Requirements based on Work Experience, Age and Maturity; and Recognition of Prior Learning

The DUT Rules G7(3), and G7(8) respectively, will apply.

*(Approved by Senate Rules Comm wef 2014/10)*

## Admission of International Students

The DUT's Admissions Policy for International Students and DUT Rules G4 and G7(5) will apply.

International students must meet the equivalent programme minimum entrance requirements as stated above.

*(Approved by Senate Rules Comm wef 2014/10)*

## Admission of Students from other Institutions

In addition to the relevant DUT Rules a transferring student will only be accepted if there are places available and the student has met the applicable entrance requirements of the university.

*(Approved by Senate Rules Comm wef 2014/10)*

## 11.3.2 Selection Criteria

In addition to the Minimum Admission Requirements (Rule 11.3.1), the following selection process will determine placement in the programme:

- All applicants must apply through the Central Applications Office (CAO).
- Initial shortlisting for selection is based on the applicant's academic performance in Grade 12 (Grade 11 or Grade 12 trial marks will be used for current matriculants).
- Applicants who meet the above criteria may be
  - a) invited to undergo placement testing
  - b) ranked based on performance
- Provisional acceptance is given to selected applicants awaiting National Senior Certificate\* (NSC) results. If the final Grade 12 NSC\* results do not meet the minimum entrance requirements, this provisional acceptance will be withdrawn.
- Final selection for placement will be based on results of the above ranking process, as well as available places (refer to DUT Rule G5) \*(or SC / NC(V)) (Approved by Senate Rules Comm wef 2014/10)

### 11.3.3 Pass Requirements

In addition to the DUT Rules G12, G14 and G15, the following programme rule applies:

- 11.3.3.1 Notwithstanding DUT Rule G12(1) a sub-minimum of 40% is required for the practical component of all modules in which the semester mark is made up of theory and practical components. These are indicated in Table 11.1 Programme Structure. (Approved by Senate Rules Comm wef 2014/10)

### 11.3.4 Re-registration Rules

In addition to the DUT Rule G16, and all prerequisite modules as identified in the Programme Structure (9.1), the following programme rules apply:-

- 11.3.4.1 Promotion from Semester 1 to Semester 2: Students must pass at least two modules, one of which must be Chemistry I or Microbiology I
- 11.3.4.2 Promotion from Semester 2 to Semester 3: Students must pass two second semester modules.
- 11.3.4.3 Promotion from Semester 3 to Semester 4: Students must pass two third semester modules.
- 11.3.4.4 Promotion from Semester 4 to Semester 5: Students must pass all of the preceding 16 modules. (Approved by Senate Rules Comm wef 2014/10)

### 11.3.5 Exclusion Rules

In addition to DUT Rule G17, a first semester student who fails three or more modules with a final result of less than 40% in each module is not permitted to reregister in this programme. Deregistration from any module is subject to the provision of DUT Rule G6. (Approved by Senate Rules Comm wef 2014/10)

### 11.3.6 Interruption of Studies

In accordance with DUT Rule G21A(b), the minimum duration for this programme will be 3 years of registered study and the maximum duration will be 5 years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration. (Approved by Senate Rules Comm wef 2014/10)

### **11.3.7 Work Integrated Learning Rules**

The DUT Rule G28 applies.

***(Approved by Senate Rules Comm wef 2014/10)***

### **11.3.8 Code of Conduct**

In addition to the Student Code of Conduct in the DUT General Handbook for Students, and the relevant requirements as stated in the appropriate Study Guides, the following rules apply:

#### **11.3.8.1 Conduct of Students in Practical Facilities**

Strict adherence to instructions issued by technical, supervisory or academic staff is required due to the need to ensure effective and safe practice in these facilities. Misconduct or disregard for instructions will be referred to the relevant disciplinary procedure.

***(Approved by Senate Rules Comm wef 2014/10)***

#### **11.3.8.2 Uniforms**

Students must adhere to instructions issued by technical, supervisory or academic staff regarding the specific dress code required during practicals. Non-compliance will result in the student being denied access to the venue.

***(Approved by Senate Rules Comm wef 2014/10)***

### **11.3.9 Attendance and Assessment**

11.3.9.1 A student who, for any valid reason (Refer to Programme Rule 11.3.9.2 above), is absent from a particular practical or test, must provide written proof of the reason for the absence to the lecturer concerned, within five (5) working days of returning to the institution in order to be considered for a special assessment.

***(Approved by Senate Rules Comm wef 2014/10)***

11.3.9.2 The DUT Rule G13(3)(a) which refers to special examinations also refers to special assessments set within departments for students who have missed coursework assessments. In these cases the department will determine the validity of the student's reason for not taking the assessment, and the nature of the special assessment.

***(Approved by Senate Rules Comm wef 2014/10)***

### **11.3.10 Health and Safety**

Students must adhere to all Health and Safety regulations both while at DUT and in WIL placements. Failure to do so will be treated as a breach of discipline. Refer to the appropriate Health and Safety policies. *(Approved by Senate Rules Comm wef 2014/10)*

## 12. NATIONAL DIPLOMA: FOOD TECHNOLOGY

**NOTE : THIS PROGRAMME IS BEING PHASED OUT AND NO NEW REGISTRATIONS ARE POSSIBLE**

### (EXTENDED CURRICULUM (NDFTFI))

#### Purpose of Qualification

Graduates of this qualification will be able to perform and organise operations in laboratories and factories of Food Processing Organisations in compliance with statutory requirements for ethics, safety and quality assurance. Supervisory, management and research skills are developed.

The diploma programme aims to develop the ability to critically evaluate and interpret experimental data. The student must be able to work independently in prioritizing, planning and executing work programmes. The student should be able to supervise the development, production and quality control of food manufacturing processes.

This qualification is offered through a three year programme (refer to item 4 above), or through an augmented curriculum - offered over a minimum of four years of study - which is devised to enhance student development and to improve the student's chances of successful completion.

### 12.1 PROGRAMME STRUCTURE (4 YEAR)

Code	Modules	Year/Sem of Study	Assessment Method	NATED Credits	Pre-requisite
CHMB102	Chemistry I	1a	EX	0.148	
QMT101	Quantitative Methods I	1a	EX	0.125	
IFDT101**	Introduction to Food Technology	1a	CA	TBA	
ACBL201	Analytical Chemistry: Biological II	1b	EX	0.125	Chemistry I
FCHM202	Food Chemistry II	1b	EX	0.125	Chemistry I
CSFT101**	Computer Skills I	1b	CA	TBA	
MICR101	Microbiology I	2a	EX	0.148	
PHYS 103	Physics I	2a	EX	0.125	
SCMT101**	The Scientific Method I	2a	CA	TBA	
MICR202	Microbiology II	2b	EX	0.125	Microbiology I
BIST101**	Biostatistics I	2b	CA	TBA	
FDTE102	Food Technology I	2b	EX	0.150	
FDTE201	Food Technology II	3a	EX	0.125	Food Technology I
FDIM101	Food Industry Management I	3a	EX	0.125	
FDPE101	Food Process Engineering I	3a	EX	0.125	
FCHM302#	Food Chemistry III	3a	EX	0.125	Food Chemistry II
FMIC302#	Food Microbiology III	3b	EX	0.140	Microbiology II
FDTE301#	Food Technology III	3b	EX	0.125	Food Technology II
FDQA101	Food Quality Assurance I	3b	EX	0.110	
FDPE201	Food Process Engineering II	3b	EX	0.125	Food Process Engineering I
FIPR101	Food Industry Practice I	4	CAS		
FIPR201	Food Industry Practice II	4	CA		All 20 modules

**KEY:** Assessment: Ex= Final Examination; CA = Continuous Assessment

Numbers 1 to 4 indicates the year of study, "a"= Semester 1, "b"=Semester 2 (eg 2b=Second year, Semester 2)  
A prerequisite means this module must be passed prior to registration for the subsequent module.

\*These module are specific to either/both the ND(ECP): Biotechnology and the ND(ECP): Food Technology.

#These modules are final level modules.

The module content for each module is found under section 16 of this handbook. This content must be read in conjunction with the relevant Study Guide.

## 12.2 PROGRAMME INFORMATION

Refer to 11.2 Programme Information under the ND: Food Technology.

## 12.3 PROGRAMME RULES

Refer to 11.3 Programme Rules under the ND: Food Technology and the following rules which apply specifically to ND: Food Technology (ECP).

### 12.3.1 Minimum Admission Requirements

Refer to Rule 11.3.1 which is applicable to both the ND and ND(ECP).

### 12.3.2 Selection Criteria

Refer to Rule 11.3.2 which is applicable to both the ND and ND(ECP).

In addition to the above, on the basis of the selection process, successful applicants for study towards the National Diploma will be accepted into either the three (3) year, or four (4) year (Extended Curriculum) programme of study

### 12.3.3 Pass Requirements

Refer to Rule 11.3.3 which is applicable to both the ND and ND(ECP).

### 12.3.4 Re-registration Rules

In addition to the DUT Rule G16, and all prerequisite modules as identified in the Programme Structure (11.1), the following programme rules apply:-

#### 12.3.4.1 Promotion from Year 1 Semester 1 (ECP) to Year 1 Semester 2 (ECP):

An ECP student is required to pass Chemistry 1 and one other module in order to be permitted to register for the next semester.

#### 12.3.4.2 Promotion from Year 1 Semester 2 (ECP) to Year 2 Semester 1 (ECP):

An ECP student is required to pass two modules in order to be permitted to register for the next semester.

#### 12.3.4.3 Promotion from Year 2 Semester 1 (ECP) to Year 2 Semester 2 (ECP):

An ECP student is required to pass two modules in order to be permitted to register for the next semester.

#### 12.3.4.4 Promotion from Year 2 Semester 2 (ECP) to Year 3 Semester 1 (ECP):

An ECP student is required to pass two modules in order to be permitted to register for the next semester.

#### 12.3.4.5 Promotion from Year 3 Semester 1 (ECP) to Year 3 Semester 2 (ECP):

An ECP student is required to pass two modules in order to be permitted to register for the next semester.

