

**FACULTIES OF THE UNIVERSITY  
OF PRETORIA**

HUMANITIES

EDUCATION

NATURAL, AGRICULTURAL AND INFORMATION SCIENCES

LAW

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**FACULTY OF NATURAL, AGRICULTURAL AND  
INFORMATION SCIENCES**

**PART I**

**(separate publication)**

**School of Mathematical Sciences**

- Mathematics and Applied Mathematics
- Statistics
- Assurance and Actuarial Science

**School of Physical Sciences**

- Physics
- Chemistry
- Geography
- Earth Sciences

**School of Information Technology**

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**PART II**

**(this publication)**

**School of Biological Sciences**

- Biochemistry
- Genetics
- Microbiology and Plant Pathology
- Physiology
- Botany
- Zoology and Entomology

**School of Agricultural Sciences**

- Agriculture Economics, Extension and Rural Development
- Animal and Wildlife Sciences
- Food Science
- Home Economics
- Plant Production and Soil Science



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**FACULTY OF NATURAL, AGRICULTURAL AND INFORMATION SCIENCES**

**ACADEMIC PERSONNEL AS ON 30 JUNE 1999**

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Roux, J., PhD(UOVS).....	Senior Research Officer
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**Faculty Administration**

Beresford, M.E., Mrs.....	Head
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## GENERAL INFORMATION

### **Admission**

Any person who wishes to register at the University for the first time, or after an interruption of studies, should apply or reapply for admission. Application for admission to all courses closes on 30 September.

### **Selection**

A selection procedure takes place prior to admission to the DipEd(Sci) diploma course and the BSc, the BSc(Agric), BInstAgrar and the BsecEd(Sci) degree course.

### **Statement of symbols**

When registering at this University for the first time, a candidate has to submit a record of symbols obtained for each subject in the Matriculation examination.

### **Medium of instruction**

In conducting its business, the University uses two official languages, namely Afrikaans and English. In formal education, the medium of instruction is either Afrikaans or English, or both of these languages, provided that there is a demand and that it is academically and economically justifiable.

However, it remains the student's responsibility to ascertain on an annual basis in which language a course and any further level of that course is presented.

In respect of administrative and other services, a student has the right to choose whether the University should communicate with him or her in Afrikaans or English.

### **Bursaries and loans**

Particulars of bursaries and loans are available on request.

### **Accommodation**

Applications for accommodation in university residences for a particular year should be submitted as from April 1 of the preceding year. Applications will be considered as long as vacancies exist, and prospective students are advised to apply well in advance.

Please note that admission to the University does not automatically mean that lodging will also be available.

### **Open day and orientation**

Details of the open day to which all parents are cordially invited, and the subsequent orientation week during which all new first-year students must be present, are obtainable from the Dean of Students, University of Pretoria 0002.

### **Prescribed books**

Lists of prescribed books are not available. The appropriate lecturers will supply information regarding prescribed books to students at the commencement of lectures.

### **Amendment of regulations and fees**

The University retains the right to amend the regulations and to change course fees without prior notification.

**NB:** The University of Pretoria will be phasing in a new system of education and learning during 2000, which will meet the requirements set out in SAQA guidelines (South African Qualification Authority) and in the NQF (National Qualification Framework). This entails the implementation of training programmes that will be outcomes-based and market-orientated. This system will be implemented in the Faculty during 2001. Students who have registered for a degree or diploma in this Faculty before 2000, or who register for 2000, will be enabled to complete the studies for the qualification.

Should a student who registered before 2000, wish to change over to the a new programme, permission may be obtained in consultation with the programme manager for the new programme. For certain programmes it will be essential that the student change over to the new programme on the recommendation of the programme manager. However, the student will have to meet all the requirements for the new qualification.

As a result of the phasing-in of this new system, information in this publication might not reflect the very latest developments in the Faculty. Problems may be taken up with the Faculty Administration.

### **Definition of terms**

*Familiarise yourself with the following terms. They are used generally in all faculties.*

**academic year:** the duration of the academic year which is determined by the University Council and consists of two semesters

**course:** a selected division of a subject deemed to be a unit and to which a course code is allocated

**after-hours studies:** classes attended after hours by students who register for the curriculum of a first degree or diploma that is presented over a longer period than the minimum duration indicated in the regulations for the particular degree or diploma

**course code:** consists of an equal number of capitals and digits, which indicate the name of the course, the year of study, the period of study and the level of the course

**credits:** a number of credits are allocated to each course. These represent the quantity of work and the extent of the course

**curriculum:** a series of courses grouped together from different subjects over a specified period of time and in a certain sequence according to the regulations

**examination mark:** the mark a student obtains for an examination in a course, including practical and clinical examinations where applicable. If necessary, the examination mark is finalised after ancillary examinations have been completed

**extended study programme:** a study programme for a degree or diploma which is completed over a longer period than the minimum duration of the particular degree or diploma

**final mark:** the mark calculated on the basis of the semester/year mark and the examination mark a student obtained in a particular course according to a formula which is determined from time to time in the regulations for each course with the proviso that should no semester/year mark be required in a course, the examination mark serves as the final mark

**GS:** a combined mark (semester/year mark plus examination mark) of at least 40%

**level of a course or level:** the academic level of a course which is indicated in the course code

**registration:** the process a candidate is required to complete to be admitted as a student of the University or for admission to a course

**regulation for admission:** a regulation drawn up by the Dean of a faculty regarding the admission of students to the faculty. It includes a provision regarding the selection process

**semester course:** a course that extends over one semester

**semester/year mark:** the mark a student obtains during the course of a semester or a year for tests, class-work, practical work or any other work in a particular course as approved by regulation

**subject:** a demarcated field of study of which one course or more may be chosen for a degree

**syllabus:** the division of the study material for a specific course, according to the regulations

**weighted average:** the weighted average is composed of the marks for the various courses, weighted with the credits of each course as a fraction of the total number of credits for the semester or year

**year course:** a course that extends over one year (two semesters)

## REGULATIONS AND CURRICULA

### 1. Admission to undergraduate study

#### 1.1 General

1.1.1 To register for a first bachelor's degree at the University, a candidate must, in addition to the required matriculation exemption certificate, comply with the specific admission requirements for particular courses and fields of study as prescribed in the admission regulations and the faculty regulations of the departments.

It is expected of every new undergraduate student who wishes to register at the University of Pretoria, to complete a language proficiency test. Based on the results of this test, the student will be enrolled in language development courses that have to be passed before the degree will be awarded. In exceptional circumstances the development course may be substituted by other courses offered by the School of Languages as approved by the Dean.

1.1.2 The following persons may also be considered for admission:

- (i) A candidate who is in possession of a certificate which is deemed by the University to be equivalent to the required matriculation certificate with university exemption.
- (ii) A candidate who is a graduate from another tertiary institution or has been granted the status of a graduate of such an institution.
- (iii) A candidate who passes an entrance examination, which is prescribed by the University from time to time.

**Note:** A conditional exemption certificate does not grant admission to bachelor's study. However, in certain circumstances some of the faculties do accept a conditional exemption on the basis of mature age. Candidates are advised to contact the specific faculty administration in this regard.

1.1.3 The Senate may limit the number of students allowed to register for a course, in which case the Dean concerned may, at his own discretion, select from the students who qualify for admission those who may be admitted.

1.1.4 Subject to faculty regulations and the stipulations of General Regulations G.1.3 and G.62, a candidate will only be admitted to postgraduate bachelor's degree studies, if he or she is already in possession of a recognised bachelor's degree.

## 1.2 Requirements for specific courses

A candidate who has:

- (a) passed the Grade 12 examination in Mathematics with at least 40% at higher grade or at least 50% at standard grade, will be admitted to the courses GLY 112 and 113 in Geology;
- (b) passed the Grade 12 examination in Mathematics with at least 50% at higher grade, will be admitted to WTW 114 and WTW 134 in Mathematics, and to WST 151,152 in Mathematical Statistics;
- (c) passed the Grade 12 examination in Mathematics as well as in Physical Science with at least 50% at higher grade, will be admitted to Molecular and Cell Biology and a course in the subjects Zoology and Entomology, Genetics, Microbiology or Botany;
- (d) passed the Grade 12 examination in Mathematics with at least 40% at higher grade or at least 50% at standard grade (or at least 50% in Statistics 151, 153 and 152, 163 and 123), will be admitted to (i) Statistics 151, 152, 161 and a course in the subjects Informatics (excluding INF 153,154, 163, 164 and 253, 263) or Statistics and (ii) courses in Business Management, Economics, Marketing Management and Financial Accounting on 200 level;
- (e) passed the Grade 12 examination in Mathematics and Physical Science at higher grade with at least 50%, will be admitted to the course CMY 112 and CMY 131 in Chemistry and PHY 131, PHY 181 and PHY 171 in Physics;
- (f) registers, may write an exemption test for module FRK 151 on the work covered in grade 12 (matric) for the subject Accountancy. Should this test be passed, the student will be exempted from module FRK 151 and will be allowed to continue with module FRK 181 immediately. This module entails computer applications for Accountancy and is presented during the full first semester (14 weeks). Should the student fail the exemption test, he or she can continue with FRK 151, which entails introductory computer-supported accountancy and a few lectures. The student who failed to pass the exemption test for FRK 151, will continue with FRK 181 in the second semester after having passed FRK 151 in the first semester; and
- (g) passed the Grade 12 examination in Computer Studies with at least 50% (D) at higher grade, as well as in Mathematics with at least 50% (D) at higher grade, obtains admission to the course COS 110 in Computer Science. (These candidates may not register for CIL 171, 172, 173 (6 credits) and/or COS 160). A candidate who has passed at standard level with an A, B, or D symbol, may not register for CIL 171, 172, 173. A candidate who has passed the courses CIL 171, 172, 173 (INF 151) and COS 160 (or equivalent as determined by the Head of Department) can register for COS 110 in Computer Science. In exceptional circumstances, a candidate who does not meet the admission requirements, may, receive permission from the Head of Department to register for COS 110 on the basis of academic achievement and/or applicable experience acquired in practice. A candidate who does not comply with the admission requirements for Computer Science, or who did not pass the Grade 12 examination in Computer Studies, may be admitted to COS 110, depending on the results of a special admissions test that can be taken before the start of the academic year, only if the admission requirements for Mathematics have been met. Applications to take this test can be submitted at the Computer Science Department.



**Please note:** ...*the Grade 12 examination*... refers to the final matriculation examination.

**2. Registration for a particular year of study**

At the beginning of an academic year, a student registers for all the courses he or she intends taking in that particular year (whether these be first-semester, second-semester or year courses). Changes to the chosen course of study may be made at the beginning of the second semester with the Dean's approval. A student may also only register for courses that will fit in on the lecture, test and examination timetables. Should a student be prepared to attend one course after hours to avoid clashes on the timetables, the approval of the Dean is not required. (This will only be possible if the course in question is offered full-time and extramurally.)

**3. Examination and pass requirements**

A semester/year mark of at least 40% is required in order to be admitted to the examination in any course, with the exception of first-semester courses at 100 level for which the requirement is 30%. Excluding cases where faculty regulations require a higher percentage, a subminimum of 40% is required in the examination in each course. A final mark of at least 50% is required to pass. The pass mark for essays is at least 50%. The stipulations of G.60.2.1.2(a) regarding requirements for theses apply *mutatis mutandis* to essays.

**3.1 Subminima in examinations**

Where applicable, the subminima required in examinations appear in the regulations of the degree in question and in the syllabi of the courses required for that degree.

**3.2 Examinations**

The examinations for first-semester courses take place in May/June, while all other examinations (second-semester courses and year courses) take place in October/November.

The relative weights of semester and examination marks in relation to the final mark are determined by the Head of Department in consultation with the lecturer/s. These weights are published in the study guide for the course.

**3.3 Ancillary examinations**

After completion of an examination and before the examination results are published, the examiners may summon a student for an ancillary examination on particular aspects of the work of that course.

**3.4 Re-marking of examination papers (also consult Reg G.14)**

After an examination, departments give feedback to students about the framework that was used by the examiners during the examination. The way in which feedback is given, is determined by the departmental heads. Students may apply for re-marking of an examination paper within 14 calendar days of commencement of lectures in the next semester. The prescribed fee has to be paid. The paper will then be re-marked by an examiner appointed by the Head of the Department.

**3.5 Supplementary examinations**

(a) Supplementary examinations in first-semester courses take place after the June examinations, while those in second-semester and year courses take place after the November examinations.

- (b) To pass a supplementary examination, a student must obtain a minimum of 50%.
- (c) The highest final percentage a student can obtain in a supplementary examination is 50%.

## DEGREES CONFERRED IN THE FACULTY

The following degrees and diploma are conferred in the Faculty (minimum period of study is given in brackets):

- (a) **Bachelor's Degrees:**
  - (i) Baccalaureus Scientiae – BSc (3 years)
  - (ii) Baccalaureus Scientiae Agriculturae – BSc(Agric) (4 years)
  - (iii) Baccalaureus Institutionis Agrariae – BInstAgrar (4 years)
  - (iv) Baccalaureus Secundae Educationis (Scientiae) – BSecEd(Sci) (4 years)
- (b) **Honours degrees: (1 year)**
  - (i) Baccalaureus Scientiae Honores – BSc(Hons)
  - (ii) Baccalaureus Scientiae Agriculturae Honores – BSc(Agric)(Hons)
  - (iii) Baccalaureus Institutionis Agrariae Honores – BInstAgrar(Hons)
- (c) **Master's degrees: (1 year)**
  - (i) Magister Scientiae – MSc
  - (ii) Magister Scientiae Agriculturae – MSc(Agric)
  - (iii) Magister Institutionis Agrariae – MInstAgrar
- (d) **Doctor's degrees:**
  - (i) Philosophiae Doctor – PhD (1 year)
  - (ii) Doctor Scientiae – DSc
- (e) **Diploma:**

Diploma in Education with specialisation in Sciences for the Secondary Phase – DipEd(Sci) (3 years)

General Regulations G.1 to G.15 are applicable to all bachelor's degrees, as well as mutatis mutandis to the undergraduate diploma.

Consult the separate information brochures on postgraduate regulations in the Faculty of Biological and Agricultural Sciences as well as regulations of the Postgraduate School for Agriculture and Rural Development for more details on postgraduate study.

Students, who take a course offered by another faculty, must familiarise themselves with the requirements for admission to the subject in question as well as the regulations governing subminima in examinations and supplementary examinations.

<b>BACCALAUREUS DEGREES</b>
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**Admission requirements**

Matriculation Certificate with matriculation exemption.

Also consult the detailed explanation below regarding M scores and other requirements.

**BSc, BSc(Agric) and BSecEd(Sci)**

Selection for the BSc, BSc(Agric) and BSecEd(Sci) degree courses is based on an adjusted M score, which is calculated as follows :

<b>Symbols</b>	<b>Higher grade</b>	<b>Standard grade</b>
A Symbol (80% and higher)	5	4
B Symbol (70% to 79%)	4	3
C Symbol (60% to 69%)	3	2
D Symbol (50% to 59%)	2	1
E Symbol (40% to 49%)	1	0

The value for Mathematics is doubled as well as the highest value for either Physical Science or Biology.

In the case of seven or more subjects, the six best symbols are taken into account with due allowance for the requirements of specific courses.

Candidates who have obtained at least a D symbol at higher grade in Mathematics and Physical Science, with an adjusted minimum M score of 20, qualify for admission to the BSc three-year programme or the BSc(Agric) four-year programme. In addition, candidates are required to obtain at least 50% (D symbol) at higher grade in two official languages, including English or Afrikaans (first or second language), to qualify for admission to the BSecEd(Sci) degree programme.

Candidates who have obtained at least an E symbol at higher grade or a D symbol at standard grade in Mathematics and Physical Science, with an adjusted M score of at least 20, can be considered for admission to either the three-year or four-year programme for the BSc or BSc(Agric) degree. In the case of the extended BSecEd(Sci) degree programme, at least an E symbol in two of the official languages at higher grade is required, of which one must be either English or Afrikaans (first or second language).

Candidates must be registered for one year for the BSecEd(Sci), BSc, BSc(Agric) degree courses or the Extended Programme before he or she can register for the DipEd(Sci) diploma. Relevant courses which have been passed, will be credited for the diploma.

**BInstAgrar**

Selection for the BInstAgrar degree course is based on an adjusted M score which is calculated as follows :

<b>Symbols</b>	<b>Higher grade</b>	<b>Standard grade</b>
A Symbol (80% and higher)	5	4
B Symbol (70% to 79%)	4	3
C Symbol (60% to 69%)	3	2
D Symbol (50% to 59%)	2	1
E Symbol (40% to 49%)	1	0

The value for Mathematics is doubled as well as the highest value for either Physical Science or Biology or Agricultural Sciences.

In the case of seven or more subjects, the six best symbols are taken into account, with due allowance for the requirements of specific courses.

Candidates who have obtained at least an E symbol at higher grade or a D symbol at standard grade in Mathematics, Physical Science and Biology, and who have obtained at least an E symbol at higher grade or a D symbol at standard grade in English, with an adjusted M score of 12, qualify for admission to the BInstAgrar degree.

Candidates who do not obtain the required M score, may be referred by the Dean for a potential test. The Dean will then decide whether a student can be admitted.

## COURSES, CODES AND PREREQUISITES

The curriculum for Baccalaureus degrees in this Faculty is compiled from the subjects listed below. When a course in any of these subjects is taken, students have to comply with the requirements indicated next to certain of the courses.

The first column lists the subjects and subject codes. The prerequisites (if any) which must be met before the course in the first column may be followed, appear in the second column. If only a code is listed in the second column, the implication is that the course must be passed before admission to the course in the first column. Where a code appears in brackets, the implication is that examination admission should have been obtained (Reg. G.10.1). The symbol GS implies that at least 40% must be obtained; i.e. the combined total of the semester/year and the examination mark. A course marked with the symbol †, implies that the course must be taken either before or concurrent with the course in the first column. Par 1.2 refers to Requirements for specific courses on page 3 of this publication

Deviations from these requirements are only possible with the approval of the Dean on the recommendation of the Head of Department. All courses offered by the Faculty are set out in a general section as well as under the particular departments listed below.

### **Course                      Prerequisites** **General**

#### **Common courses for BInstAgrar**

LBU 325  
LBU 481  
LBU 482  
ARD 481  
ARD 482  
ARD 483

#### **Common courses for BSecEd(Sci)**

BLG 250                      BLG 150  
FSG 220                      BLG 150, 160

AGC 150  
AGC 160  
AGC 250           AGC 150  
AGC 260           AGC 160  
SCE 471           BLG 150, 160; or MLB 111 GS and ZEN 120, 121 or BOT 120  
SCE 473           AGC 150, 160

**Computer Literacy**

CIL 171  
CIL 172  
CIL 173

**Molecular and Cell Biology**

MLB 111           Par 1.2

**Department of Agricultural Economics, Extension and Rural Development**

**Agricultural Economics**

LEK 210  
LEK 220           LEK 210 GS  
LEK 310           LEK 220 GS  
LEK 320           LEK 210 GS; (RNV 201)  
LEK 321           LEK 210  
LEK 410           LEK 220; (RNV 201)  
LEK 421           LEK 210; LEK 410 GS  
LEK 422           LEK 210  
LEC 414           LEK 220

**Agrarian Extension**

AGV 410  
AGV 421  
AGV 481  
AGV 482  
AGV 485  
AGV 487  
AGV 488  
AGV 489

**Department of Animal and Wildlife Sciences**

**Courses for BSc(Agric)**

**Animal Anatomy**

DAN 220           (DAN 210)  
DAN 310           (DAF 200)

**Animal Anatomy and Physiology**

DAF 200  
DAF 201

**Animal Breeding**

TLR 320           GTS 226  
TLR 411           TLR 320

TLR 412            TLR 320

**Animal Ecology**

VNE 310            (VKU 210, 220)

**Animal Physiology**

DFS 220            (DFS 210)

DFS 311            (DFS 210, 220)

DFS 320            (DAN 310; DFS 311)

**Animal Science Pharmacology**

VKF 411            (BCM 421, DFS 320, VGE 301)

**Aquaculture**

AWK 410            VGE 301; (LEK 210)

**Large Stock Science**

GVK 420            VKU 210; VGE 301; VNE 320; RPL 320; (LEK 210)

**Animal Science**

VKU 210

VKU 211

VKU 220            (VKU 210)

VKU 221

VKU 222

VKU 422

**Meat Science**

VLE 410            DAN 210, 220; DFS 210, 220; DFS 320

VLE 401            DAN 210, 220; DFS 210, 220; DFS 320

**Nutrition**

VDG 220            (BCM 216, 217)

**Nutritional Science**

VGE 301            (BCM 226, 227; VKU 210; VDG 220; DFS 210, 220; DAN 210, 220)

VGE 410            VGE 301

VGE 421            VGE 301

VGE 422            VGE 301

**Pig Science**

VKD 410            VKU 210; VGE 301; VNE 320; (LEK 210)

**Poultry Science**

PVK 420            VKU 210; VGE 301; (LEK 210)

**Reproduction Science**

RPL 310            (DFS 210, 220; DAN 210, 220)

RPL 320            RPL 310

**Small Stock Science**

KVK 420 VKU 210; VGE 301; VNE 320; RPL 320; (LEK 210)

**Wildlife Science**

WKE 420 (VNE 310) or permission from the Head of Department

**Wool Science**

WLK 410 (TLR 320; VGE 301)

**Courses for BInstAgrar**

APZ 221  
 APZ 311 Permission from the Head of Department  
 APZ 312 (APZ 221) or permission from the Head of Department  
 APZ 313 (APZ 221) or permission from the Head of Department  
 APZ 321 Permission from the Head of department  
 APZ 324 (APZ 221, 313) or permission from the Head of Department  
 APZ 325 (APZ 311) or permission from the Head of Department  
 APZ 412 (APZ 324) or permission from the Head of Department  
 APZ 422 (APZ 324, 325) or permission from the Head of Department  
 APZ 423 (APZ 324, 325) or permission from the Head of Department

**Department of Biochemistry**

BCM 216 MLB 111 GS; CMY 112 GS, 141 GS  
 BCM 217 As for BCM 216  
 BCM 218 BCM 216†, 217†, CMY 283†, 284†  
 BCM 226 BCM 217 GS  
 BCM 227 BCM 217 GS  
 BCM 228 BCM 216 GS, 226†, 227†  
 BCH 311 BCM 226 GS, 227 GS  
 BCM 312 BCM 216  
 BCM 321 BCM 216  
 BCM 322 BCM 216, 226  
 BCH 400 BCM 321 Only for students majoring in Biochemistry  
 BCM 411 BCM 216, 227  
 BCH 412 BCM 217, 226, 227  
 BCH 413 BCM 217 GS, 226 GS, 227 GS  
 BCH 421 BCM 216, 217, 227  
 BCH 422 Only for students majoring in Biochemistry  
 BCM 423 BCM 216, 227 (BCM 312 + 411 recommended)  
 BCH 424 BCM 216, 217

Students who major in Biochemistry, must pass CMY 283 and 284 in addition to the Biochemistry courses.

**Department of Botany**

**Biology**

BLG 113  
 BLG 150

**Botany**

BOT 120 MLB 111

BOT 213	BOT 120 GS or permission from the Head of Department
BOT 214	BOT 120 GS or permission from the Head of Department
BOT 215	BOT 120 GS or permission from the Head of Department
BOT 216	BOT 120 GS or permission from the Head of Department
BOT 217	BOT 120 GS or permission from the Head of Department
BOT 224	BOT 120 GS or permission from the Head of Department
BOT 227	BOT 120 GS or permission from the Head of Department
BOT 228	BOT 120 GS or permission from the Head of Department
BOT 229	BOT 120 GS or permission from the Head of Department
BOT 301	BOT 120 GS or permission from the Head of Department
BOT 313	CMY 122
BOT 316	CMY 122
BOT 317	CMY 122
BOT 320	BOT 120 GS or permission from the Head of Department
BOT 323	BOT 120 GS or permission from the Head of Department
BOT 324	BOT 120 GS or permission from the Head of Department
BOT 325	BOT 120 GS or permission from the Head of Department
BOT 326	CMY 122

#### Department of Food Science

VDW 211	
VDW 222	
VDW 223	
VDW 300	Only students majoring in Food Science
VDW 314	BCM 216, 217 or permission from the Head of Department
VDW 315	
VDW 324	VDW 314 or permission from the Head of Department
VDW 332	BCM 216, 217 or permission from the Head of Department
VDW 343	
VDW 400	Only students majoring in Food Science
VDW 411	MBY 120 or permission from the Head of Department
VDW 416	
VDW 418	
VDW 425	
VDW 431	VDW 223 or permission from the Head of Department
VDW 432	
VDW 442	
VDW 444	VDW 223 or permission from the Head of Department
VOV 200	Only students majoring in Food Processing
VOV 300	Only students majoring in Food Processing
VOV 471	Permission from the Head of Department
VOV 472	Only for final year students in BlnstAgrar
VOV 485	Permission from the Head of Department

#### Department of Genetics

GTS 122	MLB 111 GS; Par 1.2
GTS 124	Only for BlnstAgrar study programme
GTS 215	MLB 111 GS
GTS 217	GTS 122 GS
GTS 225	MLB 111 GS
GTS 226	GTS 122 GS
GTS 227	GTS 217 GS



GTS 314	GTS 122 GS
GTS 316	GTS 122 GS
GTS 325	GTS 215 GS
GTS 326	GTS 226 GS
GTS 327	GTS 227 GS
GTK 401	Permission from the Head of Department
GTK 402	Permission from the Head of Department
GTK 403	Permission from the Head of Department
GTS 442	Permission from the Head of Department

### **Department of Microbiology and Plant Pathology**

#### **Biology**

BLG 260

#### **Microbiology**

MBY 120	MLB 111 GS; CMY 112 GS; Par 1.2
MBY 211	MLB 111; MBY 120 GS; or permission from the Head of Department
MBY 215	MLB 111†; MBY 120 GS
MBY 225	MBY 120
MBY 226	MBY 120; BCM 216
MBY 311	MBY 120 or permission from the Head of Department
MBY 312	MBY 120 or permission from the Head of Department
MBY 313	MLB 111; MBY 120 or permission from the Head of Department
MBY 323	MLB 111; CMY 112; 141; MBY 120; BCM 216 GS, 217 GS and 227 GS or permission from the Head of Department
MBY 324	As for MBY 323
MBY 400	Only students majoring in Microbiology or Plant Pathology
MBY 401	Only students majoring in Microbiology or Plant Pathology
MBY 416	MLB 111; MBY 120

#### **Plant Pathology**

PLG 220	
PLG 221	MLB 111 GS
PLG 321	MBY 120 GS
PLG 412	PLG 220 GS or permission from the Head of Department
PLG 421	PLG 220 GS or permission from the Head of Department
PLG 422	PLG 220 GS or permission from the Head of Department

### **Department of Physiology**

#### **Human Physiology**

FSG 110	
FSG 120	FSG 110 GS
FSG 220	BLG 150, 160
FLG 211	MLB 111 GS, CMY 112 GS; CMY 122 GS; PHY 181/171/131 GS
FLG 212	As for FLG 211; FLG 211†
FLG 221	FLG 211 GS; 212 GS; FLG 222†
FLG 222	FLG 211 GS; 212 GS; FLG 221†
FLG 311	FLG 211 GS; 222 GS; BCM 216 GS; 217 GS; 226 GS; 227 GS
FLG 312	As for FLG 311

FLG 313	As for FLG 311
FLG 321	As for FLG 311
FLG 322	As for FLG 311
FLG 323	As for FLG 311
FLG 324	As for FLG 311
FLG 325	As for FLG 311
FLG 326	As for FLG 311
FLG 327	As for FLG 311

## **Department of Plant Production and Soil Science**

### **Agricultural Climatology**

LKM 221  
LKM 312

### **Agronomy**

AGR 313	PPK 210† or AGC 150
AGR 323	PPK 210† or AGC 150
AGR 481	PPK 210 GS
AGR 482	PPK 210 GS

### **Horticultural Science**

TBK 221	
TBK 314	
TBK 320	
TBK 410	
TBK 420	STZ 311†
HSC 482	PPK 210 GS
HSC 484	PPK 210 GS

### **Ornamental Horticultural Science**

STZ 311	
STZ 320	STZ 311†, or permission from the Head of Department
STZ 410	

### **Pasture Science**

WDE 310	PPK 210† or AGC 150
WDE 320	WDE 310 GS
WDE 412	
WDE 421	
WDE 481	
WDE 482	
WDE 483	

### **Soil Science**

GKD 213	CMY 112 GS, 141 or permission from the Head of Department
GKD 215	
GKD 228	GKD 213 GS
GKD 317	GKD 213 GS
GKD 318	GKD 213
GKD 329	GKD 213
GKD 414	GKD 213 GS

GKD 415	GKD 213; GKD 317
GKD 485	GKD 213 GS
GKD 487	GKD 213 GS

**Plant Production**

PPK 210  
PPK 411

**Plant Production and Soil Science/Common**

PGW 400	
PGW 411	GKD 213
PGW 421	BME 120†
PGW 422	One course in crop science†
PGW 423	GKD 213; GKD 317 GS
PGW 480	

**Weed Science**

OKW 413    PPK 220†; PFG 310†

**Department of Zoology and Entomology**

BLG 123	
BLG 160	
ZEN 122	MLB 111 GS
ZEN 210	Permission from the Head of Department
ZEN 211	Permission from the Head of Department
ZEN 215	Permission from the Head of Department
ZEN 220	Permission from the Head of Department
ZEN 221	Permission from the Head of Department
ZEN 222	Permission from the Head of Department
ZEN 225	Permission from the Head of Department
ZEN 310	Permission from the Head of Department
ZEN 311	Permission from the Head of Department
ZEN 320	Permission from the Head of Department
ZEN 321	Permission from the Head of Department
ZEN 322	Permission from the Head of Department
ZEN 323	Permission from the Head of Department
ZEN 400	Permission from the Head of Department

**COURSES OFFERED BY OTHER FACULTIES**

**Agricultural Engineering**

LBC 420	
LBP 420	(TKN 310); (LHL 411); (PGW 422)
LGD 410	
LGH 420	(TKN 310)
LHL 411	TKN 310 GS
LIR 421	
LIR 422	
LKW 222	
LLI 420	
LLS 410	
LPR 311	

LPR 312  
LPW 410  
LPY 314  
LPY 414  
LSC 320  
LSC 402  
LSQ 313  
LXF 110  
LXF 120

LSC 320

### **Biometry**

BME 120 Par.1.2  
BME 210 BME 120  
BME 220 BME 210GS

### **Business Law**

BER 210  
BER 220

### **Business Management**

OBS 151  
OBS 152  
OBS 161 OBS 151,152GS  
OBS 162 OBS 151,152GS  
OBS 181  
OBS 182  
OBS 251 OBS 151,152 of OBS 161, 162 with a GS in the other OBS 252; par. 1.2  
OBS 252 OBS 151,152 of OBS 161, 162 with a GS in the other OBS 252; par. 1.2  
OBS 261 OBS 151,152 of OBS 161, 162 with a GS in the other OBS 252; par. 1.2  
OBS 262 OBS 151,152 of OBS 161, 162 with a GS in the other OBS 252; par. 1.2  
OBS 351 OBS 151,152,161, 162; OBS 251, 252 of OBS 261, 262 with a GS in the other  
OBS 352 OBS 151,152,161, 162; OBS 251, 252 of OBS 261, 262 with a GS in the other  
OBS 361 OBS 151,152, 161, 162; any two of OBS 251, 252; 261, 262; OBS 351, 352; FBS 251, 252 en FBS 261, 262 with a GS in the other OBS  
OBS 363 OBS 151,152, 161, 162; any two of OBS 251, 252; 261, 262; OBS 351, 352; FBS 251, 252 en FBS 261, 262 with a GS in the other OBS

### **Chemistry**

CMY 101\* Consult par. 1.2  
CMY 102\* CMY 101 GS or permission of the Head of Department  
CMY 112 Consult par 1.2  
CMY 122 CMY 112 GS  
CMY 131 Consult par 1.2  
CMY 141 CMY 112 GS

CMY 282	CMY 131, 141 or permission from the Head of Department
CMY 283	As for CMY 282
CMY 284	As for CMY 282
CMY 285	As for CMY 282
CMY 382	CMY 282
CMY 383	CMY 283
CMY 384	CMY 284
CMY 385	CMY 285

**N.B.:** The courses on 200 and 300 level are half courses and two half courses equal one semester course.

\* Extended programme only.