#### 12.3.4.6 Promotion to Year 3 Semester 2 to Year 4 Semester 1:

Students must pass all of the preceding 20 modules.

*(Approved by Senate Rules Comm wef 2014/10)*

### 12.3.5 Exclusion Rules

Refer to Rule 11.3.5 which is applicable to both the ND and ND(ECP).

### 12.3.6 Interruption of Studies

In accordance with Rule G21A(b), the minimum duration for this programme will be 4 years of registered study and the maximum duration will be 5 years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration. *(Approved by Senate Rules Comm wef 2014/10)*

### 12.3.7 Work Integrated Learning Rules

- 12.3.8 **Code of Conduct**  
Refer to Rule 11.3.7 which is applicable to both the ND and ND(ECP).
- 12.3.9 **Attendance and Assessment**  
Refer to Rule 11.3.8 which is applicable to both the ND and ND(ECP).
- 12.3.9 **Attendance and Assessment**  
Refer to Rule 11.3.9 which is applicable to both the ND and ND(ECP).
- 12.3.10 **Health and Safety**  
Refer to Rule 11.3.10 which is applicable to both the ND and ND(ECP).

### 13. BACHELOR OF TECHNOLOGY: FOOD TECHNOLOGY (BTFTD I)

#### Purpose of Qualification

Students achieving this qualification will be competent to adopt a critical and innovative approach to contribute to the field of food technology and to pursue careers as senior technical managers and/or entrepreneurs in food and related FMCG industries.

#### 13.1 PROGRAMME STRUCTURE

Module Code	Module	Rated Credits	Assessment
RMNS 201	Research Methodology: Natural Sciences	0.040	CA
ENTP 202	Entrepreneurial Skills I	0.040	CA
FDMA401	Food Microbial Assurance IV	0.168	EX
FDTE402	Food Technology IV	0.168	EX
FPDV401	Food Product Development IV	0.168	EX
FANL402	Food Analysis IV	0.168	EX
FCMP401	Food Components IV	0.168	EX
FPRJ401	Food Project IV	0.168	CA
FPRJ421	Food Project IV – (Part-Time / D3 only)	0.168	CA

**KEY: Assessment: Ex= Final Examination; CA = Continuous Assessment**

**NOTE: Research Methodology and Research Project must be done concurrently.**

The module content for each module is found under section 17 of this handbook. This content must be read in conjunction with the relevant Study Guide.

#### 13.2 PROGRAMME INFORMATION

B Tech students can register full-time and complete the module in one year, or part-time and complete their studies over two years. The appropriate sequence of registration for the module is available from the department.

#### 13.3 PROGRAMME RULES

##### 13.3.1 Minimum Admission Requirements

In addition to Rule G7, applicants must be in possession of a ND: Food Technology or equivalent with a minimum 60% in the final level module and minimum 60% overall aggregate.

Part-time students must have adequate laboratory facilities at their place of employment to conduct their Research Project.

##### 13.3.2 Pass Requirements

In addition to the DUT Rules G12, G14 and G15, the following programme rules apply:

- 1) The final examination for each of the examinable module in the BT: Food Technology consists of one three-hour written examination. The examination mark contributes 60% of the final mark. The remaining 40% is constituted by a course mark which is



obtained by assessment of the work done by the student during the year. Theory tests, practical tests, assignments, projects and tutorials may be used to calculate the course mark.

- 2) The examinations for first semester modules will be held in the May/June examination period; the examinations for the remaining module will be held in the October/November examination period.
- 3) For modules assessed by means of continuous assessment, the pass mark is 50%. These comprise:
  - Food Project IV - assessed by the submission of a research proposal and presentation (20%), submission of a mini-dissertation (60%) and a final project presentation (20%).

#### **Part time students must complete this module over two years.**

- Research Methodology - assessed by means of class tests and assignments
- 4) A student who is absent from a test or scheduled assessment must provide acceptable proof of the reason for absence to the lecturer concerned, upon returning to lectures.

#### **13.3.3 Re-registration Rules**

The DUT Rule G16 applies.

#### **13.3.4 Exclusion Rules**

The DUT Rules G17 and G23A(a)(4) apply.

#### **13.3.5 Interruption of Studies**

In accordance with Rule G23A(a), the minimum duration for this programme will be 1 year of registered study and the maximum duration will be 2 years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the Department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

### **14. MASTER OF APPLIED SCIENCE IN FOOD SCIENCE AND TECHNOLOGY (MSFST I)**

#### **14.1 PROGRAMME INFORMATION:**

Students achieving this qualification will be able to conduct scientific research under minimal guidance in a chosen field, and to contribute to knowledge production in that field. The research problem, its justification, process and outcome are reported in a dissertation which complies with the generally-accepted norms for research at this level. BT: Biotechnology (or equivalent).

#### **14.2 PROGRAMME RULES**

##### **14.2.1 Minimum Admission Requirements**

In addition to Rule G7 and G24, an applicant must have a BT: Food Technology (or equivalent).

##### **14.2.2 Duration of Programme:**

In accordance with G24(2)(a), the minimum duration of the M App Sci (Food Science and Technology) is one year and the maximum is three years.

##### **14.2.3 Instructional Programme**

This qualification is offered by means of a full research project (Refer to Rule G24).

##### **14.2.4 Proposal**

Students are required to submit and present a research proposal to the Department within 3 months of registration.

##### **14.2.5 Progress Report**

Students must present a progress report to the Department prior to graduation.

##### **14.2.6 Publications**

Students are required to have ONE publication submitted to a DHET approved journal prior to completion of the degree.

### **15. DOCTOR OF FOOD SCIENCE AND TECHNOLOGY (DFSCT I)**

## **15.1 PROGRAMME INFORMATION**

Persons achieving this qualification will be competent scientific researchers who can work independently in developing and applying knowledge and skills to make an original contribution to the global knowledge or technology in the particular field chosen for study.

## **15.2 PROGRAMME RULES**

### **15.2.1 Minimum Admission Requirements**

In addition to Rule G7 and G24, an applicant must have a MAppSc (Food Science and Technology) (or equivalent).

### **15.2.2 Duration of Programme**

In accordance with G25(2)(a), the minimum duration of the Doctor Food Science and Technology is two years and the maximum is four years.

### **15.2.3 Instructional Programme**

This qualification is offered by means of a full research project (Refer to Rule G25).

### **15.2.4 Proposal**

Students are required to submit and present a research proposal to the Department within 3 months of registration.

### **15.2.5 Progress Report**

Students must present a progress report to the Department prior to graduation.

### **15.2.6 Publications**

Students are required to have ONE publication accepted and ONE publication submitted to a DHET approved journal prior to completion of the degree.

## 16. SERVICED MODULE

The following modules are serviced between the programmes in this department:

Serviced Programme	Servicing Programme	Serviced Module	Module Code
Biotechnology	Food Technology	Biochemistry II Sanitation, Safety and Hygiene I	BCHE202 SASH101
Food Technology	Biotechnology	Microbiology I Microbiology II Food Microbiology III	MICR101 MICR202 FMIC302

The servicing department's rules apply to all serviced modules. The following modules are serviced externally to this department.

Programme	Servicing Department	Serviced Module	Module Code
ND: Biotechnology	Department of Statistics	Quantitative Methods I	QMTH101
	Department of Chemistry	Chemistry I Analytical Chemistry II	CHMB102 ACBL201
ND: Food Technology	Department of Statistics	Quantitative Methods I	QMTH101
	Department of Physics	Physics I	PHYS103
	Department of Chemistry	Chemistry I Analytical Chemistry II	CHMB102 ACBL201

## 17. SHORT COURSES

The Department offers the following short course/s:

Name	Approved for offering	Duration
Good microbiological laboratory practice	2017 to 2019	16 hours
Good manufacturing practice for the food and cosmetic industry	2017 to 2019	16 hours

## 18. MODULE CONTENT

The information below must be read in conjunction with the relevant Study Guides.

Modules are arranged alphabetically in each section

### ND: Biotechnology and ND: Food Technology (Common Module)

1	ACBL201*	Analytical Chemistry: Biological II
2	CHMB102*	Chemistry I
3	FMIC302*	Food Microbiology III
4	MICR101*	Microbiology I
5	MICR202*	Microbiology II
6	QMTH101	Quantitative Methods I

**ND (ECP): Biotechnology and ND (ECP): Food Technology  
(Common Module)**

1	IBTC101**	Introduction to Biotechnology I
2	IFDT101**	Introduction to Food Technology I
3	BIST101**	Biostatistics I
4	CSBT101**	Computer Skills I
5	SCMT101**	The Scientific Method I

**ND: Biotechnology**

1	ABIC301	Analytical Biochemistry III
2	BCHM202	Biochemistry II
3	BIOD101	Biodiversity & Ecology I
4	BIOP301	Bioprocessing III
5	BIPR101	Biotechnology Industry Practice I
6	BIPR201	Biotechnology Industry Practice II
7	DIMR201	Disease and Immune Response II
8	FERT202	Fermentation Technology II
9	MIBC301	Microbial Biochemistry III
10	MICR301	Microbiology: Biological III
11	PRTM101	Process Technology & Management I
12	SASH101	Sanitation, Safety & Hygiene I

**ND: Food Technology**

1	FCHM202	Food Chemistry II
2	FCHM302	Food Chemistry III
3	FDIM101	Food Industry Management I
4	FIPR101	Food Industry Practice I
5	FIPR201	Food Industry Practice II
6	FDPE101	Food Process Engineering I
7	FDPE201	Food Process Engineering II
8	FDQA101	Food Quality Assurance I
9	FDTE102	Food Technology I
10	FDTE201	Food Technology II
11	FDTE301	Food Technology III
12	PHYS 103	Physics I

## **MODULE CONTENT**

### **BACHELOR OF APPLIED SCIENCE IN BIOTECHNOLOGY (BAppSc)**

#### **CHEMISTRY I**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% - Tests, assignments, practicals, projects etc.