### **Civil Engineering**

WKD 111  
WKD 112

### **Computer Science (Computer Literacy)**

COS 150

### **Economics**

EKN 151	par 1.2
EKN 152	par 1.2
EKN 120	EKN 151, 152 GS
EKN 251	EKN 151, 152, 120; STK 151, 152, 161, 162
EKN 252	EKN 151, 152, 120; STK 151, 152, 161, 162
EKN 351	EKN 220
EKN 352	EKN 220
EKN 353	EKN 220, STK 210, 220 GS
EKN 320	EKN 351,352 GS

### **Engineering and Technology Management**

IGB 220  
IGB 320

### **English**

ENG 103

**N.B.:** May only be taken by students registered for the extended programme.

### **Financial Accounting**

FRK 151, 152	par. 1.2
FRK 161,162	FIL 151, 152GS
FRK 251, 252	FRK 151, 152, 161, 162, par 1.2
FRK 261,262	FRK 151,252 GS par 1.2
FRK 351, 352	FRK 251,252; 261.262
FRK 61, 362	FRK 351,352 GS

### **Financial Management**

FBS 251 OBS 151, 152 or OBS 161, 162 with a GS in the other; FRK 161, 162 GS; Par 1.2

FBS 252	OBS 151, 152 or OBS 161, 162 with a GS in the other; FBS 251 GS; Par 1.2
FBS 262	OBS 151, 152 or OBS 161, 162 with a GS in the other; FBS 251 GS; Par 1.2
FBS 351	OBS 151, 152, 161, 162; FBS 251 of 252, 262 with a GS in the other
FBS 361	OBS 151, 152, 161, 162; FBS 251 of 252, 262 with a GS in the other

### **Geography**

GGY 162  
GGY 251

### **Geology**

GLY 112	Par 1.2
GLY 113	Par 1.2
GLY 122	GLY 112 GS, 113 GS
GLY 123	GLY 112 GS, 113 GS

### **Home Economics**

#### **Nutrition**

VDG 120	
VDG 211	VDG 120 and PHG 211, 212 or VDG 120 and FSG 110,120
VDG 320	VDG 211

#### **Labour Law**

ABR 311

### **Management Accounting**

BSR 211	FRK 110 or 114; FRK 120 GS
BSR 221	BSR 211 GS

### **Mathematics and Applied Mathematics**

WTW 101*	
WTW 114	See Par 1.2
WTW 152	See Par 1.2
WTW 162	WTW 114 GS, 152 GS
WTW 122	WTW 112 GS, 114 GS
WTW 123	WTW 114 GS
WTW 126	WTW 114 GS
WTW 128	WTW 114 GS
WTW 134**	Par 1.2
WTW 144**	WTW 134 GS
WTW 211	WTW 126
WTW 215*****	WTW 114 GS or 101 GS or 134 GS
WTW 218	WTW 128, 114 or 101
WTW 220***	WTW 128, 114 or 101
WTW 221	WTW 211
WTW 228***	WTW 128, 114 or 101
WTW 282****	WTW 122, 114 or 101
WTW 283	WTW 128, 123, 114 or 101
WTW 285	WTW 115

WTW 286****	WTW 126, 128, 114 or 101
WTW 289*****	WTW 114 GS or 101 GS or 134 GS
WTW 310	WTW 220
WTW 312	WTW 211, 218, 286
WTW 322	WTW 218, 211, 286
WTW 381	WTW 114 or 101, 211
WTW 383	WTW 128, 211, 114 or 101
WTW 384	WTW 220 of 228
WTW 385	WTW 126, 218, 285
WTW 386*****	WTW 218, 282 or 286
WTW 389*****	WTW 211

- \* Consult the publication on the extended programme of the Faculty of Natural, Agricultural and Information Sciences for prerequisites.
- \*\* WTW 114, 128 and 126 are for students who intend taking Mathematics on 200 level. WTW 134 and 144, do not generally grant admission to Mathematics on 200 level but are intended for students requiring Mathematics on 100-level only. In exceptional cases, however, students who have obtained adequate marks in WTW 134, 144, may, with the permission from the Head of department, be admitted to Mathematics on 200-level.
- \*\*\* WTW 220 or WTW 228 may not be included in the same curriculum.
- \*\*\*\* WTW 282 or WTW 286 may not be included in the same curriculum.
- \*\*\*\*\* WTW 215, WTW, 289, WTW 386 and WTW 389 are not necessarily presented every year and students must consult the Department in this regard.

**NB:** STK 161,162 may not be presented with WTW 114/101, 134; 126, 128, 144.

### **Mathematical Statistics**

WST 151	Par 1.2
WST 152	Par 1.2
WST 161	WST 151 GS and 152 GS
WST 210	WST 151, 152, 161, 162; WTW 114/110 en WTW 126, 128/102GS
WST 220	WST 210 GS

### **Mechanical Engineering**

MIT 112	
MOW 121	MIT 112 GS
MRV 122	

### **Philosophy**

FIL 155	
FIL 153	
FIL 154	

### **Physics**

PHY 101*	
PHY 102*	
FSK 116	
FSK 126	FSK 116 GS
PHY 171	Par 1.2

PHY 181            Par 1.2  
PHY 131            Par 1.2

\* Extended programme only.

### **Psychology**

SLK 151  
SLK 152  
SLK 153  
SLK 156  
SLK 251            SLK 151,152, 153,156  
SLK 254            SLK 151,152,153, 156  
SLK 255            SLK 151,152,153, 156  
SLK 256            SLK 151,152,153, 156  
SLK 351            SLK 251, 254, 255, 256  
SLK 352            SLK 251, 254, 255, 256  
SLK 353            SLK 251, 254, 255, 256  
SLK 354            SLK 251, 254, 255,256

### **Natural Science**

SCI 150  
SCI 160  
SCI 161

### **Science Orientation**

SCI 151\*  
SCI 152\*  
SCI 153\*  
SCI 154\*

\* Extended programme only.

### **Science Education Courses for BSecEd(Sci)**

SCE 170  
SCE 200  
SCE 300            SCE 200 and one subject didactics  
SCE 301            SCE 200 and one subject didactics  
SCE 302            SCE 200 and one subject didactics  
SCE 400            SCE 300  
SCE 402            two school subjects at 200 level, two subject didactics  
SCE 471            BLG 150, 160 or MLB 111 and BOT 120 or ZEN 122  
SCE 472            GGY 131, 132, GGY 141, GGY 142  
SCE 473            AGC 150, 160  
SCE 474            PHY 171, PHY 181 or PHY 101, 102; and CMY 112, 122 or  
                          CMY 101, 102  
SCE 475            COS 110, 120  
SCE 476            WTW 114, 126, 128; or WTW 101, 126, 128 or WTW 101, 144; or  
                          WTW 134, 144

### **Statistics**

STK 153\*            Par 1.2



STK 163*	STK 153 GS
STK 151	STK 153GS
STK 152	STK 163GS
STK 161	STK 153, 163 of of Par 1.2
STK 162	STK 153, 163 of Par 1.2
STK 210	STK 151, 152, 161 en 162
STK 220	STK 210 GS
STK 351	STK 210, 220
STK 352	STK 210 , 220
STK 361	STK 351GS en 352GS
STK 362	STK 351GS en 352 GS

\* Is not part of any curriculum, but together give exemption from the Grade 12 Mathematics prerequisite (40% HG of 50 % SG) for admission to STK 151 en 152.

## I. BACCALAUREUS SCIENTIAE (BSc)

### Ag. 1

The BSc curriculum consists of one of the following study programmes in Biological Sciences:

- 1.1 Study programmes
  - 1.1.1 Population Genetics
  - 1.1.2 Biochemistry
  - 1.1.3 Zoology
  - 1.1.4 Ecology
  - 1.1.5 Entomology
  - 1.1.6 Genetics
  - 1.1.7 Soil Science
  - 1.1.8 Human Physiology
  - 1.1.9 Human Genetics
  - 1.1.10 Microbiology
  - 1.1.11 Microbiology/Plant Pathology
  - 1.1.12 Molecular Biology
  - 1.1.13 Botany
    - 1.1.13.1 Plant Biology
    - 1.1.13.2 Plant Diversity and Environmental Management
    - 1.1.13.3 Plant Growth Manipulation
  - 1.1.14 Food Science

### Ag.2

#### Admission requirements

A matriculation exemption certificate.

Also consult p. 7 of this publication for M count and other requirements.

### Ag.3

#### Duration

The minimum duration of study is three years.

#### **Ag.4**

##### **Curriculum for BSc**

- (a) A BSc curriculum may only be compiled from the study programmes as set out in Regulation Ag.7. The Dean may, however, approve variations of the study programme. Optional courses are normally chosen from the courses which appear in the BSc study programmes. Other optional courses are chosen in consultation with the Head of Department.
- (b) A student must obtain at least 225 course credits to comply with the requirements for the BSc degree, except where otherwise specified. At least 56 credits must be obtained at 300/400 level. A maximum of 110 credits will be recognised at 100 level. A student may, in consultation with the Dean, follow courses not indicated in BSc study programmes to the equivalent of a maximum of 22 course credits. The credits allotted per semester to each optional course should be regarded as a guide-line only and not as an instruction. It is, however, important that the total number of prescribed optional course credits are completed during the course of the study programme. The Dean may, on the recommendation of the Head of Department, approve deviations in this regard.
- (c) A student may not register for more than 52 course credits per semester, unless with the permission of the Dean.
- (d) Students who are already in possession of a bachelor's degree, will not receive credit for any courses at 300/400 level passed previously. Deviations may be approved by the Dean on the recommendation of the Head of Department. (Refer also to Regulation G.8).
- (e) Students who register for the BSc degree, are strongly advised to include Biometry 120 (or its equivalent) in their study programme with a view to developing statistical skills.

#### **Ag.5**

##### **Examinations and promotions**

- (a) A student may be admitted to courses of the following semester or year of study, if he or she complies with the prerequisites of the courses concerned. (Consult Reg.Ag.1.)
- (b) A student will be promoted to the following year of study if:
  - (i) less than thirty credits need to be carried over, unless the Dean on the recommendation of the Head of Department, decides otherwise; and
  - (ii) no course of the first year will be transferred to the final year of study.
- (c) A student who does not comply with the requirements for promotion to the following year of study, retains credit for the courses already passed and may be admitted by the Dean, on the recommendation of the Head of Department, to courses of the following year of study to a maximum of thirty credits, provided that it will fit in with the timetable.
- (d) A student who requires a maximum of 28 credits to comply with all the requirements for the degree, may be admitted by the Dean on the recommendation of the Head of Department, to special examinations in courses failed, provided that this will enable him or her to comply with all the degree requirements. A student who has obtained a final mark of less than 40% in any one of the relevant courses, or who has previously been admitted to a special examination, does not qualify for this concession.

#### **Ag.6**

##### **Degree with distinction**

A student obtains his or her degree with distinction if all prescribed courses are passed at 300 level (or higher) in one academic year with a weighted average of at least 75%, and at least 65% in each of the relevant courses.

**Ag.7****Curricula****1. General**

- (a) The digits which appear after each course indicate the number of lectures and practicals per week. A practical followed by a ½ usually implies one practical every two weeks. Square brackets around the total of a semester, indicate that additional optional courses must be taken. The figure in brackets indicates the number of "credits":  
 1 lecture per week = 2 "credits"  
 1 x 3 hour practical = 3 "credits"  
 The minimum number of "credits" required for degree purposes, is indicated in the footnote at the end of each curriculum. (Not applicable to year courses in the extended programme for BSc or BSc(Agric)).
- (b) Optional courses are selected in consultation with the Head of Department and with the approval of the Dean to ensure that no timetable clashes occur.
- (c) The Dean may, on the recommendation of the Head of Department and in exceptional cases, grant permission for the inclusion or recognition of an alternative course(s) instead of a course prescribed in the curricula.

**2. THE PRESCRIBED CURRICULA FOR THE VARIOUS STUDY PROGRAMMES AND YEARS OF STUDY****2.1 Extended programme for Biological and Natural Sciences (Code 03182001)**

(For students who follow the extended programme for BSc and BSc(Agric))

The extended programme is presented in the Faculty of Natural, Agricultural and Information Sciences as an extension of the Renaissance programme. The first year is basically presented over two years with tutor assistance and enrichment.

Individual study programmes are compiled, depending on the matriculation results in specific subjects; taking into consideration the admission requirements for specific courses (consult par 1.2), and also the results of a potential test. The following courses are available:

**Subjects and courses**

- (i) **Extended courses:** (For students who register for the BSc: Extended Programme.)

The following courses are available:

CMY 101	First course in Chemistry (equivalent course: CMY 131).	11 credits
CMY 102	General Chemistry (equivalent course: CMY 141)	11 credits
PHY 101	General Physics (equivalent course: PHY 131 and portion of PHY 171)	11 credits
PHY 102	Mechanics and Electricity (equivalent course: portion of PHY 171) <b>(NB: Both PHY 101 and 102 must be passed for exemption from PHY 171 (year course))</b>	11 credits
WTW 101	Introductory Mathematics 101 (equivalent course: WTW 114)	11 credits

WTW 102      Mathematics 102      11 credits  
 (equivalent courses: WTW 126, 128)

(ii) **Compulsory introductory courses for the Extended Programme**

CIL 171, CIL 172,

CIL 173      Computer and Information Literacy (2 each)

COS 160      Introductory Computer Science (6)

**NB:** CIL 171, CIL 172, CIL 173 and COS 160 may not be taken if a student obtained a D-symbol at higher grade in Computer Studies in grade 12. If a student passed at standard grade, COS 160 may be taken.

SCI 152      Computer and Problem-solving Skills 152 (6)

SCI 153      Academic Proficiency 153 (2)

SCI 162      Computer and Problem-solving Skills 162 (6)

SCI 163      Basic Research Skills 163 (2)

*Combinations not allowed: Students may not register for SCI 152 at the same time as CIL 171, CIL 172.*

Students who complete SCI 152 successfully, are exempted from CIL 171 and CIL 172 and may register for COS 160.

EON 151      Basic Language Skills 151 (2)

EON 152      Basic Language Skills 152 (2)

EON 153      Basic Language Skills 153 (2)

EON 154      Basic Language Skills 154 (2)

A student is admitted to these courses only once.

## 2.2 General Biology (Code 03130001)

Students still uncertain of the study programme they wish to follow, register for the general first year.

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 114/134	Calculus 114 / Mathematics 134	4 + 1	(11)

16 + 4 (44)

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
	Optional courses from the following: Botany, Genetics, Mathematics, Microbiology, Physics, Zoology and Entomology (minimum optional credits)		(33)
		16 + 4	(44)

**2.3 Study programme in Population Genetics (Code 03133011)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4	+	1	(11)
WST 151	Mathematical Statistics 151				(5)
WST 152	Mathematical Statistics 152				(5)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
WTW 114	Calculus 114	4	+	1	(11)
		<u>16</u>	+	<u>4</u>	<u>(43)</u>

**Second semester**

WTW 126 and	Linear Algebra 126 and				
WTW 128	Calculus 128	4	+	1	(11)
GTS 122	Introductory Genetics 122	4	+	1	(11)
WST 161	Mathematical Statistics 161				(5½)
WST 162	Mathematical Statistics 162				(5½)
	Minimum optional course credits				(11)
		<u>[12</u>	+	<u>4]</u>	<u>(44)</u>

**Second year of study**

**First semester**

GTS 215	Molecular Genetics 215	2	+	1	(7)
GTS 217	Chemical and Analytical Meiosis 217	2	+	1	(7)
WST 210	Mathematical Statistics 210	4	+	2	(14)
WTW 218	Calculus 218	2	+	1	(7)
WTW 211	Linear Algebra 211	2	+	1	(7)
		<u>12</u>	+	<u>6</u>	<u>(42)</u>

**Second semester**

GTS 225	Microbial Genetics 225	1	+	½	(4)
GTS 226	Introductory Population Genetics 226	2	+	½	(6)
GTS 227	Cytogenetic Systems 227	1	+	1	(4)
WTW 220	Analysis 220	2	+	1	(7)
WST 220	Mathematical Statistics 220				(14)
	Minimum optional course credits				(4)
		<u>[10</u>	+	<u>5]</u>	<u>(39)</u>

**Third year of study**

**First semester**

GTS 314	Human Genetics 314	2	+	1	(7)
GTS 316	Plant Breeding 316	2	+	1	(7)
	Minimum optional course credits				(15)
		<u>[4</u>	+	<u>2]</u>	<u>(29)</u>

**Second semester**

GTS 325	Eukaryotic Gene Control 325	1	+	½	(4)
GTS 326	Population Genetics 326	1	+	½	(4)
GTS 327	Cytotaxonomy 327	2	+	1	(7)
	Minimum optional course credits				(13)
		<u>[4</u>	+	<u>2]</u>	<u>(28)</u>

A minimum of **225** credits is required to obtain the degree.

Optional courses: As specified in Ag. 4.

## 2.4 Study programme in Biochemistry (Code 03133001)

**N.B.:** Optional courses are chosen in consultation with the Head of Department.

### First year of study

#### First semester

CMY 131	First course in Chemistry 131	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 114 or	Calculus 114 or		
WTW 134	Mathematics 134	<u>4 + 1</u>	<u>(11)</u>
		16 + 4	(44)

#### Second semester

CMY 141	General Chemistry 141	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
WTW 126 and 128/	Linear Algebra 126 and Calculus 128/		
WTW 144	Mathematics 144	4 + 1	(11)
	Optional courses:		
	BOT 120		
	MBY 120		
	ZEN 122	<u>4 + 1</u>	<u>(11)</u>
		16 + 4	(44)

### Second year of study

#### First semester

CMY 283	Analytical Chemistry 283 and		
CMY 284	Organic Chemistry 284	4 + 2	(14)
BCM 216	Proteins and Enzymes 216 and		
BCM 217	Carbohydrate Metabolism 217 and		
BCM 218	Practical 218	4 + 2	(14)
	Optional courses from BOT, GTS, MBY, PHG and ZEN		<u>(14)</u>
		8 + 4	(42)

#### Second semester

CMY 282 and	Physical Chemistry 282 and		
CMY 285 or	Inorganic Chemistry 285 or		
	Optional course(s)	4 + 2	(14)
BCM 226	Lipid and Nitrogen Metabolism 226 and		
BCM 227	Biosynthesis of Macromolecules 227 and		
BCM 228	Practical 228	4 + 2	(14)
	Optional course(s) as for first semester		<u>(12)</u>
		8 + 4	(40)

### Third year of study

#### First semester

BCM 312	Protein Chemistry 312	2 + 1	(7)
BCM 411	Molecular Biology of Nucleic Acids 411	1 + 1	(5)

Optional courses from BOT, CMY, GTS, MBY, PHG and ZEN at the 300 level	4 + 2	(14)
	7 + 4	(26)

### Second semester

BCM 321	Enzymology 321	1 + 1	(5)
BCM 322	Biomembranes 322	1 + 1	(5)
BCM 423	Immunobiochemistry 423	2 + 1	(7)
	Optional courses as for first semester	4 + 2	(14)
		8 + 5	(31)

A minimum of **225** credits is required to obtain the degree.

## 2.5 Study programme in Zoology (Code 03133021)

### First year of study

#### First semester

WTW 114 or	Calculus 114 or	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
		16 + 4	(44)

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
ZEN 122	Introductory Zoology 122	4 + 1	(11)
	Minimum optional course credits		(22)
		[8 + 2]	(44)

### Second year of study

#### First semester

ZEN 210	Development and Morphology 210	2 + 1	(7)
ZEN 211	Invertebrate Biology 211	2 + 1	(7)
ZEN 215	Principles of Conservation Biology 215	4 + 0	(8)
	Minimum optional course credits		(20)
		8 + 2	(42)

#### Second semester

ZEN 220	Animal Physiology 220	2 + 1	(7)
ZEN 221	Mammalogy 221	2 + 1	(7)
ZEN 225	Zoological Diversity in South Africa 225	4 + 0	(8)
	Minimum optional course credits		(17)
		8 + 2	(39)

### Third year of study

#### First semester

ZEN 310	Ecology 310	2 + 1	(7)
ZEN 311	Ecophysiology 311	2 + 1	(7)
	Minimum optional course credits		(14)
		4 + 2	(28)

**Second semester**

ZEN 322	Evolution and Systematics 322	2	+	1	(7)
ZEN 323	Behavioural Ecology 323	2	+	1	(7)
	Minimum optional course credits				(14)
		<hr/>			[4 + 2] (28)

A minimum of **225** credits is required to obtain the degree.

**NB:** Optional courses are chosen in consultation with the Head of Department, from, inter alia, the following disciplines: Biochemistry; Chemistry; Zoology and Entomology; Genetics; Geography; Geology; Botany; Microbiology; Mathematics and Applied Mathematics.

**2.6 Study programme in Ecology (Code 03133031)**

**First year of study**

**First semester**

WTW 114 or	Calculus 114 or				
WTW 134	Mathematics 134	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
CMY 112	First course in Chemistry 112	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
		<hr/>			16 + 4 (44)

**Second semester**

CMY 122	General Chemistry 122	4	+	1	(11)
BOT 120	Introductory Botany 120	4	+	1	(11)
ZEN 122	Introductory Zoology 122	4	+	1	(11)
	Minimum optional course credits				(11)
		<hr/>			[12 + 3] (44)

**Second year of study**

**First semester**

ZEN 210	Development and Morphology 210	2	+	1	(7)
ZEN 211	Invertebrate Biology 211	2	+	1	(7)
ZEN 215	Principles of Conservation Biology 215	4	+	0	(8)
BOT 214	Plant Conservation 214	1	+	0	(2)
BOT 215	Plant Ecological Techniques 215	0	+	1	(3)
CIL 171	Computer Literacy 171				(2)
CIL 172	Computer Literacy 172				(2)
	Minimum optional course credits				(8)
		<hr/>			[11 + 3] (39)

**Second semester**

BOT 228	Plant Utilisation 228	1	+	1	(5)
BOT 227	Introductory Ecology 227	1	+	0	(2)
ZEN 221	Mammalogy 221	2	+	1	(7)
ZEN 222	Insect Diversity 222	2	+	1	(7)
BME 120	Biometry 120	3	+	1	(9)
CIL 173	Computer Literacy 173				(2)
	Minimum optional course credits				(8)
		<hr/>			[11 + 4] (39)



**Third year of study**

**First semester**

ZEN 311	Ecophysiology 311	2	+	1	(7)
ZEN 310	Ecology 310	2	+	1	(7)
	Minimum optional course credits	2	+	1	(14)
		<hr/>			[6 + 3] (28)

**Second semester**

BOT 325	Plant Community Ecology 325	1	+	1	(5)
BOT 320	Population Dynamics 320	1	+	0	(2)
ZEN 323	Behaviour Ecology 323	2	+	2	(7)
	Minimum optional course credits				(14)
		<hr/>			[4 + 3] (28)

A minimum of **225** credits is required to obtain the degree.

Optional courses: As specified in Ag. 4.

**2.7 Study programme in Entomology: (Code 03133041)**

**First year of study**

**First semester**

WTW 114 or	Calculus 114 or				
WTW 134	Mathematics 134	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
CMY 112	First course in Chemistry 112	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
		<hr/>			16 + 4 (44)

**Second semester**

CMY 122	General Chemistry 122	4	+	1	(11)
ZEN 122	Introductory Zoology 122	4	+	1	(11)
	Minimum optional course credits				(22)
		<hr/>			[8 + 2] (44)

**Second year of study**

**First semester**

ZEN 211	Invertebrate Biology 211	2	+	1	(7)
ZEN 215	Principles of Conservation Biology 215	4	+	0	(8)
	Minimum optional course credits				(24)
		<hr/>			[6 + 1] (39)

**Second semester**

ZEN 220	Animal Physiology 220	2	+	1	(7)
ZEN 222	Insect Diversity 222	2	+	1	(7)
ZEN 225	Zoological Diversity in South African Biomes 225	4	+	0	(8)
	Minimum optional course credits				(20)
		<hr/>			[8 + 2] (42)

### Third year of study

#### First semester

ZEN 310	Ecology 310	2	+	1	(7)
ZEN 311	Ecophysiology 311	2	+	1	(7)
	Minimum optional course credits				(14)
		<u>4</u>	+	<u>2</u>	(28)

#### Second semester

ZEN 320	Insect Pest Management 320	2	+	1	(7)
ZEN 321	South African Insect Pests 321	2	+	1	(7)
	Minimum optional course credits				(14)
		<u>4</u>	+	<u>2</u>	(28)

A minimum of **225** course credits is required to obtain the degree.

**NB:** Optional courses are chosen in consultation with the Head of the Department from, *inter alia*, the following disciplines: Biochemistry, Chemistry, Zoology and Entomology, Genetics, Geography, Geology, Botany, Microbiology, Mathematics and Applied Mathematics.

## 2.8 Study programme in Genetics (Code 03133051)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
WTW 134	Mathematics 134	4	+	1	(11)
		<u>16</u>	+	<u>4</u>	(44)

#### Second semester

CMY 122	General Chemistry 122	4	+	1	(11)
GTS 122	Introductory Genetics 122	4	+	1	(11)
	Minimum optional course credits				(22)
		<u>8</u>	+	<u>2</u>	(44)

### Second year of study

#### First semester

GTS 215	Molecular Genetics 215	2	+	1	(7)
GTS 217	Chemical and Analytical Meiosis 217	2	+	1	(7)
	Minimum optional course credits				(26)
		<u>4</u>	+	<u>2</u>	(40)

#### Second semester

GTS 225	Microbial Genetics 225	1	+	½	(4)
GTS 226	Introductory Population Genetics 226	2	+	½	(6)
GTS 227	Cytogenetic Systems 227	1	+	1	(5)
BME 120	Biometry 120	3	+	1	(9)
	Minimum optional course credits				(16)
		<u>7</u>	+	<u>3</u>	(40)

**Third year of study**

**First semester**

GTS 314	Human Genetics 314	2	+	1	(7)
GTS 316	Plant Breeding 316	2	+	1	(7)
	Minimum optional course credits				(15)
		<hr/>			
		[4	+	2]	(29)

**Second semester**

GTS 325	Eukaryotic Gene Control 325	1	+	½	(4)
GTS 326	Population Genetics 326	1	+	½	(4)
GTS 327	Cytotaxonomy 327	2	+	1	(7)
	Minimum optional course credits				(14)
		<hr/>			
		[4	+	2]	(29)

A minimum of **225** credits is required to obtain the degree.

Optional courses: As specified in Ag. 4.

**2.9 Study programme in Soil Science (Code 03133061)**

**First year of study**

**First semester**

CMY 131	First course in Chemistry 131	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
WTW 114 or	Calculus 114 or				
WTW 134	Mathematics 134	4	+	1	(11)
		<hr/>			
		16	+	4	(44)

**Second semester**

CMY 141	General Chemistry 141	4	+	1	(11)
BOT 120	Introductory Botany 120	4	+	1	(11)
WTW 126 and 128/	Linear Algebra 126 and Calculus 128/				
WTW 144	Mathematics 144	4	+	1	(11)
	Minimum optional course credits				(11)
		<hr/>			
		[12	+	3]	(44)

**Second year of study**

**First semester**

GKD 213	Introductory Soil Science 213	3	+	1	(9)
CMY 283	Analytical Chemistry 283	2	+	1	(7)
CMY 284	Organic Chemistry 284	2	+	1	(7)
	Minimum optional course credits				(16)
		<hr/>			
		[7	+	3]	(39)

**Second semester**

GKD 228	Soil Fertility 228	3	+	1	(9)
CMY 285	Inorganic Chemistry 285	2	+	1	(7)
	Minimum optional course credits				(23)
		<hr/>			
		[5	+	2]	(39)

### Third year of study

#### First semester

GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
GKD 318	Soil Chemistry 318	2 + 1	(7)
GKD 415	Soil Mineralogy and Genese 415	2 + 1	(7)
GLY 112	Earth Material 112	2 + ½	(5)
GLY 113	General Geology 113	2 + ½	(6)
		<u>10 + 4</u>	<u>(32)</u>

#### Second semester

GKD 329	Soil Physics 329	3 + 1	(9)
GLY 122	Introductory Structural Geology 122	2 + ½	(5)
GLY 123	Stratigraphy 123	2 + ½	(6)
			(7)
		<u>[7 + 2]</u>	<u>(27)</u>

A minimum of **225** credits is required to obtain the degree.

Optional courses: As specified in Ag. 4.

## 2.10 Study programme in Human Physiology (Code 03134021)

**N.B.:** Optional courses in consultation with the Head of Department, preferably from the following disciplines: Biochemistry, Genetics and Microbiology.

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		<u>16 + 4</u>	<u>(44)</u>

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
Three choices from:			
BOT 120	Introductory Botany 120	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
WTW 144	Mathematics 144	4 + 1	(11)
		<u>16 + 4</u>	<u>(44)</u>

### Second year of study

#### First semester

FLG 211	Introductory and Neurophysiology 211	2 + ½	(6)
FLG 212	Circulatory Physiology 212	2 + ½	(6)
BCM 216	Proteins and Enzymes 216 and	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
			(16)
		<u>[8 + 2]</u>	<u>(40)</u>

**Second semester**

FLG 221	Lung and Renal Physiology, Acid base Balance and Temperature 221	2 + ½	(6)
FLG 222	Digestion, Endocrinology and Reproductive systems 222	2 + ½	(6)
BCM 226 and BCM 227	Lipid and Nitrogen Metabolism 226 and Biosynthesis of Macromolecules 227	2 + ½	(6)
	Minimum optional course credits		(16)
		<u>[10 + 2]</u>	(40)

**Third year of study**

**First semester**

FLG 311	Applied Cellular Physiology 311	1 + 1	(5)
FLG 312	Developmental Physiology 312	2 + 0	(4)
FLG 313	Research methodology and Literature study 313	1 + 1	(5)
	Minimum optional course credits		(15)
		<u>[4 + 2]</u>	(29)

**Second semester**

FLG 321	Immunology 321	1 + 0	(2)
FLG 322	Industrial Physiology 322	1 + ½	(3)
FLG 323	Physiology Control systems & Modelling 323	0 + 1	(3)
FLG 324	Exercise Physiology 324	1 + ½	(4)
FLG 325	Nutrition Physiology 325	1 + 0	(2)

The following modules can, with permission of the Head of the Department only, replace certain of the above modules:

FLG 326	Research Project 326	1 + 1	(5)
FLG 327	Higher Neurological Functions 327	0 + 1½	(5)
	Minimum optional course credits		(15)
		<u>[4 + 2]</u>	(29)

**NB:** Obtainal subject courses in consultation with Head of Department, preferably from the following disciplines: Biochemistry, Genetics and Microbiology.

A minimum of **225** credits is required to obtain the degree.

**2.11 Study programme in Human Physiology and Psychology (Code 03134041)**

**NB:** Optional courses in consultation with the Head of Department.

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
SLK 151	Psychological Perspectives 151 (after hours)		(3)
SLK 152	Cognitive Processes 152		(3)
		<u>19 + 4</u>	(50)

**Second semester**

CMY 122	General Chemistry 122	4	+	1	(11)
SLK 161	Social Psychology 161				(3)
SLK 162	Development System Theory 162				(3)
GTS 122	Introductory Genetics 122	4	+	1	(11)
	Minimum optional course credits	<u>4</u>	+	<u>1</u>	<u>(11)</u>
		15	+	3	(39)

**Second year of study**

**First semester**

FLG 211	Introductory and Neurophysiology 211	2	+	½	(6)
FLG 212	Circulatory Physiology 212	2	+	½	(6)
BCM 216 and	Proteins and Enzymes 216 and	2	+	½	(6)
BCM 217	Carbohydrate Metabolism 217	2	+	½	(6)
SLK 251	Personology 251				(3)
SLK 252	Social Psychology 252				(3)
GTS 215	Molecular Genetics 215	2	+	1	(7)
	Minimum optional course credits	<u>2</u>	+	<u>1</u>	<u>(6)</u>
		14	+	4½	(43)

**Second semester**

FLG 221	Lung and Renal Physiology, Acid base Balance and Temperature 221	2	+	½	(6)
FLG 222	Digestion, Endocrinology and Reproductive systems 222	2	+	½	(6)
BCM 226	Lipid and Nitrogen Metabolism 226	2	+	½	(6)
BCM 227	Biosynthesis of Macromolecules 227	2	+	½	(6)
SLK 255	Perspectives in the Family 255				(3)
SLK 256	Psychological Assessment 256				(3)
	Minimum optional course credits	<u>3</u>	+	<u>1</u>	<u>(8)</u>
		12	+	3½	(38)

**Third year of study**

**First semester**

FLG 311	Applied Cellular Physiology 311	1	+	1	(5)
FLG 312	Developmental Physiology 312	2	+	0	(4)
FLG 313	Research methodology and Literature study 313	1	+	1	(5)
SLK 351	Community Psychology 351				(3)
SLK 352	Abnormal Behaviour 352				(3)
GTS 314	Human Genetics 314	<u>2</u>	+	<u>1</u>	<u>(7)</u>
		8	+	4	(27)

**Second semester**

FLG 321	Immunology 321	1	+	0	(2)
FLG 327	Higher Neurological Functions 327	0	+	1½	(5)
SLK 353	Critical Perspectives 353				(3)
SLK 354	Comm Psychology in Practice 354				(3)
A combination of at least two of the following modules:					
FLG 322	Industrial Physiology 322	1	+	½	(3)
FLG 324	Exercise Physiology 324	1	+	½	(4)

FLG 325	Nutrition Physiology 325	1	+	0	(2)
	Minimum optional course credits				(9)
		6	+	3	(30)
	<b>or</b>				(32)

A minimum of **225** credits is required to obtain the degree.