60% - Exam

Syllabus: This course will equip students with grounding in chemistry that will develop a level of theoretical knowledge and practical and problem-solving skills, and to present the physical and descriptive inorganic and organic aspects of chemistry. General chemistry makes up 70% of the syllabus: Measurements, energy and matter, atoms and elements, compounds and their bonds, chemical reactions and quantities, gases, solutions, acids & bases and nuclear radiation. Organic chemistry makes up 30% of the syllabus. The organization of organic chemistry, alkanes and cycloalkanes, unsaturated hydrocarbons, organic compounds with oxygen and sulphur, carboxylic acid and esters, amines and amides. Laboratory exercises in selected topics from above.

#### **BIOLOGY I**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% - Tests, assignments, practicals, projects etc.

60% - Exam

Syllabus: Biology as a module will assist the student to acquire fundamental and integrated knowledge of diverse life forms relevant to Biotechnology

#### **MATHEMATICS**

Contact Time: 48 hours - Theory (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: N/A – Continuous Assessment

Final Mark: Minor Tests and assignments: 20%

Major Test 1: 40% (internally moderated)

Major Test 2: 40% (Internally moderated) A pass is 50%, Students who obtain a final mark of 45% to 49% may write Major test 1 and Major test 2 together. If a combined score of 50% or higher is obtained then students will be awarded a pass of 50% for the module. All assessments and moderation will take place in accordance with the DUT policies and procedures.

Syllabus: Elementary mathematics: simple algebraic manipulation, indices, logarithms, solution of equations, use of calculators, approximate, significant figures. Functions: polynomial, rational, exponential, logarithmic, ratio and proportion. Geometry and plane analytic geometry. Differentiation: simple techniques, use in optimization and curve sketching. Integration: simple techniques, evaluation of areas. Differential equations: first order equations, uses in Applied Science modelling.

#### **CORNERSTONE 101**

Contact Time:	40 hours per semester
Assessment:	
Course Mar:	Refer to the study guide
Examination:	N/A
Final Mark:	The approach will be one of continuous assessment. The assessment will be made up as follows : A weekly blog written by each student 20% Tutorial attendance (forfeited if student attends less than 80% of tutorials) 10% <ul style="list-style-type: none"> <li>- Visual artefact 15%</li> <li>- Written report 30%</li> <li>- Oral presentation 15%</li> <li>- Peer assessment 10%</li> </ul>
Syllabus:	The module content will be developed around the concept of journeys, across time, across space, and across human relationships; the first use of the concept will take the journey of the uMngeni River (which is close to all DUT campuses) as a metaphor. The module will bring different disciplinary perspectives to this content. The module will start with the analysis of a particular issue or metaphor (one critical event or development will be and analysed; the event in focus will be selected on the basis of its connections to the theme of journeys and its relevance to the issues of ethics, diversity and critical citizenry). The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning. At each stage of the module, students will be required to engage in activities that involve reflection and build communicative practices. There will be a concluding section in which students will identify their learning and examine the implications for their roles as students and as citizens.

## **BACTERIOLOGY 2**

Contact Time:	64 hours - Theory (4), Practical (4) periods per week
Assessment:	
Course Mark :	Refer to the study guide.
Examination:	1 X 3 hour paper
Final Mark:	40% – Tests, assignments, practicals, projects etc 60% – Exam.
Syllabus:	To give the student a basic knowledge and understanding of bacterial growth, physiology and control.

## **BIOCHEMISTRY 2**

Contact Time:	64 hours - Theory (4), Practical (4) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3 hour paper
Final Mark:	40% – Tests, assignments, practicals, projects etc. 60% – Exam.
Syllabus:	This module provides an introduction to the molecules and chemical reactions of living systems. Structure and function of important classes of biomolecules to the biotechnology and food technology niche areas are explored.

## **PHYSICS**

Contact Time:	48 hours - Theory (3), Practical (2) periods per week
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Assessment:  
Course Mark: Refer to the study guide.  
Examination: 1 X 3 hour paper  
Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam.  
Syllabus: The student will acquire knowledge of Physics and its application to the Biological and Life sciences.

### **MYCOLOGY**

Contact Time: 48 hours - Theory (3), Practical (2) periods per week  
Assessment:  
Course Mark: Refer to the study guide.  
Examination: 1 X 3-hour paper  
Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam.

Syllabus: To identify the characteristics of the members of the Kingdom Fungi, manipulate their growth and interpret their ecological and economic impact.

### **INSTITUTIONAL GENERAL EDUCATION ELECTIVE I (IGE I)**

REFER TO ADDENUM

### **FOOD MICROBIOLOGY 2**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week  
Assessment:  
Course Mark: Refer to the study guide.  
Examination: 1 X 3-hour paper  
Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: To study the characteristics of genera of bacteria and fungi that are found in foods, their role in foods and food spoilage and in fermentation and development of foods. To explain methods of determining their presence and numbers in foods, factors that affect their growth and methods of preventing and controlling their presence in foods.

### **MICROBIAL BIOCHEMISTRY 3**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week  
Assessment:  
Course Mark: Refer to the study guide.  
Examination: 1 X 3-hour paper  
Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: This module is aimed at equipping a student with the knowledge of metabolic pathways involved in the breakdown of different substrates, the energies and enzymes involved during these processes. The module further highlights the regulation of enzymes involved in the synthesis of products of industrial importance.

### **VIROLOGY AND IMMUNOLOGY 2**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week  
Assessment:

Course Mark	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, assignments, practicals, projects etc. 60% – Exam
Syllabus:	The module deals with a general introduction to viruses and focuses on key viral diseases of KZN. It also outlines the various mechanisms of action of the human immune system and the various types of biotechnological diagnostic assays of diseases.

## **FERMENTATION SCIENCE AND TECHNOLOGY 2**

Contact Time:	64 hours - Theory (4), Practical (4) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, assignments, practicals, projects etc. 60% – Exam
Syllabus:	This module focuses on the general isolation, morphology, growth and control of microorganisms. Fermentation Technology ties in all these aspects and demonstrates how microorganisms can be harnessed to demonstrate their real potential in producing value added products on a large scale.

## **INSTITUTIONAL GENERAL EDUCATION ELECTIVE 2 (IGE 2)**

**REFER TO ADDENDUM**

## **ANALYTICAL BIOCHEMISTRY 3**

Contact Time:	64 hours - Theory (4), Practical (4) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, assignments, practicals, projects etc. 60% – Exam
Syllabus:	The module focuses on the application of advanced analytical methods in biochemistry and molecular biology. Students that register for this course will receive instruction not only to key biochemical concepts, but also in the chemistry underpinning these concepts and the applications of biochemistry in biotechnology

## **MOLECULAR BIOLOGY 3**

Contact Time:	64 hours - Theory (4), Practical (4) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, assignments, practicals, projects etc. 60% – Exam
Syllabus:	This module reinforces the basic concepts of molecular biology, then introduces the genetic processes that occur in a cell, explores the transfer of genetic material between organisms, introduces methods and techniques to create or modify cells at the genetic level, and finally explores the new field of bioinformatics



### **BACTERIOLOGY 3**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus This module deals with the classification and identification of microorganisms, explores their symbiotic relationships with other microorganisms and other living organisms and briefly reviews the characteristics of selected antibacterial, antifungal and antiviral drugs.

### **FACULTY GENERAL EDUCATION ELECTIVE I (FGE I)**

Contact Time: 48 hours - Theory (4) periods per week

Assessment:

Course Mark: Refer to the study guide

Examination: N/A

Final Mark: Class test will contribute 30% of Final Mark  
Assignment will contribute 30% of Final Mark  
Group project will contribute 40% of Final Mark

Syllabus: To critically evaluate the impact of key challenges of sustainable development within a Kwa-Zulu Natal and SADC context; and design strategies on how applied sciences can address these challenges

### **INDUSTRIAL BIOTECHNOLOGY 3**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: The student has acquired knowledge and expertise in basic and core biotechnology areas and will be introduced to the application of biotechnology for industrial production. Different examples will be used to illustrate the various applications, strategies and techniques used in the biotechnology industry.

### **RECOMBINANT DNA TECHNOLOGY 3**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: The aim of this module is to allow you to develop an in-depth knowledge and understanding of four key disciplines: biochemistry, cell biology, microbiology and molecular biology. It will show how each of these disciplines can be applied in the biotechnology, pharmaceutical and pathology industries. The module will also develop the independent learning, professional and communication skills required for the rest of the course and a future career.

## **PLANT BIOTECHNOLOGY**

Contact Time: 32 hours - Theory (3) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, projects etc.  
60% – Exam

Syllabus: This module aims to show you how plants can be utilised in biotechnological applications. You will study key biological principles that underlie our ability to manipulate plants to yield desirable characteristics, the ecological implications of plant biotechnology and appreciate a range of laboratory techniques important for the manipulation of plants in biotechnology.

## **MEDICAL BIOTECHNOLOGY 3**

Contact Time: 32 hours - Theory (3) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, projects etc.  
60% – Exam

Syllabus : This module will include the study of current and potential techniques for disease diagnosis, prevention and therapy. Students will be introduced to a host of scientific developments in medical biotechnology and its applications. The module will provide students with an insight into the fast-emerging medical biotechnology and the innovative processes that ensures the success of such endeavours. The module will also cover a host of topics that will provide the students with a springboard to develop their creative thinking and explore their ideas of new vision of medical biotechnology.

## **RESEARCH PROJECT I**

Contact Time: 32 hours - Theory (3) periods per week

Assessment:

Course Mark: Refer to the study guide

Examination: N/A

Final Mark: Control Test 40% of final mark  
Written assignment and Project Proposal 40% of final mark  
Oral presentation 20% of final mark

Syllabus: The course is intended for undergraduate students in preparation for research that they may undertake in industry or as postgraduates. Students who complete this course will have an understanding of formulating a research topic, reading and critically reviewing literature, research strategy, research ethics, sampling, data analysis, referencing, writing and presenting for research.

## **INSTITUTIONAL GENERAL EDUCATION ELECTIVE 3 (IGE 3)**

REFER TO ADDENUM

## **RESEARCH PROJECT 2**

Contact Time: 64 hours

Research Supervision = 40%,

Independent student study and Research (Laboratory, Library and Computer

	labs) = 60%
Assessment	
Course Mark:	N/A
Examination:	N/A
Final Mark:	The final mark for this module will be calculated as follows: Research Project Report – 70% Research Project Presentation – 30%
Syllabus:	To holistically apply knowledge acquired in the qualification to research and perform experiments on a community-based project within the biotechnology field.

## **FOOD BIOTECHNOLOGY**

Contact Time:	32 hours - Theory (3) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, assignments, projects etc. 60% – Exam
Syllabus:	This module deals with the fundamental knowledge of biotechnology and its applications in food production. The role of food biotechnology in Food industries and Africa as well as ethical and regulatory issues will be covered.

## **BIOREMEDIATION**

Contact Time:	64 hours - Theory (4), Practical (4) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, Practicals, assignments, projects etc. 60% – Exam
Syllabus:	Advance the basic and applied science of bioremediation as an alternative solution to environmental pollution problems in South Africa and globally

## **INDUSTRY MANAGEMENT**

Contact Time:	32 hours - Theory (3) periods per week
Assessment:	
Course Mark:	Refer to the study guide.
Examination:	1 X 3-hour paper
Final Mark:	40% – Tests, assignments, projects etc. 60% – Exam
Syllabus:	module develops a critical understanding of the commercial aspects of the biotechnology and food industry. It covers principles and policies of business and personnel management, entrepreneurship, intellectual property and government legislation currently applicable to Biotechnological industries in KZN and globally.

## **FACULTY GENERAL EDUCATION ELECTIVE 2 (FGE 2)**

Contact Time:	48 hours - Theory (4) periods per week
Assessment:	
Course Mark:	N/A
Examination:	N/A

Final Mark:	Written assignment or poster	20%
	Presentations	20%
	Tests	20%
	Portfolio of evidence/reflective journal	20%
	Project	20%
Syllabus:	To explore the impact of various aspects of the applied sciences on society	

### **FACULTY GENERAL EDUCATION ELECTIVE 3 (FGE 3)**

Contact Time:	48 hours - Theory (4) periods per week	
Assessment:		
Course Mark:	N/A	
Examination:	N/A	
Final Mark:	RADICAL/CREATIVE PEDAGOGY AND ASSESSMENT (Continuous assessment) 25% Reflective Journal 25% Creative presentation 50% Practical project (25% individual portfolio; 25% group presentation)	
Syllabus:	The purpose of this module is to develop students through creating a holistic awareness of the variety of problems, engage in socially valuable action while critically reflecting on the nature of their action and the problems it seeks to address	

### **General Education in the Department of Biotechnology and Food Technology**

Where a module is designated as an Institutional General Education Elective module the student is to select from list of modules made available at time of registration. All modules made available will be 8 credits and at NQF level 5. If a student has registered for and passed a module, he/she may not select that module again.

\* Note – all modules that students will be asked to select from are 8 credits and at NQF level 5. Further, modules may be removed or added to this list, depending on availability of resources and popularity of modules.

## Bachelor of Applied Science in Biotechnology

Year	Module	Level	Credit	Purpose of Module
1 – S2	Interpersonal Communication & Self	5	8	To prepare students to understand the role of self and others in the communication process and use their understanding to communicate more effectively and develop interpersonal relationships.
	Introduction to Techno-preneurship	5	8	The purpose of General Education is to ensure that our graduates are not only skilled professionals in their chosen area of study but also broadly educated and well-rounded local and global citizens. Toward this greater purpose, this module will introduce students to the concept and language of technopreneurship. Students will be exposed to the excitement of potentially starting their own technically related businesses, and will be able to explain the difference between small business and entrepreneurship. The current SA need for SMMEs, and the related supporting organisations will be introduced. The module scope is designed to provide breadth rather than depth. Students would be advised to seek the depth necessary for the success of their potential small businesses in subsequent modules.
	Reflections on Quantitative Thinking	5	8	The module inducts students at level 5 or higher across all programmes into reflective thinking practices which foster logical, analytical and meaningful thinking. It further aims to facilitate the transference of critical thinking into quantitative reasoning problems where appropriate quantitative methods are used and into argumentation and evaluation. The module is offered as one in a suite of electives in the General Education curriculum.
	Cultural Diversity	5	8	The purpose of this module is as follows : <ol style="list-style-type: none"> <li>1. To equip students with knowledge about human diversity issues particularly around the social constructions of race, gender, sexual orientation, spirituality and disability.</li> <li>2. To prepare students to demonstrate respect and empathy for diverse cultures locally and globally.</li> <li>3. To enable students to recognize the importance of critical reflection of the stereotypes one holds of other groups.</li> </ol>
	Literacies through Literature	5	8	This module would support students with the on-going development of their reading, critical-thinking, discussion and writing competencies by using a holistic “scaffolding” model of teaching and learning. It is proposed that the process be text-based and that a contemporary South African novel, such as <i>At the rendezvous of victory and other stories</i> (Kwela, 1999) be prescribed for this purpose.
2 – S3	Me, My World, My Universe	5	8	<ol style="list-style-type: none"> <li>1. The module inducts students at level 5 across all Programmes into the awareness of the role of quantitative reasoning in critical, insightful and meaningful reasoning applied to self, world and universe.</li> <li>2. The module is designed to enable learners in a quantitative and data dense world to extend and develop their ability to solve quantitative problems, understand and construct valid arguments supported by quantitative evidence and analysis and to communicate arguments in a variety of appropriate mathematical and verbal formats.</li> </ol>

				3. The module will contribute to the development of “knowledge, attitudes and values” within the themes indicated thereby contributing to the purpose of General Education.
Practical Parenting	5	8		The purpose of this module is: To equip students to demonstrate understanding of child development and child rearing thereby contributing to the development of child friendly communities in society.
Hands Filled with Meaning	5	8		This learning module is a General Education Elective module and contributes to ensuring that students who graduate from DUT are well-rounded citizens. The Introduction to South African Sign Language (SASL) module will enable students who select to do it to sign a basic conversation with a Deaf person in SASL and also understand some of the key concepts and policies around disability in South Africa. Students will gain a grounded understanding of the Deaf Community and the challenges faced by Deaf persons in South Africa. The module would assist students to consider how they can work effectively with people with disabilities generally and Deaf people specifically.
Violence and Nonviolence	5	8		To develop students’ awareness of self and society through engaging with text and lived experiences related to violence and nonviolence; To develop students’ practice of critical and engaged citizenry; To challenge the ways in which violence serves to deepen inequality between social groups, in particular between men and women; To develop students’ understanding of the nature, extent and causes of violence; To enable students to become active leaders for nonviolence within their roles as students and citizens.
Sustainable Earth Studies	5	8		The module provides a knowledge base to develop positive attitudes and actions that will benefit environmental sustainability on a range of levels. It stresses the importance of biodiversity as the foundation of human wellbeing and demonstrates the relevance of local biodiversity and healthy functioning ecosystems to young people living and studying in KwaZulu–Natal today.  This module describes planet earth as a complex biosphere made up of living and non- living components, each wholly dependent and inextricably linked to each other.

3 – S5	Values in the Workplace	5	8	<p>The purpose of this module is as follows :</p> <ul style="list-style-type: none"> <li>• To heighten student’s awareness of their personal beliefs, values, and attitudes regarding culture, race, ethnic and other identity statuses and how it intersects with values for the workplace.</li> <li>• To enable students to become knowledgeable about values, gender, sexual orientation, socioeconomic status, and disability within society and resultantly within the context of values in the workplace.</li> <li>• To enable students to be familiar with methods to develop effective values, ethics and leadership in the workplace, thereby developing a level of social responsibility.</li> </ul>
	Constitutional Law and Human Rights	5	8	<p>The aim of this module is to make the constitution and the bill of rights relevant to students and to gain an understanding of how the Constitution and Human Rights issues impact on them privately, at work and in the broader society. A few areas have been chosen based on relevance, interest and the graduate attributes that general education at DUT aims to develop oral, written communication skills, logic and reasoning. The purpose of this module is to introduce students to the importance of being responsible citizens through having an appreciation of the importance of the Constitution and Human Rights, within a local and global context. To encourage and develop a practice of critical and engaged citizenry. It will assist students to understand the ways in which humans shape these systems, through conflict and struggle, the values that underlie them, namely why they should vote and what it means to be part of a democracy. The module is based on the idea of combining theory and practice. In each section a constitutional concept and/or a human right issue or experience will be introduced and discussed. Module specific terminology will be explained and an understanding of key concepts will be developed. Each scenario will include a focus on the development of skills by developing the student’s capacity for research, independent critical thinking and debate.</p>
	Law for Life	5	8	<p>The aim of this module is to make the law relevant to everyday life. It is based on the idea of combining theory and practice. In each section an everyday life experiences will be introduced and discussed. Module specific terminology will be explained and an understanding of key concepts will be developed. Each scenario will include a focus on the development of skills by developing the student’s capacity for research, independent critical thinking and debate.</p>
	World of Work	5	8	<p>The purpose of General Education is to ensure that our graduates are not only skilled professionals in their chosen area of study but also broadly educated and well-rounded local and global citizens. Toward this greater purpose, this module is designed to introduce and develop non-technical working related competencies and values within students in order to facilitate easier adapting to the workplace in Work</p>

				Integrated Learning (WIL) placements, and/or their future careers.
	Leadership	5	8	The purpose of this module is to develop students with a critical and informed understanding of leadership, and with skills that enable them to understand and take ethical leadership in a variety of contexts, including within the institution.



## MODULE CONTENT

### BACHELOR OF APPLIED SCIENCE IN FOOD SCIENCE AND TECHNOLOGY (BAppSc)

#### CHEMISTRY I

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.