## 2.12 Study programme in Human Genetics (Code 03134031)

### First year of study:

#### First semester

CMY 112	First course in Chemistry 112	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
WTW 134	Mathematics 134	4	+	1	(11)
		16	+	4	(44)

#### Second semester

CMY 122	General Chemistry 122	4	+	1	(11)
GTS 122	Introductory Genetics 122	4	+	1	(11)
MBY 120	Introductory Microbiology 120	4	+	1	(11)
	Minimum optional course credits				(11)
		[12	+	3]	(44)

### Second year of study

#### First semester

BCM 216	Proteins and Enzymes 216	2	+	½	(6)
BCM 217	Carbohydrate Metabolism 217	2	+	½	(6)
GTS 215	Molecular Genetics 215	2	+	1	(7)
GTS 217	Chemical and Analytical Meiosis 217	2	+	1	(7)
	Minimum optional course credits				(14)
		[8	+	3]	(40)

#### Second semester

GTS 225	Microbial Genetics 225	1	+	½	(4)
GTS 226	Introductory Population Genetics 226	2	+	½	(6)
BCM 227	Biosynthesis of Macromolecules 227	2	+	½	(6)
BME 120	Biometry 120	3	+	1	(9)
	Minimum optional course credits				(15)
		[8	+	2½]	(40)

### Third year of study

#### First semester:

GTS 314	Human Genetics 314	2	+	1	(7)
BCM 411	Molecular Biology of Nucleic Acids 411	1	+	1	(5)
	Minimum optional course credits				(17)
		[4	+	2]	(29)

#### Second semester

BCM 423	Immunobiochemistry 423	2	+	1	(7)
MBY 323	Molecular Microbiology 323	2	+	1	(7)

GTS 325	Eukaryotic Gene Control 325	1	+	$\frac{1}{2}$	(4)
GTS 326	Population Genetics 326	1	+	$\frac{1}{2}$	(4)
	Minimum optional course credits				(7)
		[6	+	3]	(29)

A minimum of **225** credits is required to obtain the degree.

Optional courses: As specified in Ag. 4.

## 2.13 Study programme in Microbiology (Code 03133071)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
WTW 134	Mathematics 134	4	+	1	(11)
		16	+	4	(44)

#### Second semester

CMY 122	General Chemistry 122	4	+	1	(11)
MBY 120	Introductory Microbiology 120	4	+	1	(11)
GTS 122	Introductory Genetics 122	4	+	1	(11)
	An optional course in consultation with the Head of Department				(11)
		[12	+	3]	(44)

### Second year of study

#### First semester

GTS 215	Molecular Genetics 215	2	+	1	(7)
MBY 215	Taxonomy of Bacteria 215	2	+	1	(7)
BCM 216	Proteins and Enzymes 216	2	+	$\frac{1}{2}$	(6)
BCM 217	Carbohydrate Metabolism 217	2	+	$\frac{1}{2}$	(6)
MBY 211	Microbial Physiology 211	3	+	1	(9)
CIL 171	Computer Literacy 171				(2)
CIL 172	Computer Literacy 172				(2)
		13	+	4	(39)

#### Second semester

BCM 227	Biosynthesis of Macromolecules 227	2	+	$\frac{1}{2}$	(6)
CIL 173	Computer Literacy 173				(2)
GTS 225	Microbial Genetics 225	1	+	$\frac{1}{2}$	(4)
MBY 225	Food Microbiology 225	2	+	1	(7)
MBY 226	Industrial Microbiology 226	2	+	1	(7)
	Minimum optional course credits				(12)
		[8	+	3]	(38)

Optional courses: (**two** courses from the following):

BME 120	Biometry 120	3	+	1	(9)
PLG 220	Introductory Plant Pathology 220	2	+	1	(7)
PLG 221	Introductory Plant Virology 221	2	+	$\frac{1}{2}$	(6)
BCM 226	Lipid and Nitrogen metabolism 226	2	+	$\frac{1}{2}$	(6)
GTS 226	Introductory Population Genetics 226	2	+	$\frac{1}{2}$	(6)



Optional courses are chosen in consultation with the Head of the Department.

### Third year of study

#### First semester

MBY 311	Fungal Biotechnology 311	1 + ½	(4)
MBY 312	Taxonomy of Fungi 312	2 + 1	(7)
BCM 312	Protein Chemistry 312	2 + 1	(7)
BCM 411	Molecular Biology of Nucleic Acids 411	1 + 1	(5)
MBY 416	Basic Microbial Ecology 416	2 + 1	(7)
MBY 313	Human-microbial Interactions 313	2 + 0	(4)
		<u>10 + 4½</u>	(34)

#### Second semester

MBY 323	Molecular Microbiology 323	2 + 1	(7)
MBY 324	Molecular Virology 324	2 + 1	(7)
BCM 423	Immunobiochemistry 423	2 + 1	(7)
			(8)
		<u>[6 + 3]</u>	(29)

Optional courses: (**two** courses of the following)

BCM 322	Biomembranes 322	1 + 1	(5)
BCM 321	Enzymology 321	1 + 1	(5)
GTS 325	Eukaryotic Gene Control 325	1 + ½	(4)
AGV 421	Communication 421	2 + 0	(4)

A minimum of **228** course credits is required to obtain the degree.

## 2.14 Study programme in Microbiology/Plant Pathology (Code 03134000)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		<u>16 + 4</u>	(44)

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
		<u>[16 + 4]</u>	(44)

### Second year of study

#### First semester

MBY 215	Taxonomy of Bacteria 215	2 + 1	(7)
BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
GTS 215	Molecular Genetics 215	2 + 1	(7)

CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)
BOT 217	Plant Growth Control Mechanisms 217	1 + 0	(2)
MBY 211	Microbial Physiology 211	3 + 1	(9)
		<u>14 + 4</u>	(41)

**Second semester**

PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
PLG 221	Introductory Plant Virology 221	2 + ½	(6)
BCM 227	Biosynthesis of Macromolecules 227	2 + ½	(6)
GTS 225	Microbial Genetics 225	1 + ½	(4)
CIL 173	Computer Literacy 173		(2)
MBY 225	Food Microbiology 225	2 + 1	(7)
MBY 226	Industrial Microbiology 226	2 + 1	(7)
		<u>12 + 4½</u>	(39)

**Third year of study**

**First semester**

MBY 311	Fungal Biotechnology 311	1 + ½	(4)
MBY 312	Taxonomy of Fungi 312	2 + 1	(7)
MBY 416	Basic Microbial Ecology 416	2 + 1	(7)
PLG 412	Parasitology and Epidemiology 412	2 + ½	(6)
BCM 411	Molecular Biology of Nucleic Acids 411	1 + 1	(5)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
		<u>11 + 5</u>	(38)

**Second semester**

MBY 323	Molecular Microbiology 323	2 + 1	(7)
MBY 324	Molecular Virology 324	2 + 1	(7)
PLG 321	Introductory Phytobacteriology 321	1 + ½	(4)
Plus <b>one</b> of the following:			
BCM 321 and	Enzymology 321	1 + 1	(5)
BCM 423	Immunobiochemistry 423	2 + 1	(7)
or			
PLG 421 and	Disease Control 421	2 + ½	(6)
PLG 422	Nursery and Seed Pathology 422	1 + ½	(4)
		<u>8 + 4½</u>	(30)
or		8 + 3½	(28)

A minimum of **234** credits is required for degree purposes.

**2.15 Study programme in Molecular Biology (Code 03133081)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		<u>16 + 4</u>	(44)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
	Minimum optional course credits		(11)
		<u>12 + 3</u>	(44)

**Second year of study****First semester**

BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
GTS 215	Molecular Genetics 215	2 + 1	(7)
GTS 217	Chemical and Analytical Meiosis 217	2 + 1	(7)
	Minimum optional course credits		(14)
		<u>8 + 3</u>	(40)

**Second semester**

GTS 225	Microbial Genetics 225	1 + ½	(4)
BCM 227	Biosynthesis of Macromolecules 227	2 + ½	(6)
BME 120	Biometry 120	3 + 1	(9)
	Minimum optional course credits		(21)
		<u>7 + 2</u>	(40)

**Third year of study****First semester**

BCM 411	Molecular Biology of Nucleic Acids 411	1 + 1	(5)
	Minimum optional course credits		(24)
		<u>1 + 1</u>	(29)

**Second semester**

BCM 423	Immunobiochemistry 423	2 + 1	(7)
MBY 323	Molecular Microbiology 323	2 + 1	(7)
GTS 325	Eukaryotic Gene Control 325	1 + ½	(4)
MBY 324	Molecular Virology 324	2 + 1	(7)
	Minimum optional course credits		(4)
		<u>7 + 3½</u>	(29)

A minimum of **225** credits is required to obtain the degree.

Optional courses: As specified in Ag. 4.

**2.16 Study programme in Plant Biology (Code 03133101)****First year of study****First semester**

WTW 134	Mathematics 134	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
		<u>16 + 4</u>	(44)

**Second semester**

CMY 122	General Chemistry 122	4	+	1	(11)
BOT 120	Introductory Botany 120	4	+	1	(11)
	Minimum optional course credits				(22)
		8	+	2	(44)

**Second year of study**

**First semester**

BOT 216	Plant Diversity and Evolution 216	1	+	0	(2)
BOT 217	Plant Growth Control Mechanisms 217	1	+	0	(2)
BOT 214	Plant Conservation 214	1	+	0	(2)
BOT 213	Anatomy of Vascular Plants 213	1	+	1	(5)
BOT 215	Plant Ecological Techniques 215	0	+	1	(3)
CIL 171	Computer Literacy 171				(2)
CIL 172	Computer Literacy 172				(2)
	Minimum optional course credits				(20)
		6	+	2	(38)

**Second semester**

BOT 224	Environmental Factors 224	1	+	0	(2)
BOT 227	Introductory Ecology 227	1	+	0	(2)
BOT 228	Plant Utilisation 228	1	+	1	(5)
BOT 229	Introductory Plant Physiology 229	1	+	1	(5)
CIL 173	Computer Literacy 173				(2)
PLG 220	Introductory Plant Pathology 220	2	+	1	(7)
	Minimum optional course credits				(18)
		7	+	3	(41)

**Third year of study**

**First semester**

BOT 313	Reproductive Biology 313	2	+	1	(7)
BOT 301	Research Report 301	0	+	1	(3)
BOT 316	Secondary Metabolites 316	1	+	0	(2)
BOT 317	Fungus Biology & Technology 317	1	+	1	(5)
	Minimum optional course credits				(15)
		[4	+	3]	(32)

**Second semester**

BOT 320	Population Dynamics 320	1	+	0	(2)
BOT 323	Plant Systematics 323	1	+	0	(2)
BOT 324	Classification and Identification 324	1	+	1	(5)
BOT 325	Plant Community Ecology 325	1	+	1	(5)
BOT 301	Research Report 301	0	+	1	(3)
	Minimum optional course credits				(14)
		4	+	3	(31)

A minimum of **225** credits is required for degree purposes.

Optional courses (see their prerequisites):

BME 120	Biometry 120	3	+	1	(9)
GKD 213	Introductory Soil Science 213	3	+	1	(9)
WDE 310	Principles of Veld Management 310	2	+	½	(6)

PGW 411	Environment Management 411	2	+	1	(7)
SLK 300	Psychology 300	2	+	0	(4)

**2.17 Study programme in Plant Diversity and Environmental Management  
(Code 03133111)**

**First year of study**

**First semester**

WTW 134	Mathematics 134	4	+	1	(11)
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
CMY 112	First course in Chemistry 112	4	+	1	(11)
PHY 131	General Physics 131	4	+	1	(11)
		<u>16</u>	+	<u>4</u>	<u>(44)</u>

**Second semester**

CMY 122	General Chemistry 122	4	+	1	(11)
BOT 120	Introductory Botany 120	4	+	1	(11)
GGY 162	Distance observation 162	0	+	1	(3)
ZEN 122	Introductory Zoology 122	4	+	1	(11)
					(5)

Optional courses: (Choose **one** of the following two possibilities):

GTS 122	Introductory Genetics 122	4	+	1	(11)
MBY 120	Introductory Microbiology 120	4	+	1	(11)
		<u>16</u>	+	<u>5</u>	<u>(52)</u>

**Note:** GTS 122 is a prerequisite for GTS 226, GTS 227 and GTS 327.

**Second year of study**

**First semester**

BOT 213	Anatomy of Vascular Plants 213	1	+	1	(5)
BOT 217	Plant Growth Control Mechanisms 217	1	+	0	(2)
BOT 216	Plant Diversity and Evolution 216	1	+	0	(2)
BOT 214	Plant Conservation 214	1	+	0	(2)
BOT 215	Plant Ecological Techniques 215	0	+	1	(3)
CIL 171	Computer Literacy 171				(2)
CIL 172	Computer Literacy 172				(2)
GKD 213	Introductory Soil Science 213	3	+	1	(9)
		<u>9</u>	+	<u>3</u>	<u>(27)</u>

Optional course:

PPK 210	Introductory Plant Production 210	3	+	1	(9)
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**Second semester**

BOT 229	Introductory Plant Physiology 229	1	+	1	(5)
BOT 224	Environmental Factors 224	1	+	0	(2)
BOT 228	Plant Utilisation 228	1	+	1	(5)
BOT 227	Introductory Ecology 227	1	+	0	(2)
BME 120	Biometry 120	3	+	1	(9)
CIL 173	Computer Literacy 173				(2)
LKM 221	Introduction to Agricultural Climatology 221	2	+	0	(4)
GGY 251	Raster GIS 251	2	+	1	(7)

	Minimum optional course credits		<u>(7)</u>
		12 + 4	(43)
Optional courses: (Choose <b>one</b> of the following four possibilities):			
GTS 226	Introductory Population Genetics 226	2 + ½	(6)
GTS 227	Cytogenetic Systems 227	1 + 1	(5)
ZEN 222	Insect Diversity 222	2 + 1	(7)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
<b>Third year of study</b>			
<b>First semester</b>			
BOT 301	Research Report 301	0 + 1	(3)
BOT 316	Secondary Metabolites 316	1 + 0	(2)
BOT 317	Fungus Biology & Technology 317	1 + 1	(5)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
GKD 414	Soil and Environmental Processes 414	2 + 1	(7)
ZEN 310	Ecology 310	2 + 1	(7)
	Minimum optional course credits		<u>(6)</u>
		8 + 5	(37)
Optional courses: (Choose <b>one</b> of the following three possibilities):			
GKD 485	Land Suitability Evaluation 485	3 + 1	(9)
WDE 310	Principles of Veld Management 310	2 + ½	(6)
PGW 411	Environmental Management 411	2 + 1	(7)
<b>Second semester</b>			
BOT 320	Population Dynamics 320	1 + 0	(2)
BOT 323	Plant Systematics 323	1 + 0	(2)
BOT 324	Classification and Identification 324	1 + 1	(5)
BOT 325	Plant Community Ecology 325	1 + 1	(5)
BOT 301	Research Report 301	0 + 1	(3)
GKD 487	Resource Surveying 487	3 + 1	(9)
ZEN 320	Insect Pest Management 320	2 + 1	(7)
		9 + 5	(33)
Optional courses: (see their prerequisites):			
GGY 332	Site evaluation 332	0 + 2	(6)
GGY 342	Environment Project Study 342	0 + 2	(6)
GTS 327	Cytotaxonomy 327	2 + 1	(7)

A minimum of **225** credits is required for degree purposes.

## 2.18 Study programme in Plant Growth Manipulation (Code 03133121)

### First year of study

#### First semester

WTW 134	Mathematics 134	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
		16 + 4	(44)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
	Minimum optional course credits		(5)
		<u>12 + 3</u>	(38)

**Second year of study****First semester**

BOT 217	Plant Growth Control Mechanisms 217	1 + 0	(2)
BOT 213	Anatomy of Vascular Plants 213	1 + 1	(5)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)
GTS 215	Molecular Genetics 215	2 + 1	(7)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
	Minimum optional course credits		(5)
		<u>12 + 4</u>	(41)

**Second semester**

BOT 224	Environmental Factors 224	1 + 0	(2)
BOT 228	Plant Utilisation 228	1 + 1	(5)
BOT 229	Introductory Plant Physiology 229	1 + 1	(5)
BOT 227	Introductory Ecology 227	1 + 0	(2)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
BME 120	Biometry 120	3 + 1	(9)
CIL 173	Computer Literacy 173		(2)
GTS 225	Microbial Genetics 225	1 + ½	(4)
		<u>11 + 4½</u>	(36)

**Third year of study****First semester**

BOT 316	Secondary Metabolites 316	1 + 0	(2)
BOT 313	Reproductive Biology 313	2 + 1	(7)
BOT 301	Research Report 301	0 + 1	(3)
BOT 317	Fungus Biology and Technology 317	1 + 1	(5)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
STZ 311	Nursery Management 311	2 + ½	(6)
GTS 316	Plant Cultivation 316	2 + 1	(7)
		<u>10 + 5</u>	(36)

**Second semester**

BOT 326	Plant Productivity 326	2 + 1	(7)
BOT 323	Plant Systematics 323	1 + 0	(2)
BOT 301	Research Report 301	0 + 1	(3)
GTS 325	Eukaryotic Gene Control 325	1 + ½	(4)
GTS 442	Plant Orientated Advanced Genetics 442	2 + 1	(7)
PGW 421	Research Methodology 421	3 + 1	(9)
		<u>9 + 4½</u>	(32)

A minimum of **225** credits is required for degree purposes.