60% – Exam

Syllabus: This course will equip students with grounding in chemistry that will develop a level of theoretical knowledge and practical and problem-solving skills, and to present the physical and descriptive inorganic and organic aspects of chemistry. General chemistry makes up 70% of the syllabus: Measurements, energy and matter, atoms and elements, compounds and their bonds, chemical reactions and quantities, gases, solutions, acids & bases and nuclear adiation. Organic chemistry makes up 30% of the syllabus. The organization of organic chemistry, alkanes and cycloalkanes, unsaturated hydrocarbons, organic compounds with oxygen and sulphur, carboxylic acid and esters, amines and amides. Laboratory exercises in selected topics from above.

#### BIOLOGY I

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.

60% – Exam

Syllabus: Biology as a module will assist the student to acquire fundamental and integrated knowledge of diverse life forms relevant to Biotechnology

#### MATHEMATICS

Contact Time: 48 hours - Theory (4) periods per week

Assessment:

Course Mark: Minor Tests and assignments: 20% of final mark

Examination: N/A (continuous assessment)

Final Mark: Minor Tests and assignments: 20%

Major Test 1: 40% (internally moderated)

Major Test 2: 40% (Internally moderated)

A pass is 50%. Students who obtain a final mark of 45% to 49% may write Major test 1 and Major test 2 together. If a combined score of 50% or higher is obtained then students will be awarded a pass of 50% for the module. All assessments and moderation will take place in accordance with the DUT policies and procedure

Syllabus: Elementary mathematics: simple algebraic manipulation, indices, logarithms, solution of equations, use of calculators, approximate, significant figures. Functions: polynomial, rational, exponential, logarithmic, ratio and proportion. Geometry and plane analytic geometry. Differentiation: simple techniques, use in optimization and curve sketching. Integration: simple techniques, evaluation of

areas. Differential equations: first order equations, uses in Applied Science modelling

### **CORNERSTONE 101**

Contact Time: 40 hours per semester

Assessment:

Course Mark : N/A

Examination : N/A

Final Mark: The approach will be one of continuous assessment. The assessment will be made up as follows : A weekly blog written by each student 20%  
-Tutorial attendance (forfeited if student attends less than 80% of tutorials) 10%  
-Visual artefact 15%  
-Written report 30%  
-Oral presentation 15%  
-Peer assessment 10%

Syllabus: The module content will be developed around the concept of journeys, across time, across space, and across Human. Relationships; the first use of the concept will take the journey of the uMngeni River (which is close to all DUT campuses) as a metaphor. The module will bring different disciplinary perspectives to this content. The module will start with the analysis of a particular issue or metaphor (one critical event or development will be analysed; the event in focus will be selected on the basis of its connections to the theme of journeys and its relevance to the issues of ethics, diversity and critical citizenry). The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning. At each stage of the module, students will be required to engage in activities that involve reflection and build communicative practices. There will be a concluding section in which students will identify their learning and examine the implications for their roles as students and as citizens.

### **INSTITUTIONAL GENERAL EDUCATION ELECTIVE I (IGE I)**

REFER TO ADDENUM

### **BACTERIOLOGY 2**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.

60% – Exam

Syllabus: To give the student a basic knowledge and understanding of bacterial growth, physiology and control.

## **BIOCHEMISTRY 2**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: This module provides an introduction to the molecules and chemical reactions of living systems. Structure and function of important classes of biomolecules to the biotechnology and food technology niche areas are explored.

## **PHYSICS**

Contact Time: 48 hours - Theory (3), Practical (2) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3 hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: The student will acquire knowledge of Physics and its application to the Biological and Life sciences.

## **MYCOLOGY 2**

Contact Time: 48 hours - Theory (3), Practical (2) periods per week

Assessment:

Course Mark: Theory: 2 x 1.5-hour theory test (30% each): Practicals (40%)

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: To identify the characteristics of the members of the Kingdom Fungi, manipulate their growth and interpret their ecological and economic impact.

## **FOOD SCIENCE AND TECHNOLOGY I**

Contact Time: 64 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam.

Syllabus: To introduce physical, chemical and biological principles of food processing and preservation as well as processing techniques of different food commodities (e.g. cereals, legumes, fruits and vegetables, meat and dairy).

## **FOOD CHEMISTRY 2**

Contact Time: 64

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: The purpose of this module is to introduce students to the biochemical composition of foods; elucidation of chemical structures of compounds and metabolic processes that produce energy after the food has been consumed.

## **FOOD MICROBIOLOGY 3**

Contact Time: 64 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: To study the characteristics of genera of bacteria and fungi that are found in foods, their role in foods and food spoilage and in fermentation and development of foods. To explain methods of determining their presence and numbers in foods, factors that affect their growth and methods of preventing and controlling their presence in foods.

## **FOOD QUALITY MANAGEMENT**

Contact Time: 32 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam.

Syllabus: To introduce the student to the basic concepts and principles of quality control and quality assurance, sanitation, hygiene, and quality systems used in the food industry.

## **HUMAN NUTRITION**

Contact Time: 32 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: Introduction to Nutrition: Global Perspective on Food and Nutrition

- Digestion, Absorption and Transport of Food
- Energy Metabolism
- Role of Macronutrients: Nutrition and metabolism of carbohydrate, lipid, protein
- Role of Micronutrients: Vitamins and minerals
- Food function, grouping and measurement of food intake
- Dietary reference standards

- Phytochemicals as Food Components
- Substitutions for Sugar and Fat
- Diet, Chronic Disease and Nutritional Problems
- Food Allergy and Intolerance
- Food nutrition: policy and regulatory issues.
- Current issues in Nutrition (Case study)

## **FOOD SCIENCE AND TECHNOLOGY 2**

Contact Time: 64 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: To introduce physical, chemical and biological principles of food processing and preservation as well as processing techniques of different food commodities (e.g. cereals, legumes, fruits and vegetables, meat and dairy).

## **MOLECULAR BIOLOGY 3**

Contact Time: 64 hours - Theory (4), Practical (4) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: This module reinforces the basic concepts of molecular biology, then introduces the genetic processes that occur in a cell, explores the transfer of genetic material between organisms, introduces methods and techniques to create or modify cells at the genetic level, and finally explores the new field of bioinformatics

## **FOOD LEGISLATION**

Contact Time: 32 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: To introduce students to the large number of Acts and other legislation that controls the production and sale of food products in the South African and International Markets.

## **FOOD PROCESS ENGINEERING**

Contact Time: 32 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: Provides students with an understanding of the importance of designing and maintaining a sanitary food holding facility, as well as the environmental impact

caused by the production and processing of foods and how to mitigate the effect on people, profit and planet.

### **FACULTY GENERAL EDUCATION ELECTIVE (FGE 1)**

Contact Time: 48 hours - Theory (4) periods per week

Assessment:

Course Mark: N/A

Examination: N/A

Final Mark: Class test will contribute 30% of Final Mark  
Assignment will contribute 30% of Final Mark  
Group project will contribute 40% of Final Mark

Syllabus: To critically evaluate the impact of key challenges of sustainable development within a Kwa-Zulu Natal and SADC context; and design strategies on how applied sciences can address these challenges

### **INSTITUTIONAL GENERAL EDUCATION ELECTIVE 2 (IGE 2)**

SEE ATTACHED ADDENDUM

### **FOOD SCIENCE AND TECHNOLOGY 3**

Contact Time: 64 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam

Syllabus: The general aim of the module is to provide a sound knowledge of the theoretical background of Food Technology preparing the student for entry in to the Food Industry with specific emphasis on product research and development Upon completion of this module students should be able to:

- Describe human nutritional requirements and problems arising from diet
- Explain the factors leading to food deterioration and its restraint
- Distinguish between the different radiation formats that can be applied to food and their respective effects
- Elucidate how microorganisms may be used to add value to foods and create new foods
- Describe the Importance of food packaging to modern food processing industry
- Explain the mechanisms of forming and maintaining emulsions
- Describe the potential problems that may occur during mixing operation

### **RESEARCH PROJECT I**

Contact Time: 32 hours - Theory (3) periods per week

Assessment:

Course Mark: N/A

Examination: N/A

Final Mark: Control Test 40% of final mark  
Written assignment and Project Proposal 40% of final mark  
Oral presentation 20% of final mark

Syllabus: The course is intended for undergraduate students in preparation for research that they may undertake in industry or as postgraduates. Students who complete

this course will have an understanding of formulating a research topic, reading and critically reviewing literature, research strategy, research ethics, sampling, data analysis, referencing, writing and presenting for research.

### **FOOD CHEMISTRY 3**

Contact Time: 64

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.

60% – Exam

- Syllabus:
- human nutritional requirements and problems arising from diet
  - factors leading to food deterioration and its restraint
  - radiation formats that can be applied to food and their respective effects
  - how microorganisms may be used to add value to foods and create new foods
  - Importance of food packaging to modern food processing industry
  - mechanisms of forming and maintaining emulsions
  - potential problems that may occur during mixing operation

### **FOOD PRODUCT DEVELOPMENT**

Contact Time: 48 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.

60% – Exam

- Syllabus: Examine the different stages of the food product development process from idea generation to product launch. It also contextualises the relationship between packaging, engineering, manufacturing, and quality in the development of food products.

### **FOOD AND BEVERAGE PACKAGING**

Contact Time: 48 hours

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, practicals, projects etc.

60% – Exam

- Syllabus:
- Modify the micro-atmosphere in packaged food products to safely preserve them and extend their shelf lives.
  - Critically analyse the large range of packaging and packaging machinery available today to package foods and beverages
  - Effectively demonstrate the construction of metal cans, glass and plastic containers and the role played by each in packaging foods and beverages.
  - Evaluate the role and functions of paper and paperboard in the packaging of food products.
  - Effectively demonstrate logistical packaging for food marketing systems.
  - Critically analyse the considerable environmental issues concerning packaging waste.

## **INSTITUTIONAL GENERAL EDUCATION ELECTIVE 3 (IGE 3)**

SEE ATTACHED ADDENDUM

### **RESEARCH PROJECT 2**

- Contact Time: 64 hours  
Research Supervision = 40%,  
Independent student study and Research (Laboratory, Library and Computer labs) = 60%
- Assessment:  
Course Mark: N/A  
Examination: N/A  
Final Mark: The final mark for this module will be calculated as follows:  
Research Project Report - 70%  
Research Project Presentation - 30%
- Syllabus: To holistically apply knowledge acquired in the qualification to research and perform experiments on a community-based project within the biotechnology field.

### **INDUSTRY MANAGEMENT**

- Contact Time: 32 hours - Theory (3) periods per week  
Assessment:  
Course Mark: Refer to the study guide.  
Examination: 1 X 3-hour paper  
Final Mark: 40% – Tests, assignments, projects etc.  
60% – Exam
- Syllabus: This module develops a critical understanding of the commercial aspects of the biotechnology and food industry. It covers principles and policies of business and personnel management, entrepreneurship, intellectual property and government legislation currently applicable to Biotechnological industries in KZN and globally.

### **FOOD SAFETY AND TOXICOLOGY**

- Contact Time: 64 hours  
Assessment:  
Course Mark: Refer to the study guide.  
Examination: 1 X 3-hour paper  
Final Mark: 40% – Tests, assignments, practicals, projects etc.  
60% – Exam
- Syllabus: Essentials of food safety and toxicology. The module will also inform the students about public health risks of hazards and toxins. Students should be able to :
- Critically evaluate food biological hazards with conventional methods, molecular techniques and other rapid methods
  - Effectively distinguish natural and synthetic toxicants in foods
  - Critically analyse the role of biofilm formation and stress adaptation in persistent pathogens.
  - Identify and implement processes to prevent food hazards and toxicants contaminations in the food system
  - Predict food hazards and toxicants with risk analysis tools.

### **FOOD BIOTECHNOLOGY**



Contact Time: 32 hours - Theory (3) periods per week

Assessment:

Course Mark: Refer to the study guide.

Examination: 1 X 3-hour paper

Final Mark: 40% – Tests, assignments, projects etc.

60% – Exam

Syllabus: This module deals with the fundamental knowledge of biotechnology and its applications in food production. The role of food biotechnology in Food industries and Africa as well as ethical and regulatory issues will be covered.

### **FACULTY GENERAL EDUCATION ELECTIVE 2 (FGE 2)**

Contact Time: 48 hours - Theory (4) periods per week

Assessment:

Course Mark: N/A

Examination: N/A

Final Mark: Written assignment or poster: 20%

Presentations 20%

Tests 20%

Portfolio of evidence/reflective journal 20%

Project 20%

Syllabus: To explore the impact of various aspects of the applied sciences on society

### **FACULTY GENERAL EDUCATION ELECTIVE 3 (FGE 3)**

Contact Time: 48 hours - Theory (4) periods per week

Assessment:

Course Mark: N/A

Examination: N/A

Final Mark: RADICAL\CREATIVE PEDAGOGY AND ASSESSMENT (Continuous assessment) : 25% Reflective Journal

25% Creative presentation

50% Practical project (25% individual portfolio; 25% group presentation)

Syllabus: The purpose of this module is to develop students through creating a holistic awareness of the variety of problems, engage in socially valuable action while critically reflecting on the nature of their action and the problems it seeks to address

### **General Education in the Department of Biotechnology and Food Technology**

Where a module is designated as an Institutional General Education Elective module the student is to select from list of modules made available at time of registration. All modules made available will be eight credits and at NQF level 5. If a student has registered for and passed a module, he/she may not select that module again.

\* Note – all modules that students will be asked to select from are 8 credits and at NQF level 5. Further, modules may be removed or added to this list, depending on availability of resources and popularity of modules. Bachelor of Applied Science in Food Science and Technology

Year	Module	Level	Credit	Purpose of Module
I –S2	Interpersonal Communication & Self	5	8	To prepare students to understand the role of self and others in the communication process and use their understanding to communicate more effectively and develop interpersonal relationships.

	Introduction to Technopreneurship	5	8	The purpose of General Education is to ensure that our graduates are not only skilled professionals in their chosen area of study but also broadly educated and well-rounded local and global citizens. Toward this greater purpose, this module will introduce students to the concept and language of technopreneurship. Students will be exposed to the excitement of potentially starting their own technically related businesses, and will be able to explain the difference between small business and entrepreneurship. The current SA need for SMMEs, and the related supporting organisations will be introduced. The module scope is designed to provide breadth rather than depth. Students would be advised to seek the depth necessary for the success of their potential small businesses in subsequent modules.
	Reflections on Quantitative Thinking	5	8	The module inducts students at level 5 or higher across all programmes into reflective thinking practices which foster logical, analytical and meaningful thinking. It further aims to facilitate the transference of critical thinking into quantitative reasoning problems where appropriate quantitative methods are used and into argumentation and evaluation. The module is offered as one in a suite of electives in the General Education curriculum.
	Cultural Diversity	5	8	The purpose of this module is as follows : 4. To equip students with knowledge about human diversity issues particularly around the social constructions of race, gender, sexual orientation, spirituality and disability. 5. To prepare students to demonstrate respect and empathy for diverse cultures locally and globally. 6. To enable students to recognize the importance of critical reflection of the stereotypes one holds of other groups.
	Literacies through Literature	5	8	This module would support students with the ongoing development of their reading, critical-thinking, discussion and writing competencies by using a holistic “scaffolding” model of teaching and learning. It is proposed that the process be text-based and that a contemporary South African novel, such as <i>At the rendezvous of victory and other stories</i> (Kwela, 1999) be prescribed for this purpose.
<b>2 – S4</b>	Me, My World, My Universe	5	8	1. The module inducts students at level 5 across all Programmes into the awareness of the role of

				<p>quantitative reasoning in critical, insightful and meaningful reasoning applied to self, world and universe.</p> <p>2. The module is designed to enable learners in a quantitative and data dense world to extend and develop their ability to solve quantitative problems, understand and construct valid arguments supported by quantitative evidence and analysis and to communicate arguments in a variety of appropriate mathematical and verbal formats.</p> <p>3. The module will contribute to the development of “knowledge, attitudes and values” within the themes indicated thereby contributing to the purpose of General Education.</p>
Practical Parenting	5	8	<p>The purpose of this module is: To equip students to demonstrate understanding of child development and child rearing thereby contributing to the development of child friendly communities in society.</p>	
Hands Filled with Meaning	5	8	<p>This learning module is a General Education Elective module and contributes to ensuring that students who graduate from DUT are well-rounded citizens. The Introduction to South African Sign Language (SASL) module will enable students who select to do it to sign a basic conversation with a Deaf person in SASL and also understand some of the key concepts and policies around disability in South Africa. Students will gain a grounded understanding of the Deaf Community and the challenges faced by Deaf persons in South Africa. The module would assist students to consider how they can work effectively with people with disabilities generally and Deaf people specifically.</p>	
Violence and Nonviolence	5	8	<p>To develop students’ awareness of self and society through engaging with text and lived experiences related to violence and nonviolence; To develop students’ practice of critical and engaged citizenry; To challenge the ways in which violence serves to deepen inequality between social groups, in particular between men and women; To develop students’ understanding of the nature, extent and causes of violence; To enable students to become active leaders for nonviolence within their roles as students and citizens.</p>	
Sustainable Earth Studies	5	8	<p>The module provides a knowledge base to develop positive attitudes and actions that will benefit environmental sustainability on a range of levels.</p>	

				<p>It stresses the importance of biodiversity as the foundation of human wellbeing and demonstrates the relevance of local biodiversity and healthy functioning ecosystems to young people living and studying in KwaZulu–Natal today.</p> <p>This module describes planet earth as a complex biosphere made up of living and non- living components, each wholly dependent and inextricably linked to each other.</p>
<b>3 – S5</b>	Values in the Workplace	5	8	<p>The purpose of this module is as follows :</p> <ul style="list-style-type: none"> <li>• To heighten student’s awareness of their personal beliefs, values, and attitudes regarding culture, race, ethnic and other identity statuses and how it intersects with values for the workplace.</li> <li>• To enable students to become knowledgeable about values, gender, sexual orientation, socioeconomic status, and disability within society and resultantly within the context of values in the workplace.</li> <li>• To enable students to be familiar with methods to develop effective values, ethics and leadership in the workplace, thereby developing a level of social responsibility.</li> </ul>
	Constitutional Law and Human Rights	5	8	<p>The aim of this module is to make the constitution and the bill of rights relevant to students and to gain an understanding of how the Constitution and Human Rights issues impact on them privately, at work and in the broader society. A few areas have been chosen based on relevance, interest and the graduate attributes that general education at DUT aims to develop oral, written communication skills, logic and reasoning. The purpose of this module is to introduce students to the importance of being responsible citizens through having an appreciation of the importance of the Constitution and Human Rights, within a local and global context. To encourage and develop a practice of critical and engaged citizenry. It will assist students to understand the ways in which humans shape these systems, through conflict and struggle, the values that underlie them, namely why they should vote and what it means to be part of a democracy. The module is based on the idea of combining theory and practice. In each section a constitutional concept and/or a human right issue or experience will be introduced and discussed. Module specific terminology will be explained and an understanding</p>

				of key concepts will be developed. Each scenario will include a focus on the development of skills by developing the student's capacity for research, independent critical thinking and debate.
Law for Life	5	8		The aim of this module is to make the law relevant to everyday life. It is based on the idea of combining theory and practice. In each section an everyday life experiences will be introduced and discussed. Module specific terminology will be explained and an understanding of key concepts will be developed. Each scenario will include a focus on the development of skills by developing the student's capacity for research, independent critical thinking and debate.
World of Work	5	8		The purpose of General Education is to ensure that our graduates are not only skilled professionals in their chosen area of study but also broadly educated and well-rounded local and global citizens. Toward this greater purpose, this module is designed to introduce and develop non-technical working related competencies and values within students in order to facilitate easier adapting to the workplace in Work Integrated Learning (WIL) placements, and/or their future careers.
Leadership	5	8		The purpose of this module is to develop students with a critical and informed understanding of leadership, and with skills that enable them to understand and take ethical leadership in a variety of contexts, including within the institution.