Optional courses: (see their prerequisites):

CMY 284	Organic Chemistry 284	2	+	1	(7)
CMY 384	Organic Chemistry 384	2	+	1	(7)
BCM 216	Proteins and Enzymes 216	2	+	½	(6)
BCM 226	Lipid and Nitrogen Metabolism 226	2	+	½	(6)
MBY 120	Introductory Microbiology 120	4	+	1	(11)
BOT 324	Classification and Identification 324	1	+	1	(5)
STZ 320	Ornamental Plants 320	2	+	½	(6)

## 2.19 Study programme in Food Science (Code 03134011)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4	+	1	(11)		
PHY 131	General Physics 131	4	+	1	(11)		
MLB 111	Molecular and Cell Biology 111	4	+	1	(11)		
WTW 134	Mathematics 134	4	+	1	(11)		
		<hr/>		16	+	4	(44)

#### Second semester

CMY 122	General Chemistry 122	4	+	1	(11)		
MBY 120	Introductory Microbiology 120	4	+	1	(11)		
WTW 144	Mathematics 144	4	+	1	(12)		
					(11)		
		<hr/>		[12	+	3]	(44)

### Second year of study

#### First semester

BCM 216 and Proteins and Enzymes 216 and							
BCM 217	Carbohydrate Metabolism 217	4	+	1	(12)		
FSG 110	Physiology 110	3	+	0	(6)		
VDW 211	Food Science 211	2	+	1	(7)		
CIL 171	Computer Literacy 171					(2)	
CIL 172	Computer Literacy 172					(2)	
					(9)		
		<hr/>		[11	+	2]	(38)

#### Second semester

BCM 226 and Lipid and Nitrogen Metabolism 226 and							
BCM 227	Biosynthesis of Macromolecules 227	4	+	1	(12)		
FSG 120	Physiology 120	3	+	0	(6)		
VDW 222	Food Science 222	2	+	½	(6)		
CIL 173	Computer Literacy 173					(2)	
BME 120	Biometry 120	3	+	1	(9)		
VDG 120	Nutrition 120	3	+	0	(6)		
		<hr/>		[16	+	2½]	(41)

### Third year of study

#### First semester

VDG 211	Nutrition 211	3	+	⅔	(8)
VDW 314	Food Science 314	2	+	1	(7)



VDW 400	Food Science 400	2 + 0	(4)
VDW 411	Food Science 411	2 + 1	(7)
LPR 311	Processing 311	3 + 0	(6)
		<u>12 + 2<sup>2</sup>/<sub>3</sub></u>	<u>(32)</u>

**Second semester**

MBY 225	Food Microbiology 225	2 + 1	(7)
VDW 324	Food Science 324	2 + 1	(7)
VDW 400	Food Science 400	2 + 0	(4)
			(12)
		<u>6 + 2</u>	<u>(30)</u>

Choose optional courses from the following (subject to Ag.4):

Biochemistry on 300 and 400 level;

Microbiology on 200, 300 and 400 level;

Nutrition on 300 level;

Food Science on 200, 300 and 400 level;

Business Management on 100 level (OBS 111/OBS 121).

Optional courses subject to approval of the Head of Department.

A minimum of **229** course credits is required to obtain the degree.

<b>II. BACCALAUREUS SCIENTIAE HONORES [BSc(Hons)]</b>
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Also consult General Regulations G. 16 – G. 29.

**Ag. 8**

**Admission requirement**

- (a) Subject to the stipulations of General Regulations G. 1.3 and G. 62, an applicable bachelor's degree in a biological field is a prerequisite: Provided that a candidate who obtained an average of less than 60% in the major courses in the final year of the bachelor's degree, will only be admitted to study with the approval of the Dean, on the recommendation of the Head of Department. Additional requirements may be prescribed by the Head of Department.
- (b) The duration of study for full-time students is a minimum of one year, and two years for part-time students.
- (c) A student must obtain an average of at least 75% in the major course(s), with at least 65% in all other courses to obtain the degree with distinction.
- (d) In addition to the prescribed courses, a research project forms an integral part of the course.
- (e) A student must provide proof that an appropriate course in Statistical Methods has been passed before the degree will be conferred.
- (f) The BSc(Hons) degree is offered in the following fields of specialisation: Biochemistry, Zoology, Entomology, Genetics, Soil Science, Microbiology, Wildlife Management, Plant Physiology, Botany, Plant Pathology and Food Science. Details appear in the Faculty's publication Postgraduate Regulations.  
**NB:** Students who wish to pursue Human Physiology at postgraduate level, are referred to the postgraduate publication of the Faculty of Health Sciences.

### III. MAGISTER SCIENTIAE (MSc)

Also consult General Regulations G. 30 – G. 44.

#### Ag.9

- (a) Subject to the stipulations of General Regulations G. 30, G. 1.3 and G. 62, an applicable honours degree is a prerequisite for admission. Additional requirements may be set by the Dean on the recommendation of the Head of Department. A candidate with an average mark of less than 60% for the honours degree will only be admitted to the MSc degree study with the approval of the Dean on the recommendation of the Head of Department.
- (b) The MSc degree is conferred by virtue of a dissertation and such additional postgraduate courses as may be prescribed.
- (c) The degree is conferred with distinction on a student who obtains a final average of at least 75%, provided that all the members of the Examination Commission indicate in writing that they have no objection against the degree being conferred with distinction.
- (d) **General**  
Students should take particular note of the maximum period of registration (General Regulation G. 32.4), as well as of the requirement regarding submission of a draft article/articles for publication (General Regulation G. 61).

### IV. BACCALAUREUS SCIENTIAE AGRICULTURAE [BSc(Agric)]

#### Ag.10

The BSc(Agric) curriculum consists of one of the study programmes indicated below:

1. Study programme in Biochemistry
2. Study programme in Entomology
3. Study programme in Mechanised Agriculture
4. Study programmes in Genetics:
  - 4.1 Plant Breeding
  - 4.2 Animal Breeding
  - 4.3 Molecular Genetics
5. Study programmes in Agricultural Economics
  - 5.1 Agribusiness Management
  - 5.2 Agriculture Economics
6. Study programmes in Microbiology and Plant Pathology
  - 6.1 Microbiology
  - 6.2 Plant Pathology
  - 6.3 Plant Protection
7. Study programmes in Plant Production and Soil Science
  - 7.1 Agronomy/Irrigation/Weed Science
  - 7.2 Horticulture
  - 7.3 Pasture Science
  - 7.4 Soil Science
  - 7.5 Sustainable Resource Utilisation
8. Study programme in Animal Science
9. Study programme in Animal Science/Pasture Science
10. Study programme in Food Science and Food Technology

**Ag. 11**

**Admission requirements**

A matriculation exemption certificate.

Also consult page 7 of this publication for information on M scores and other requirements.

**Ag. 12**

**Examinations and promotion**

- (a) A student may be admitted to courses of the following semester or year of study, if he or she complies with the prerequisites for the specific courses of the following semester or year of study. (Consult Reg. Ag.1.)
- (b) A student is promoted to the following year of study if:
  - (i) not more than thirty credits will be transferred to the following year, unless the Dean, on the recommendation of the Head of Department, decides otherwise; and
  - (ii) no first year courses will be transferred to the final year of study.
- (c) A student who does not comply with the requirements for promotion to the following year of study, retains credit for courses already passed and may be admitted by the Dean, on the recommendation of Head of Department, to courses of the following year of study to a maximum of thirty credits, provided that there are no timetable clashes.
- (d) A student who has failed only one year course or two semester courses in the final year but obtained a combined mark of 40%, may be admitted to a special examination in the course(s) concerned at the end of the first semester of the following year.
- (e) A major subject is passed with distinction if a student obtains an average of at least 75% in the major subject courses.
- (f) The BSc(Agric) degree is conferred with distinction if a student obtains a weighted average of at least 75% in the courses of the major subjects in the third and the fourth year of study, with a weighted average of at least 65 % in the other courses of the third and the fourth year of study.

**Ag. 13**

**Curricula**

**(1) General**

- (a) The digits listed after each course indicate the number of lectures and practicals per week. A practical followed by a ½ usually implies one practical every two weeks. Square brackets around the total of a semester, indicate that additional optional courses must be taken. The figure in brackets indicates the number of "credits":  
 1 Lecture per week = 2 "credits"  
 1 x 3 hour practical = 3 "credits"  
 The minimum number of "credits" required for a degree, are indicated in the footnote at the end of each curriculum. (Not applicable to year courses in the extended programme for BSc or BSc(Agric)).
- (b) Optional courses are chosen in consultation with the Head of Department and with the approval of the Dean, to ensure that no timetable clashes occur.
- (c) The Dean may, on the recommendation of the Head of department and in exceptional cases, grant permission for the inclusion or recognition of an alternative course other than a course included in the curricula.
- (d) All students for the BSc(Agric) degree must follow a course in Computer Literacy. No examinations are required, but satisfactory attendance and a year mark of at least 50 percent are required before the degree will be conferred.

**(2.) PRESCRIBED CURRICULA FOR THE DIFFERENT STUDY PROGRAMMES AND THE YEARS OF STUDY**

**1. Study programme in Biochemistry (Code 03130011)**

**First year of study**

**First semester**

CMY 131	First course in Chemistry 131	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		<hr/>	
		16 + 4	(44)

**Second semester**

CMY 141	General Chemistry 141	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
WTW 144	Mathematics 144	4 + 1	(11)
		4 + 1	(11)
		<hr/>	
		16 + 4	(44)

**Second year of study**

**First semester**

CMY 283 and Analytical Chemistry 283 and CMY 284 Organic Chemistry 284	4 + 2	(14)	
BCM 216 and Proteins and Enzymes 216 and BCM 217 and Carbohydrate Metabolism 217 and BCM 218 Practical 218	4 + 2	(14)	
Minimum optional course credits	5 + 1	(13)	
		<hr/>	
		13 + 5	(41)

**Second semester**

CMY 282 and Physical Chemistry 282 and CMY 285 or Inorganic Chemistry 285 or Optional course(s)	4 + 2	(14)	
BCM 226 and Lipid and Nitrogen Metabolism 226 and BCM 227 and Biosynthesis of Macromolecules 227 and BCM 228 Practical 228	4 + 2	(14)	
Minimum optional course credits	4 + 1	(11)	
		<hr/>	
		12 + 5	(39)

**Third year of study**

**First semester**

CMY 382 and Physical Chemistry 382 and CMY 383 or Analytical Chemistry 383 or Optional course credits	4 + 2	(14)	
BCH 311 Biochemistry 311	1 + 0	(2)	
BCM 312 Protein Chemistry 312	2 + 1	(7)	
CIL 171 Computer Literacy 171		(2)	
CIL 172 Computer Literacy 172		(2)	
		<hr/>	
		9 + 3	(27)

**Second semester**

CMY 385 and Inorganic Chemistry 385 and CMY 384 or Organic Chemistry 384 or Minimum optional course(s)	4 + 2	(14)
BCM 321 Enzymology 321	1 + 1	(5)
BCM 322 Biomembranes 322	1 + 1	(5)
BME 120 Biometry 120	3 + 1	(9)
CIL 173 Computer Literacy 173		(2)
AGV 421 Communication 421	<u>2 + 0</u>	<u>(4)</u>
	12 + 5	(39)

**Fourth year of study****First semester**

BCH 400 Biochemistry 400	0 + 2	(6)
BCM 411 Mol. Biol. of Nucleic Acids 411	1 + 1	(5)
BCH 412 Biochemistry 412	2 + 0	(4)
BCH 413 Biochemistry 413	1 + 0	(2)
Minimum optional course credits	<u>7 + 1</u>	<u>(17)</u>
	11 + 4	(34)

**Second semester**

BCH 400 Biochemistry 400	0 + 2	(6)
BCH 421 Biochemistry 421	1 + 0	(2)
BCH 422 Biochemistry 422	1 + 0	(2)
BCM 423 Immunobiochemistry 423	2 + 1	(7)
BCH 424 Biochemistry 424	1 + ½	(4)
MBY 323 Molecular Microbiology 323	2 + 1	(7)
Minimum optional course credits	<u>3 + ½</u>	<u>(7)</u>
	10 + 5	(35)

A minimum of **300** credits is required to obtain the degree.

Optional courses are chosen in consultation with the Head of Department.

**2. Study programme in Entomology (Code 03130120)****First year of study****First semester**

CMY 112 First course in Chemistry 112	4 + 1	(11)
PHY 131 General Physics 131	4 + 1	(11)
MLB 111 Molecular and Cell Biology 111	4 + 1	(11)
WTW 134 Mathematics 134	<u>4 + 1</u>	<u>(11)</u>
	16 + 4	(44)

**Second semester**

CMY 122 General Chemistry 122	4 + 1	(11)
GTS 122 Introductory Genetics 122	4 + 1	(11)
<b>Two</b> choices from:		
ZEN 122 and Introductory Zoology 122		
MBY 120 Introductory Microbiology 120	4 + 1	(11)
BOT 120 Introductory Botany 120	4 + 1	(11)
WTW 144 Mathematics 144	<u>4 + 1</u>	<u>(11)</u>
	16 + 4	(44)

**Second year of study**

**First semester**

BCM 216 and	Proteins and Enzymes 216 and		
BCM 217	Carbohydrate Metabolism 217	4 + 1	(11)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)
	Minimum optional course credits	<u>4 + 1</u>	<u>(11)</u>
		13 + 3	(35)

**Second semester**

BOT 227	Introductory Ecology 227	1 + 0	(2)
AGV 421	Communication 421	2 + 0	(4)
LKM 221	Introduction to Agricultural Climatology 221	2 + 0	(4)
PLG 220	Introductory Plant Pathology 220	2 + ½	(6)
TBK 221	Introductory Horticulture 221	3 + 1	(9)
CIL 173	Computer Literacy 173		(2)
	Minimum optional course credits	<u>4 + 1</u>	<u>(11)</u>
		15 + 2½	(38)

**Third year of study**

**First semester**

ZEN 211	Invertebrate Biology 211	2 + 1	(7)
BOT 217	Plant Growth Control Mechanisms 217	1 + 0	(2)
LEK 210	Agricultural Economics 210	3 + 0	(6)
AGR 313	Primary Food Crops 313	2 + ½	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
	Minimum optional course credits	<u>2 + 1</u>	<u>(7)</u>
		13 + 3½	(37)

**Second semester**

ZEN 220	Animal Physiology 220	2 + 1	(7)
ZEN 222	Insect Diversity 222	2 + 1	(7)
BOT 229	Introductory Plant Physiology 229	1 + 1	(5)
PLG 221	Introductory Plant Virology 221	2 + ½	(6)
BME 120	Biometry 120	3 + 1	(9)
		<u>10 + 4½</u>	<u>(34)</u>

**Fourth year of study**

**First semester**

ZEN 400	Entomology 400	1 + 0	(2)
ZEN 310	Ecology 310	2 + 1	(7)
ZEN 311	Ecophysiology 311	2 + 1	(7)
OKW 413	Weed Science 413	3 + 1	(9)
PLG 412	Parasitology and Epidemiology 412	2 + 1	(7)
	Minimum optional course credits		(6)
		<u>12 + 4½</u>	<u>(38)</u>

**Second semester**

ZEN 400	Entomology 400	1 + 0	(2)
ZEN 320	Insect Pest Management 320	2 + 1	(7)
ZEN 321	SA Insect Pests 321	2 + 1	(7)

PLG 421	Disease Control 421	2	+	1	(7)
	Minimum optional course credits				(8)
		<u>7</u>	+	3	(31)

A minimum of **301** credits is required to obtain the degree.  
 Optional courses are chosen in consultation with the Head of Department.