## MODULE CONTENT

### ND: BIOTECHNOLOGY AND ND: FOOD TECHNOLOGY (Common Modules)

#### ACBL201 - ANALYTICAL CHEMISTRY: BIOLOGICAL II (150418622)

Contact Time: Theory (4); Practical (4) (Periods per week)

**ASSESSMENT** (Examinable)

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This course is designed to teach the underlying principles of wet chemical analysis and selected instrumentation commonly used in biotechnology and food industries. It involves the theoretical principles associated with these methods of analysis. Concentration and preparation of solutions, acids bases and salts, General principles of acid base balance and application of acid/base titrations in biotechnology industries, pH, Principles of precipitation titrations, application of titrations in biotechnology, Metal complexes in solution, redox reactions, Moisture analysis, Ashing procedures, Introduction to spectroscopy, Introduction to refractometry, Introduction to chromatography, Sampling and sample preparation

#### CHMB102 - CHEMISTRY I (150417112)

Contact Time: Theory (4); Practical (4) (Periods per week)

**ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This course will equip students with grounding in chemistry that will develop a level of theoretical knowledge and practical and problem solving skills, and to present the physical and descriptive inorganic and organic aspects of chemistry. General chemistry makes up 70% of the syllabus: atomic structure and periodic table, ionic compounds, molecular elements and compounds, chemical equations and reactions, composition and stoichiometry, acid-base equilibria, reaction rates and equilibrium, solutions. Organic chemistry makes up 30% of the syllabus. The organization of organic chemistry, alkanes and cycloalkanes, unsaturated hydrocarbons, alcohols, phenols and ethers, aldehydes and ketones, carboxylic acids and esters, amines and amides. Laboratory exercises in selected topics from above.

#### FMIC302 - FOOD MICROBIOLOGY 3 (150311003)

Contact Time: Theory (4); Practical (3) (Periods per week)

**ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: To study the characteristics of genera of bacteria and fungi that are found in foods, their role in foods and food spoilage and in fermentation and development of foods. To explain methods of determining their presence and numbers in foods, factors that affect their growth and methods of preventing and controlling their presence in foods.

#### MICR101 - MICROBIOLOGY I (150304212)

Contact Time: Theory (4); Practical (3) (Periods per week)

### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: To give the student a basic knowledge and understanding of bacterial growth, physiology and control.

### **MICR202 - MICROBIOLOGY II (150312822)**

Contact Time: Theory (4); Practical (3) (Periods per week)

### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The Microbiology II course serves to cement and expand the basic knowledge of microorganisms learned in the Microbiology I course. In particular, the use of antibiotics to control microbial growth and characteristics of viruses and fungi are studied in more detail and the biochemical activities of microorganisms will be studied so that we appreciate and understand our response to the various consequences of microbial activity. In this course, the varied activities of microorganisms will also be used as a means of identifying them.

### **QMTH101 - QUANTITATIVE METHODS I (160803412)**

Contact Time: Theory (4); Practical (4) (Periods per week)

### **ASSESSMENT**

Course Mark: Refer to the study guide.

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The aim of this course is to provide students with sound mathematical and computer skills relevant to Biotechnology. The course is made of two components ie: statistics and computer skills. The statistics portion involves the process of statistical enquiry and making sense of data.

## **12.2 ECP MODULE CONTENT: ND (ECP): BIOTECHNOLOGY AND ND (ECP): FOOD TECHNOLOGY**

### **IBTC101 - INTRODUCTION TO BIOTECHNOLOGY I**

Contact Time: Theory (4); Practical (4) (Periods per week)

### **ASSESSMENT**

Continuous: Refer to the study guide

Syllabus: The aim of this course is to facilitate the development of a well-grounded understanding of biotechnological themes, such as broad principles of biotechnology, knowledge of the latest developments in the field of biotechnology as well as its applications in industry both globally and locally. In this course the student will be introduced to the multidisciplinary nature of biotechnology and the many fields that biotechnology impacts.

### **IFDT101- INTRODUCTION TO FOOD TECHNOLOGY I**

Contact Time: Theory (4); Practical (4) (Periods per week)

## **ASSESSMENT**

- Continuous: Refer to the study guide
- Syllabus: This module is an introduction to food technology. This course serves as a foundational course for the Food Technology programme and is aimed at orientating students to the food technology discipline. It covers the basics in food processing and engineering, food chemistry food microbiology and sensory and nutrition.

## **BIST101 - BIOSTATISTICS I**

- Contact Time: Theory (4); Practical (4) (Periods per week)

### **ASSESSMENT**

- Continuous: Refer to the study guide
- Syllabus: The purpose of this module is to introduce students to the key concepts and calculations associated with biological systems. This course will supplement the calculation-based requirements for other courses in the program that require this. In this course, the student will: The student will: manipulate and convert numbers in various formats such as decimal and exponential and express them in a scientific manner; utilize manipulations above to demonstrate knowledge of producing dilutions, concentrations, percent and molar solutions; calculate magnification when using a microscope; calculate DNA concentrations using a spectrophotometer; demonstrate knowledge of growth and fermentation kinetics; apply descriptive and inferential statistics to interpret data; demonstrate knowledge of immunological and biochemical calculations associated with chemicals; choose type and Dr.aw appropriately formatted graphs and tables; and demonstrate knowledge of basic Excel operations.

## **CSBT 101 - COMPUTER SKILLS**

- Contact Time: Theory (4); Practical (4) (Periods per week)

### **ASSESSMENT**

- Continuous: Refer to the study guide
- Syllabus: This aim of this course is to provide an introduction to computer applications which will enable the student to use the computer in a working environment and academia.

## **SCMT101 - THE SCIENTIFIC METHOD I**

- Contact Time: Theory (4); Practical (4) (Periods per week)

### **ASSESSMENT**

- Continuous: Refer to the study guide
- Syllabus: This course provides the basic groundwork for science students to scientific theory and scientific methods. Teaching the scientific method is a fundamental way for students to practice thinking critically and scientifically. By performing science experiments and analysing the resultant data, it is hoped that this training will stimulate creative thinking and scientifically. Equally important is the ability to write scientifically by following acceptable scientific writing protocols that aids in communication of results. The course also aims to introduce and cement basic study skills that are most probably poorly-implemented by these students.



## 16.3 MODULE CONTENT: ND: BIOTECHNOLOGY

### **ABIC301 - ANALYTICAL BIOCHEMISTRY III (150413203)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The purpose of this module is to develop knowledge and skills, values and attitudes appropriate to the use of sophisticated analytical instruments to carry out qualitative or quantitative analysis of biological material for the presence of biochemical or chemical compounds and report the results in a scientific manner. The module is intended to give students a toolkit of core concepts they can use in the higher level research applications.

### **BCHM202 - BIOCHEMISTRY 2 (150411222)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This course mainly focuses on chemical structures of biomolecules and their functions. The sources of major food components and the reactions of these components with other agents are explained. The metabolic processes that produce energy after consuming foods are also covered. The purpose of this course is to introduce the student to the major types of biomolecules that are of importance to a cell, and learn to identify and analyse biomolecules. Structure and reactivity of carbohydrates, lipids, proteins, nucleic acids. Analysis of above including centrifugation, kjeldhal, ultra violet and visible spectroscopy and qualitative methods.

### **BIOD101 - BIODIVERSITY AND ECOLOGY I (150300912)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This course serves as an introduction to the dynamic field of biotechnology and will serve as the basis and foundation for future courses (Microbiology I, II, III, Bio-processing etc) emphasizing the application of the science to benefit humans and the environment. It deals with the diversity of living organisms and the interrelationships of organisms with each other and the physical environment.

### **BIOP301 - BIOPROCESSING 3 (150311503)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: Bioprocessing III will discuss several applications of biotechnology in industry.

Each application will be examined from the development, implementation and economic perspectives. Development will be looked at from the perspective of biotechnological development of microorganisms and associated processes to produce the associated product. Implementation will be discussed as applying developed microorganisms in industrial processes along with downstream processing of products and waste materials. Economic perspective will be discussed for each subsection as well as for the biotechnology industry as a whole.

### **BIPR 101- BIOTECHNOLOGY INDUSTRY PRACTICE I**

Contact Time: Industry based

#### **ASSESSMENT:**

Continuous: Refer to the study guide

Syllabus: A 12 month period of relevant laboratory practice must be undertaken by the student in an approved work integrated learning environment. During this time the student must demonstrate skills to solve problems by innovation in the relevant industry.

### **BIPR 201 - BIOTECHNOLOGY INDUSTRY PRACTICE II**

Contact Time: Industry based

#### **ASSESSMENT:**

Continuous: Refer to the study guide

Syllabus: The student will conduct a mini-research project independently, present their findings at a public forum and write-up a scientific report on the same.

### **DIMR201- DISEASE AND IMMUNE RESPONSE 2 (90106022)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: Demonstrate knowledge and skills in basic immunology and infectious diseases in South Africa and display a responsible attitude relevant to the above. Important infectious diseases of man, animals, plants, Control strategies including biocontrol, Immune system structure & function, Vaccination, Monoclonal & polyclonal antibodies, Diagnostic techniques (electrophoresis, PAGE, immunoassay, radioimmunoassay, serological techniques).

### **FERT202 - FERMENTATION TECHNOLOGY II (150306022)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The Biotechnology course focuses on the general isolation, morphology, growth and control of microorganisms. Fermentation Technology ties in all these aspects and demonstrates how microorganisms can be harnessed to demonstrate their real potential in producing value added products on a large scale.

### **MIBC301- MICROBIAL BIOCHEMISTRY 3 (150418803)**

Contact Time: Theory (4); Practical (4) (Periods per week)

## **ASSESSMENT**

Course Mark:	Refer to the study guide
Examination:	1 x 3 hour paper
Final Mark:	Course Mark (40%) + Examination Mark (60%)
Syllabus:	This module is aimed at equipping a student with the knowledge of metabolic pathways involved in the breakdown of different substrates, the energies and enzymes involved during these processes. The module further highlights the regulation of enzymes involved in the synthesis of products of industrial importance.