### 3. Study programme in Mechanised Agriculture (Code 03130411)

#### First year of study

##### First semester

MLB 111	Molecular and Cell Biology 111	4	+	1	(11)
CMY 112	First course in Chemistry 112	4	+	1	(11)
FSK 116	Physics 116 or	3½+	½		(9)
PHY 131	General Physics 131	4	+	1	(11)
WTW 114	Calculus 114 or	5	+	0	(10)
WTW 134	Mathematics 134	4	+	1	(11)
LXF 110	Forum 110	½+	0		(1)
		<u>16½+</u>	4		(45)
	or	17	+	2½	(42)

##### Second semester

MRV 122	Computer Literacy 122	1	+	0	(2)
WTW 128 and	Calculus 128 and	2½+	0		(5)
WTW 126	Linear Algebra 126 or	2½+	0		(5)
WTW 144	Mathematics 144	4	+	1	(11)
CMY 122	General Chemistry 122	4	+	1	(11)
LXF 120	Forum 120	½+	0		(1)
FSK 126	Physics 126	3	+	1	(9)
	Optional course(s) minimum				(8)
MOW 121	Machine design 121	2	+	2	(10)
	Optional course(s) minimum				(9)
		<u>14½+</u>	4		(42)
	or	15½+	4		(43)

#### Second year of study

##### First semester

CIL 171	Computer Literacy 171				(2)
CIL 172	Computer Literacy 172				(2)
LEK 210	Agricultural Economics 210	3	+	0	(6)
PPK 210	Introduction to Plant Production 210	3	+	1	(9)
GKD 213	Introductory Soil Science 213	3	+	1	(9)
MIT112	Engineering Drawing 112	2	+	1	(7)
FRK 151					
and 152	Financial Accounting 151 and 152	4	+	0	(8)
	Optional course(s) minimum				(7)
		<u>17</u>	+	3	(43)
	or	15	+	4	(42)

**Second semester**

TBK 221	Introductory Horticulture 221	3 + 1	(9)
LEK 220	Agricultural Economics 220	3 + 0	(6)
CIL 173	Computer Literacy 173		(2)
BME 120	Biometry 120	3 + 1	(9)
IGB 220	Engineering Management 220	3 + ½	(8)
	Optional course(s) minimum		(6)
		<hr/>	
		15 + 3	(40)

**Third year of study**

**First semester**

LPR 311 and	Processing 311and	3 + 0	(6)
LPR 312	Processing 312	2 + ½	(6)
AGR 313	Primary Food Crops 313	2 + ½	(6)
WKD 111 &	Atmospheric Processes 111 &	2 + ½	(5)
WKD 112	Atmospheric Circulation 112	2 + ½	(6)
LSQ 313	Communication 313 ½	+ 0	(1)
TRN 213	Site Surveying 213	2 + 1	(6)
	Optional course(s) minimum		(6)
LPY 314	Practical report 314		(Report)
		<hr/>	
		15½+	4½ (42)

**Second semester**

GKD 228	Soil Fertility 228	3 + 1	(9)
PGW 422	Irrigation 422	3 + 1	(9)
AGR 323	Diverse Crops 323	2 + ½	(6)
GGY 162	Remote Sensing 162	0 + 1	(3)
LKW 222	Agricultural Power Units 222	2 + ½	(6)
LSC 320	Project: Preparation 320	0 + ½	(2)
IGB 320	Engineering Management 320	2 + ½	(5)
	Optional course(s) minimum		(4)
		<hr/>	
		12 + 5	(40)
	or	12 + 4½	(39)

**Fourth year of study**

**First semester**

LPW 413	Agricultural Production Equipment 413 ( <i>Capita Selecta</i> )	2 + ½	(6)
LSC 402	Project 402	0 + 1½	(4)
LLS 410	Agricultural Structures 410	3 + ½	(8)
LHL 411	Hydraulics 411 ( <i>Capita Selecta</i> )	2 + ½	(6)
LGD 410	Soil Dynamics 410 ( <i>Capita Selecta</i> )	2 + ½	(6)
TKN 310	Terrain Construction 310 ( <i>Capita Selecta</i> )	2 + 1	(7)
GGY 251	Raster GIS 251	2 + 1	(7)
LPY 414	Practical Training 414		(Report)
		<hr/>	
		13 + 5½	(44)

**Second semester**

LSC 402	Project 402	0 + 2½	(8)
LBP 420	Irrigation 420	3 + ½	(10)
LBC 420	Industrial Principles 420	2 + 0	(4)



LGH 420	Soil Conservation and Hydrology 420 ( <i>Capita Selecta</i> )	2 + 0	(4)
LEK 320	Agricultural Economics 320	3 + 1	(9)
LLI 420	Rural Engineering 420 or Optional course(s) minimum	3 + 0	(6)
		<u>4 + 0</u>	<u>(6)</u>
		13 + 4	(41)

A minimum of **332** credits is required to obtain the degree.

Optional courses to be chosen in consultation with the Head of Department.

#### 4. Study programmes in Genetics

1. Plant Breeding: 03130301;
2. Animal Breeding: 03130190;
3. Molecular Genetics: 03130371.

##### First year of study

###### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	<u>4 + 1</u>	<u>(11)</u>
		16 + 4	(44)

###### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
MBY 120	Introductory Microbiology 120	<u>4 + 1</u>	<u>(11)</u>
		16 + 4	(44)

##### Second year of study

###### First semester

GTS 215 and	Molecular Genetics 215 and	2 + 1	(7)
GTS 217	Chemical and Analytical Meiosis 217	2 + 1	(7)
BCM 216 and	Proteins and Enzymes 216 and		
BCM 217	Carbohydrate Metabolism 217	4 + 1	(12)
LEK 210	Agricultural Economics 210	3 + 0	(6)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		<u>(2)</u>
		13 + 3	(36)

###### Second semester

GTS 225 and	Microbial Genetics 225 and	1 + ½	(4)
GTS 226 and	Introductory Population Genetics 226 and	2 + ½	(6)
GTS 227	Cytogenetic Systems 227	1 + 1	(5)
BCM 226 and	Lipid and Nitrogen Metabolism 226 and		
BCM 227	Biosynthesis of Macromolecules 227	4 + 1	(12)
BME 120	Biometry 120	3 + 1	(9)
CIL 173	Computer Literacy 173		(2)
AGV 421	Communication 421	<u>2 + 0</u>	<u>(4)</u>
		14 + 4	(42)

**Third year of study: Plant Breeding**

**First semester**

BOT 215	Plant Ecological Techniques 215	0 + 1	(3)
BOT 217	Plant Growth Control Mechanisms 217	1 + 0	(2)
GTS 314 and	Human Genetics 314	2 + 1	(7)
GTS 316	Plant Breeding 316	2 + 1	(7)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
AGR 313	Primary Food Crops 313	2 + ½	(6)
STZ 320	Ornamental Plants 320	2 + ½	(6)
		<u>12 + 5</u>	(40)

**Second semester**

GTS 325 and	Eukaryotic Gene Control 325	1 + ½	(4)
GTS 326 and	Population Genetics 326	1 + ½	(4)
GTS 327	Cytotaxonomy 327	2 + 1	(7)
TBK 221	Introductory Horticulture 221	3 + 1	(9)
AGR 323	Diverse Crops 323	2 + ½	(6)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
		<u>11 + 4½</u>	(37)

**Fourth year of study: Plant Breeding**

**First semester**

GTK 401	Genetics 401	2	2 + 0	(4)
GTK 402	Genetics 402	2	2 + 0	(4)
GTK 403	Genetics 403	1	1 + 2	(8)
BME 210	Biometry 210	3	3 + 1	(9)
PLG 412	Parasitology and Epidemiology 412		2 + ½	(6)
WDE 310	Principles of Veld Management 310		2 + ½	(6)
			<u>12 + 4</u>	(37)

**Second semester**

GTK 401	Genetics 401		2 + 0	(4)
GTK 402	Genetics 402		2 + 0	(4)
GTK 403	Genetics 403		1 + 2	(8)
BME 220	Biometry 220		3 + ½	(8)
PLG 221	Introductory Plant Virology 221		2 + ½	(6)
	Minimum optional course credits			(6)
			<u>[10 + 3]</u>	(36)

A minimum of **316** credits is required to obtain the degree.

**Third year of study: Animal Breeding**

**First semester**

GTS 314	Human Genetics 314		2 + 1	(7)
GTS 316	Plant Breeding 316		2 + 1	(7)
VKU 210	Animal Science 210		2 + ½	(6)
DAF 200	Animal Anatomy and Physiology 200		4 + 1	(11)
BME 210	Biometry 210		3 + 1	(9)
			<u>13 + 4½</u>	(40)

**Second semester**

GTS 325	Eukaryotic Gene Control 325	1 + ½	(4)
GTS 326	Population Genetics 326	1 + ½	(4)
GTS 327	Cytotaxonomy 327	2 + 1	(7)
TLR 320	Animal Breeding 320	2 + ½	(6)
DAF 200	Animal Anatomy and Physiology 200	4 + 1	(11)
BME 220	Biometry 220	3 + ½	(8)
		<u>13 + 4</u>	<u>(40)</u>

**Fourth year of study: Animal Breeding****First semester**

GTK 401	Genetics 401	2 + 0	(4)
GTK 402	Genetics 402	2 + 0	(4)
GTK 403	Genetics 403	1 + 2	(8)
TLR 411	Animal Breeding 411	2 + ½	(6)
TLR 412	Animal Breeding 412	2 + ½	(6)
BCM 411	Mol. biol. of Nucleic Acids 411	1 + 1	(5)
RPL 310	Reproduction Science 310	1 + ½	(4)
		<u>11 + 4½</u>	<u>(37)</u>

**Second semester**

GTK 401	Genetics 401	2 + 0	(4)
GTK 402	Genetics 402	2 + 0	(4)
GTK 403	Genetics 403	1 + 2	(8)
RPL 320	Reproduction Science 320	2 + ½	(6)
MBY 324	Molecular Virology 324	2 + 1	(7)
	Minimum optional course credits		(6)
		<u>9 + 3½</u>	<u>(35)</u>

A minimum of **318** credits is required to obtain the degree.

**Third year of study: Molecular Genetics****First semester**

GTS 314	Human Genetics 314	2 + 1	(7)
GTS 316	Plant Breeding 316	2 + 1	(7)
BCM 312	Protein Chemistry 312	2 + 1	(7)
BCH 413	Biochemistry 413	1 + 0	(2)
BCH 311	Biochemistry 311	1 + 0	(2)
MBY 311	Fungal Biotechnology 311	1 + ½	(4)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
		<u>12 + 4½</u>	<u>(38)</u>

**Second semester**

GTS 325	Eukaryotic Gene Control 325	1 + ½	(4)
GTS 326	Population Genetics 326	1 + ½	(4)
GTS 327	Cytotaxonomy 327	2 + 1	(7)
BCM 321	Enzymology 321	1 + 1	(5)
MBY 323	Molecular Biology 323	2 + 1	(7)
MBY 324	Molecular Virology 324	2 + 1	(7)
CIL 174	Computer Literacy 174		(2)
		<u>10 + 5</u>	<u>(36)</u>

**Fourth year of study: Molecular Genetics**

**First semester**

GTK 401	Genetics 401	2 + 0	(4)
GTK 402	Genetics 402	2 + 0	(4)
GTK 403	Genetics 403	1 + 2	(8)
BCM 411	Mol. Biol. of Nucleic Acids 411	1 + 1	(5)
BCH 412	Biochemistry 412	2 + 0	(4)
MBY 313	Human microbial Interaction 313	2 + 0	(4)
MBY 416	Basic Microbial Ecology 416	<u>2 + 1</u>	<u>(7)</u>
		[12 + 4]	(36)

\*\* Free choice of at least **15** credits from courses as specified in Ag. 4.

**Second semester**

GTK 401	Genetics 401	2 + 0	(4)
GTK 402	Genetics 402	2 + 0	(4)
GTK 403	Genetics 403	1 + 2	(8)
BCM 322	Biomembranes 322	1 + 1	(5)
BCH 421	Biochemistry 421	1 + 0	(2)
BCM 423	Immunobiochemistry 423	2 + 1	(7)
MBY 226	Industrial Microbiology 226	<u>2 + 1</u>	<u>(7)</u>
		11 + 5	(37)

A minimum of **309** credits is required to obtain the degree.

**5. Study programmes in Agricultural Economics**

**5.1 Agribusiness Management (Code 03130050)**

**First year of study**

**First semester**

FRK 151 or 181 & 152	Financial Accounting 151 or 181 & 152		(8)
EKN 151	Economics 151		(3)
EKN 152	Economics 152		(3)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
CMY 112	First course in Chemistry 112	<u>4 + 1</u>	<u>(11)</u>
		15 + 2	(36)

**Second semester**

FRK 161	Financial Accounting 161		(4)
FRK 162	Financial Accounting 162		(4)
EKN 120	Economics 120	3 + 0	(6)
CMY 122	General Chemistry 122	4 + 1	(11)
LIR 421	Agricultural Engineering 421	3 + 1	(9)
FIL 120	Philosophy 120	3 + 0	(6)
BOT 227	Introductory Ecology 227	<u>1 + 0</u>	<u>(2)</u>
		18 + 2	(42)

**Second year of study**

**First semester**

LEK 210	Agricultural Economics 210	3 + 0	(6)
OBS 151&152	Business Management 151 & 152		(6)
STK 151	Statistics 151		(3)
STK 152	Statistics 152		(3)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)
BER 210	Business Law 210	<u>3 + 0</u>	<u>(6)</u>
		20 + 2	(46)

**Second semester**

LEK 220	Agricultural Economics 220	3 + 0	(6)
OBS 161&162	Business Management 161 & 162	3 + 0	(6)
STK 161	Statistics 161		(3)
STK 162	Statistics 162		(3)
CIL 173	Computer Literacy 173		(2)
AGV 421	Communication 421	2 + 0	(4)
BER 220	Business Law 220	<u>3 + 0</u>	<u>(6)</u>
		15 + 0	(30)

**Third year of study**

**First semester**

LEK 310	Agricultural Economics 310	3 + 0	(6)
EKN 251	Economics 251		(3)
EKN 252	Economics 252		(3)
VKU 210	Animal Science 210	2 + ½	(6)
ABR 351&352	Labour Law 351 & 352		(4)
STK 210	Statistics 210		(9)
VDW 211	Food Science 211	2 + 1	(7)
	Minimum optional course credits	<u>3 + 0</u>	<u>(6)</u>
		20 + 2½	(44)

**Second semester**

LEK 320	Agricultural Economics 320	3 + 1	(9)
EKN 220	Economics 220		(6)
LEK 321	Agricultural Economics 321	3 + 0	(6)
VKU 222	Animal Science 222	2 + 0	(4)
	Minimum optional course credits	<u>10 + 0</u>	<u>(20)</u>
		21 + 1	(45)

**Fourth year of study**

**First semester**

LEK 410	Agricultural Economics 410	4 + 0	(8)
AGV 410	Agrarian Extension 410	2 + 0	(4)
EKN 351	Economics 351		(3)
EKN 352	Economics 352		(3)

At least **twelve optional subject units from:**

- Financial Management
- Financial Accounting

Statistics			
Management Accounting			
Business Management			
Minimum			9 + 0 (30)

**Second semester**

LEK 421	Agricultural Economics 421	4 + 0	(8)
LEK 422	Agricultural Economics 422	3 + 0	(6)
EKN 320	Economics 320	3 + 0	(6)

At least **twelve optional subject units from:**

Economics			
Financial Management			
Financial Accounting			
Statistics			
Management Accounting			
Business Management			
Minimum			10 + 0 (32)

**N.B.:**

1. Students must keep their possible choices for the fourth year in mind when choosing third-year optional courses.
2. The Dean may, in consultation with the Head of Department, approve courses other than those mentioned above.
3. A minimum of **305** credits is required to obtain the degree.