## **MICR301 - MICROBIOLOGY: BIOLOGICAL III (150305903)**

Contact Time: Theory (4); Practical (4) (Periods per week)

### **ASSESSMENT**

Course Mark:	Refer to the study guide
Examination:	1 x 3 hour paper
Final Mark:	Course Mark (40%) + Examination Mark (60%)
Syllabus:	The present public interest in biotechnology, particularly in recent developments in genetic engineering, tends to emphasize the future value of biotechnology to society. The course therefore introduces the genetic processes that occur in a cell, explores the transfer of genetic material between organisms and introduces methods and techniques to create or modify cells at the genetic level. Finally, the safety and ethics of this technology is paramount and the satisfactory handling of these issues is crucial to its acceptance by the public.

## **PRTM101 - PROCESS TECHNOLOGY AND MANAGEMENT (150311312)**

Contact Time: Theory (4) (Periods per week)

### **ASSESSMENT**

Course Mark:	Refer to the study guide.
Examination:	1 x 3 hour paper
Final Mark:	Course Mark (40%) + Examination Mark (60%)
Syllabus:	The general aim of this instructional offering is to provide a sound knowledge of the theoretical aspect of Biotech Industrial Management.

## **SASH101 - SANITATION SAFETY AND HYGIENE I (150305812)**

Contact Time: Theory (4) (Periods per week)

### **ASSESSMENT**

Course Mark:	Refer to the study guide
Examination:	1 x 3 hour paper
Final Mark:	Course Mark (40%) + Examination Mark (60%)
Syllabus:	This module provides the student with a sound knowledge of the basic concepts of Sanitation, Safety and Hygiene, with special reference to the work place and various manufacturing industries.

## 16.4 MODULE CONTENT: NATIONAL DIPLOMA: FOOD TECHNOLOGY

### FCHM 202 - FOOD CHEMISTRY II (100310822)

Contact Time: Theory (4); Practical (4) (Periods per week)

#### ASSESSMENT

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This course mainly focuses on chemical structures of biomolecules and their functions. The sources of major food components and the reactions of these components with other agents are explained. The metabolic processes that produce energy after consuming foods are also covered.

### FCHM 202 - FOOD CHEMISTRY III (100310903)

Contact Time: Theory (4); Practical (4) (Periods per week)

#### ASSESSMENT

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The major outcome of this module is to enable students to understand foods as mechanistic, chemical systems. All the phenomena observed in preparing food can, in principle, be understood in classically chemical terms. Understanding how chemical systems behave enables us to better control them to meet our many needs. Students will enter the class with a basic knowledge of chemistry and leave understanding how it applies to food. As well as understanding the important chemical basis of food quality, successful students will develop a conceptual framework to understand unfamiliar phenomena in terms of food chemistry. Achievement of these outcomes requires both an accumulation of facts and the development of an analytical approach to food quality.

### FDIM 101 - FOOD INDUSTRY MANAGEMENT I (100311012)

Contact Time: Theory (4) (Periods per week)

#### ASSESSMENT

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The Food Technology course focuses on the application of food science for the production, preparation, processing, packaging, storage, distribution and use of wholesome food. Food Industry Management therefore introduces students to the importance of management in the proper operation of the food industry

### FIPR 101 - FOOD TECHNOLOGY INDUSTRY PRACTICE I

Contact Time: Industry based

#### ASSESSMENT

Continuous: Refer to the study guide

Syllabus: A 12 month period of relevant laboratory practice must be undertaken by the student in an approved work integrated learning environment. During this time the student must demonstrate skills to solve problems by innovation in the relevant industry.

### FIPR 201 - FOOD TECHNOLOGY INDUSTRY PRACTICE II

Contact Time: Industry based

**ASSESSMENT:**

Continuous: Department and external examiners will assess the project as follows:

Proposal: 10%

Oral Presentation: 40%

Written Scientific Report: 50%

A minimum of 50% must be obtained to pass the module.

Syllabus: The student will conduct a mini-research project independently, present their findings at a public forum and write-up a scientific report on the same.

**FDPE101 - FOOD PROCESS ENGINEERING I (81605812)**

Contact Time: Theory (4) (Periods per week)

**ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This module discusses the basic engineering principles and shows how they are important in, and applicable to the food industry and food processes. As an introduction to food process engineering, this module describes the scientific principles on which food processing is based and gives examples of the application of these principles in several food industries.

**FDPE201 - FOOD PROCESS ENGINEERING II (81605922)**

Contact Time: Theory (4) (Periods per week)

Syllabus: Environmental protection, safety, factory systems, materials handling, water and waste disposal, process control, automation and food plant design, loss control and accident management, sampling and data management, steam supply, compressed air and electricity.

**FDQA101 - FOOD QUALITY ASSURANCE I (100311312)**

Contact Time: Theory (4) (Periods per week)

**ASSESSMENT**

Course Mark:

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This course provides a sound knowledge of the basic concepts and principles of quality control and quality assurance, sanitation, hygiene, and quality systems used in the food industry. This includes the application and understanding of good manufacturing practices, food safety and food quality systems used in the food industry to ensure the manufacture of safe and nutritious food.

**FDTE 102 - FOOD TECHNOLOGY I (100311812)**

Contact Time: Theory (4); Practical (4) (Periods per week)

**ASSESSMENT**

Course Mark:

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: Food Technology I is the module that introduces students to the principles of food technology which is the use of information generated by food science in the selection, preservation, processing, packaging and distribution, as it affects the

consumption of safe, nutritious and wholesome food. The general aim of this study is to provide a sound knowledge of the theoretical and practical aspects of food technology. It introduces students to basic pre-processing operations and selected processing operations of food products.

### **FDTE 201 - FOOD TECHNOLOGY II (100301822)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: This module introduces students to the scientific aspects of food processing including the basic concepts, applications and principles of various food processing operations.

### **FDTE 301 - FOOD TECHNOLOGY III (100301903)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark:

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: The general aim of the module is to provide a sound knowledge of the theoretical background of Food Technology. The module prepares the student for entry in to the Food Industry with specific emphasis on product research and development

### **PHYSI03 - PHYSICS (150710512)**

Contact Time: Theory (4); Practical (4) (Periods per week)

#### **ASSESSMENT**

Course Mark: Refer to the study guide

Examination: 1 x 3 hour paper

Final Mark: Course Mark (40%) + Examination Mark (60%)

Syllabus: Demonstrate knowledge of introductory principles of physics for topics as outlined in the indicative content.

## **16.5 MODULE CONTENT: BTECH: BIOTECHNOLOGY**

### **ENTREPRENEURIAL SKILLS I (ENSB 101)**

Entrepreneurship & entrepreneurs, the business plan, managing markets & finances, legal aspects, general management.

### **ENVIRONMENTAL BIOTECHNOLOGY IV (ENBT 401)**

Environmental protection and waste disposal, Industrial wastewater treatment processes, Biodegradation and xenobiotic compounds, Bioleaching and biosorption, Soil bioremediation, Bioremediation of oil spills.

### **INDUSTRIAL BIOTECHNOLOGY IV (INBT 401)**

Industrial enzymes: classes, production, applications, economic considerations, genetic modification. Processes, applications and economics for the production of industrially important products.

### **PLANT BIOTECHNOLOGY IV (PLBT 401)**

Plant cell culture, Clonal propagation and transfer of tissue culture to soil, Genetic manipulations in tissue culture, Plant improvement, Microbial control of insects, Biofertiliser technology, Biological control.

### **RECOMBINANT DNA TECHNOLOGY IV (DNAT 401)**

Gene organisation in prokaryotes and eukaryotes, Molecular basis of mutations, Phages and plasmids in bacterial recombination, Fungal genetics systems, Yeast genetic engineering.

### **RESEARCH METHODOLOGY: NATURAL SCIENCES (RMNS 201)**

The nature of research, Formulating a research topic, Reading & critically reviewing literature, Research strategy, Research ethics, Sampling, Data analysis, Referencing, Writing & presenting for research, Proposal writing, Research statistics.

### **RESEARCH PROJECT IV (RESP 411)**

The student must plan and conduct a research project in an appropriate field of Biotechnology, and report on the findings according to the guidelines provided by the department.

## **16.6 MODULE CONTENT: BTECH: FOOD TECHNOLOGY**

### **ENTREPRENEURIAL SKILLS I (ENTP202)**

Entrepreneurship & entrepreneurs, the business plan, managing markets & finances, legal aspects, general management.

### **FOOD ANALYSIS IV (FANL402)**

Introduction to biochemical investigations, food adulteration, centrifugation, filtrations, HPLC/GC, CE, UV, IR, AA, radio-isotope techniques, immunochemical techniques and rapid methods in food analysis.

### **FOOD COMPONENTS IV (FCMP401)**

Proteins, CHO, lipids, enzymes, ingredient function and selection, and miscellaneous additives.

### **FOOD MICROBIAL ASSURANCE IV (FDMA401)**

Microbiological control of Food, Introduction to HACCP, Application of HACCP, Production and harvesting of plant foods, hygienic design of food operating areas, Production of animal products, Hygienic design and use of equipment, food processing, cleaning and disinfecting, knowledge required by personnel and public food safety culture.

### **FOOD PRODUCT DEVELOPMENT IV (FPDV401)**

Marketing, food product development processes, management of food product development, engineering manufacturing, food safety and regulations, packaging, protection of intellectual property, role of suppliers, function of ingredients and functional foods.

### **FOOD PROJECT IV (FPRJ 401)**

The student must plan and conduct a research project in some field of Food Technology, and report the findings according to the guidelines provided by the department.

### **FOOD TECHNOLOGY IV (FDTE402)**

Concepts related to food contaminants, GMF's and organic foods, advances in food processing and production and the impact of various technologies, relate nanotechnology and nutrigenomics to food processing, the impact of technology on nutrition and nutrigenomics, advances in packaging technology.

### **RESEARCH METHODOLOGY: NATURAL SCIENCES (RMNS202)**

The nature of research, Formulating a research topic, Reading and critically reviewing literature, research strategy, Research Ethics, Sampling, Data Analysis, Referencing, Writing and presenting for research, Proposal writing, Research Statistics.