**5.2 Agricultural Economics (Code 03130062)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		16 + 4	(44)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
LIR 421	Agricultural Engineering 421	3 + 1	(9)
FIL 120	Philosophy 120	3 + 0	(6)
BOT 227	System Ecology 227	1 + 0	(2)
<b>One choice from:</b>			
BOT 120	Introductory Botany 120	4 + 1	(11)
ZEN 122	Introductory Zoology 122		
GTS 122	Introductory Genetics 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
WTW 144	Mathematics 144	4 + 1	(11)
		15 + 3	(39)

**Second year of study**

**First semester**

LEK 210	Agricultural Economics 210	3 + 0	(6)
OBS 151&152	Business Management 151 & 152		(6)
STK 151&152	Statistics 151 & 152		(6)

PPK 210	Introduction to Plant Production 210	3 + 1	(9)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
CIL 171	Computer Literacy 171	+	(2)
CIL 172	Computer Literacy 172	+	(2)
EKN 151	Economics 151		(3)
EKN 152	Economics 152		(3)
		<hr/>	
		20 + 2	(46)

**Second semester**

LEK 220	Agricultural Economics 220	3 + 0	(6)
OBS 120	Business Management 120		(6)
VKU 222	Animal Science 222	2 + 0	(4)
AGV 421	Communication 421	2 + 0	(4)
CIL 173	Computer Literacy 173	+	(2)
EKN 120	Economics 120		(6)
STK 120	Statistics 120	<hr/>	
		3 + 0	(6)
		17 + 0	(34)

**Third year of study**

**First semester**

LEK 310	Agricultural Economics 310	3 + 0	(6)
FRK 151 or 152 and 181	Financial Accounting 151 or 181 and 152		(8)
VKU 210	Animal Science 210	2 + ½	(6)
BER 251&252	Business Law 251 & 252		(6)
ABR 351&352	Labour Law 351 & 352		(4)
STK 210	Statistics 210	3 + 1	(9)
	Minimum optional course credits	1 + 1	(5)
		<hr/>	
		17 + 2½	(44)

**Second semester**

LEK 320	Agricultural Economics 320	3 + 1	(9)
FRK 161&162	Financial Accounting 161 & 162		(8)
LEK 321	Agricultural Economics 321	3 + 0	(6)
BER 261&262	Business Law 261 & 262		(6)
	Minimum optional course credits	<hr/>	
		8 + 0	(16)
		21 + 1	(45)

**Fourth year of study**

**First semester**

LEK 410	Agricultural Economics 410	4 + 0	(8)
AGV 410	Agrarian Extension 410	2 + 0	(4)
At least <b>14 optional course units</b> from other agric disciplines (400 level) and/or economic disciplines (300 level)			(14)
		<hr/>	
		13 + 0	(26)

**Second semester**

LEK 421	Agricultural Economics 421	4 + 0	(8)
LEK 422	Agricultural Economics 422	3 + 0	(6)
At least <b>14 optional course units</b> from other agric disciplines (400 level) and/or economic disciplines (300 level)			(14)
		<hr/>	
		14 + 0	(28)

**N.B.:**

1. When choosing second and third year optional courses, students must keep their possible choices for the fourth year in mind.
2. The Dean may, in consultation with the Head of Department, approve courses other than those mentioned above.
3. A minimum of **306** credits is required to obtain the degree.

**6. Study programme in Microbiology and Plant Pathology**

6.1	Microbiology	(03130071)
6.2	Plant Pathology	(03130321)
6.3	Plant Protection	(03130261)

**6.1 Microbiology (03130071)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		<hr/>	
		16 + 4	(44)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
<b>One choice from:</b>			
WTW 144	Mathematics 144	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
		<hr/>	
		16 + 4	(44)

**Second year of study**

**First semester**

MBY 215	Taxonomy of Bacteria 215	2 + 1	(7)
BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
GTS 215	Molecular Genetics 215	2 + 1	(7)
MBY 211	Microbial Physiology 211	3 + 1	(9)
OBS 111	Business Management 111	3 + 0	(6)
		<hr/>	
		14 + 4	(41)

**Second semester**

BCM 226	Lipid and Nitrogen Metabolism 226	2 + ½	(6)
BCM 227	Biosynthesis of Macromolecules 227	2 + ½	(6)
GTS 225	Microbial Genetics 225	1 + ½	(4)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
PLG 221	Introductory Plant Virology 221	2 + ½	(6)
MBY 225	Food Microbiology 225	2 + 1	(7)
		<hr/>	
		11 + 4	(36)



**Third year of study**

**First semester**

MBY 311	Fungal Biotechnology 311	1 + ½	(4)
MBY 312	Taxonomy of Fungi 312	2 + 1	(7)
BCM 312	Protein Chemistry 312	2 + 1	(7)
BCM 411	Mol. Biol. of Nucleic Acids 411	1 + 1	(5)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
		<hr/>	
		12 + 5½	(41)

**Second semester**

MBY 323	Molecular Microbiology 323	2 + 1	(7)
MBY 324	Molecular Virology 324	2 + 1	(7)
BCM 321	Enzymology 321	1 + 1	(5)
BCM 322	Biomembranes 322	1 + 1	(5)
GTS 325	Eukaryotic Gene Control 325	1 + ½	(4)
PLG 321	Introductory Phytobacteriology 321	1 + ½	(4)
MBY 226	Industrial Microbiology 226	2 + 1	(7)
		<hr/>	
		10 + 6	(39)

**Fourth year of study**

**First semester**

MBY 400	Seminar Course 400	1 + 0	(2)
MBY 401	Practical Project 401	0 + 1	(3)
MBY 416	Basic Microbial Ecology 416	2 + 1	(7)
PLG 412	Parasitology and Epidemiology 412	2 + ½	(6)
VDW 411	Food Science 411	2 + 1	(7)
MBY 313	Human-microbial Interactions 313	2 + 0	(4)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)
		<hr/>	
		11 + 3½	(33)

**Second semester**

MBY 400	Seminar Course 400	1 + 0	(2)
MBY 401	Practical Project 401	0 + 1	(3)
BCM 423	Immunobiochemistry 423	2 + 1	(7)
BCH 424	Biochemistry 424	1 + ½	(4)
BME 120	Biometry 120	3 + 1	(9)
AGV 421	Communication 421	2 + 0	(4)
CIL 173	Computer Literacy 173		(2)
		<hr/>	
		10 + 3½	(31)

A minimum of **309** credits is required to obtain the degree.

**6.2 Plant Pathology (Code 03130321)**

**6.3 Plant Protection (Code 03130261)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)

WTW 134	Mathematics 134	$\frac{4 + 1}{16 + 4}$	(11) (44)
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**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
		$\frac{4 + 1}{16 + 4}$	(44)

**Second year of study**

**First semester**

BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
LEK 210	Agricultural Economics 210	3 + 0	(6)

Plus **one** of the following options:

**(a) Plant Pathology**

MBY 215	Taxonomy of Bacteria 215	$\frac{2 + 1}{15 + 4}$	(7) (43)
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**(b) Plant Protection**

AGR 313	Primary Food Crops 313	$\frac{2 + \frac{1}{2}}{15 + 3\frac{1}{2}}$	(6) (42)
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**Second semester**

PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
PLG 221	Introductory Plant Virology 221	2 + ½	(6)
TBK 221	Introductory Horticulture 221	3 + 1	(9)
ZEN 222	Insect Diversity 222	2 + 1	(7)
GKD 228	Soil Fertility 228	3 + 1	(9)
AGV 421	Communication 421	2 + 0	(4)
		$\frac{2 + 0}{14 + 4\frac{1}{2}}$	(42)

**Third year of study**

**First semester**

MBY 312	Taxonomy of Fungi 312	2 + 1	(7)
BOT 217	Plant Control Mechanisms 217	1 + 0	(2)
BOT 213	Anatomy of Vascular Plants 213	1 + 1	(5)
LKM 312	Microclimatology 312	2 + ½	(6)
GTS 316	Plant Breeding 316	2 + 1	(7)
STZ 311	Nursery Management 311	2 + ½	(6)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)

Plus **one** of the following options:

**(a) Plant Pathology**

GTS 215	Molecular Genetics 215	$\frac{2 + 1}{14 + 5}$	(7) (44)
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**(b) Plant Protection**

TBK 313	Subtropical Fruit Production 313	<u>2 + ½</u>	(6)
		14 + 4½	(43)

**Second semester**

PLG 321	Introductory Phytobacteriology 321	1 + ½	(4)
BME 120	Biometry 120	3 + 1	(9)
CIL 173	Computer Literacy 173		(2)
ZEN 320	Insect Pest Management 320	2 + 1	(7)

Plus **one** of the following options:

**(a) Plant Pathology**

GTS 225	Microbial Genetics 225	1 + ½	(4)
BCM 227	Biosynthesis of Macromolecules 227	<u>2 + ½</u>	(6)
		10 + 3½	(32)

**(b) Plant Protection**

PPK 411	Crop Physiology 411	3 + ½	(8)
LKM 221	Introduction to Agricultural Climatology 221	2 + 0	(4)
AGR 323	Diverse Crops 323	<u>2 + ½</u>	(6)
		14 + 3½	(40)

**Fourth year of study**

**First semester**

PLG 412	Parasitology and Epidemiology 412	2 + ½	(6)
OKW 413	Weed Science 413	3 + 1	(9)
MBY 400	Seminar Course 400	1 + 0	(2)
MBY 401	Practical Project 401	0 + 1	(3)
MBY 416	Basic Microbial Ecology 416	2 + 1	(7)

Plus **one** of the following options:

**(a) Plant Pathology**

BCM 411	Molecular Biology of Nucleic Acids 411	1 + 1	(5)
MBY 211	Microbial Physiology 211	<u>3 + 1</u>	(9)
		12 + 5½	(41)

**(b) Plant Protection**

AGV 410	Agrarian Extension 410	2 + 0	(4)
WDE 412	Turf Grass Management 412	<u>2 + ½</u>	(6)
		12 + 4	(37)

**Second semester**

PLG 421	Disease Control 421	2 + ½	(6)
PGW 421	Research Methodology 421	3 + 1	(9)
PLG 422	Nursery and Seed Pathology 422	1 + ½	(4)
MBY 400	Seminar Course 400	1 + 0	(2)
MBY 401	Practical Project 401	0 + 1	(3)
BOT 326	Plant Productivity 326	2 + 1	(7)

Plus **one** of the following options:

**(a) Plant Pathology**

MBY 323	Molecular Microbiology 323	2 + 1	(7)
MBY 324	Molecular Virology 324	<u>2 + 1</u>	<u>(7)</u>
		13 + 6	(45)

**(b) Plant Protection**

ZEN 321	South African Insect Pests 321	<u>2 + 1</u>	<u>(7)</u>
		11 + 5	(38)

A minimum of **335** credits is required for the Plant Pathology option and a minimum of **330** credits is required for the Plant Protection option to obtain the degree.

**7. Study programme in Plant Production and Soil Science**

7.1	Agronomy/Irrigation/Weed Science	(03130211)
7.2	Soil Science	(03130290)
7.3	Horticulture	(03130340)
7.4	Sustainable Resource Utilisation	(03130330)
7.5	Pasture Science	(03130350)

**NB:** Alternative ancillary courses may be chosen in consultation with the Head of the Department.

**First year of study (Common to all study programmes in Plant Production and Soil Science):**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	<u>4 + 1</u>	<u>(11)</u>
		16 + 4	(44)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
MBY 120	Introductory Microbiology 120	<u>4 + 1</u>	<u>(11)</u>
		16 + 4	(44)

**Second year of study (Common to all study programmes in Plant Production and Soil Science):**

**First semester**

PPK 210	Introduction to Plant Production 210	3 + 1	(9)
BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
BOT 217	Plant Growth Control Mechanisms 217	1 + 0	(2)
CIL 171	Computer Literacy 171		(2)
CIL 172	Computer Literacy 172		(2)
ZEN 211	Invertebrate Biology 211	<u>2 + 1</u>	<u>(7)</u>
		15 + 4	(43)

**Second semester**

BOT 229	Introductory Plant Physiology 229	1 + 1	(5)
BOT 326	Plant Productivity 326	2 + 1	(7)
TBK 221	Introductory Horticulture 221	3 + 1	(9)
GKD 228	Soil Fertility 228	3 + 1	(9)
LKM 221	Introduction to Agricultural Climatology 221	2 + 0	(4)
CIL 173	Computer Literacy 173		(2)
BOT 227	Introductory Ecology 227	1 + 0	(2)
AGV 421	Communication 421	<u>2 + 0</u>	<u>(4)</u>
		15 + 4	(42)

**7.1 Agronomy/Irrigation/Weed Science (Code 03130212)**

**Third year of study**

**First semester**

GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
LKM 312	Micro Climatology 312	2 + ½	(6)
LEK 210	Agricultural Economics 210	3 + 0	(6)
AGR 313	Primary Food Crops 313	2 + ½	(6)
STZ 311	Nursery Management 311	2 + ½	(6)
TBK 314	Tropical and Subtropical Fruit Cultivation 314	2 + ½	(6)
WDE 310	Principles of Veld Management 310	<u>2 + ½</u>	<u>(6)</u>
		15 + 3½	(43)

**Second semester**

BME 120	Biometry 120	3 + 1	(9)
LEK 320	Agricultural Economics 320	3 + 1	(9)
PLG 220	Introductory Plant Pathology 220	2 + ½	(6)
AGR 323	Diverse Crops 323	2 + ½	(6)
Choice of <b>two</b> from the following:			
STZ 320	Ornamental Plants 320	2 + ½	(6)
TBK 320	Deciduous Fruits 320	2 + ½	(6)
WDE 320	Planted Pasture and Fodder Crops 320	<u>2 + ½</u>	<u>(6)</u>
		14 + 4	(42)

**Fourth year of study**

**First semester**

PGW 400	Seminar 400	2 + 0	(4)
PPK 411	Crop Physiology 411	3 + ½	(8)
OKW 413	Weed Science 413	3 + 1	(9)
PGW 411	Environmental Management 411	2 + 1	(7)
	Optional course(s) min	<u>3 + 1</u>	<u>(9)</u>
		13 + 3½	(37)

**Second semester**

PGW 400	Seminar 400	2 + 0	(4)
PGW 421	Research Methodology 421	3 + 1	(9)
PGW 422	Irrigation 422	3 + 1	(9)
Choice of <b>two</b> from the following:			
PGW 423	Land-use Planning 423	3 + 1	(7)

LIR 421	Agricultural Engineering 421	3 + 1	(9)
	or other optional course(s) min	<u>3 + 1</u>	<u>(9)</u>
		14 + 4	(38)

A minimum of **335** credits is required to obtain the degree.

## 7.2 Soil Science (Code 03130290)

### Third year of study

#### First semester

GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
GKD 318	Soil Chemistry 318	2 + 1	(7)
CMY 283	Analytical Chemistry 283	2 + 1	(7)
CMY 284	Organic Chemistry 284	2 + 1	(7)
LKM 312	Microclimatology 312	2 + ½	(6)
LEK 210	Agricultural Economics 210	<u>3 + 0</u>	<u>(6)</u>
		13 + 4½	(40)

#### Second semester

GKD 329	Soil Physics 329	3 + 1	(9)
CMY 282	Physical Chemistry 282	2 + 1	(7)
CMY 285	Inorganic Chemistry 285	2 + 1	(7)
BME 120	Biometry 120	3 + 1	(9)
	Minimum optional course credits	<u>2 + ½</u>	<u>(6)</u>
		12 + 4½	(38)

### Fourth year of study

#### First semester

GKD 414	Soil and Environmental Processes 414	2 + 1	(7)
PGW 411	Environmental Management 411	2 + 1	(7)
GKD 415	Soil Mineralogy and Genesis 415	2 + 1	(7)
GLY 112	Earth Materials 112 and		
GLY 113	General Geology 113	4 + 1	(11)
PGW 400	Seminar 400	<u>2 + 0</u>	<u>(4)</u>
		12 + 4	(36)

#### Second semester

PGW 421	Research Methodology 421	3 + 1	(9)
PGW 422	Irrigation 422	3 + 1	(9)
PGW 423	Land-use Planning 423	3 + 1	(7)
GLY 123	Stratigraphy 123	4 + 1	(11)
PGW 400	Seminar 400	<u>2 + 0</u>	<u>(4)</u>
		15 + 4	(40)

A minimum of **329** credits is required to obtain the degree.

## 7.3 Horticulture (Code 03130340)

### Third year of study

#### First semester

AGR 313	Primary Food Crops 313	2 + ½	(6)
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LKM 312	Microclimatology 312	2 + ½	(6)
LEK 210	Agricultural Economics 210	3 + 0	(6)
STZ 311	Nursery Management 311	2 + ½	(6)
TBK 314	Tropical and Subtropical Fruit Cultivation 314	2 + ½	(6)
Choice of <b>two</b> of the following (minimum of 13 credits):			
GKD 317	Soil classification and mapping 317	2 + 1	(7)
ABR 311	Labour Law 311	3 + 0	(6)
FRK 151 or 181 and 152	Financial Accounting 151 or 181 and 152		(8)
			<hr/>
			[11 + 2] (43)

**Second semester**

BME 120	Biometry 120	3 + 1	(9)
LEK 320	Agricultural Economics 320	3 + 1	(9)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
STZ 320	Ornamental Plants 320	2 + ½	(6)
TBK 320	Deciduous Fruits 320	2 + ½	(6)
Choice of <b>one</b> of the following (minimum of 6 credits):			
AGR 323	Diverse Crops 323	2 + ½	(6)
FRK 161&162	Financial Accounting 161 & 162		(8)
			<hr/>
			[12 + 4] (43)

**Fourth year of study**

**First semester**

PGW 400	Seminar 400	2 + 0	(4)
OKW 413	Weed Science 413	3 + 1	(9)
WDE 412	Turf Grass Management 412	2 + ½	(6)
PGW 411	Environmental Management 411	2 + 1	(7)
TBK 410	Citrus Cultivation 410	3 + 1	(9)
PPK 411	Crop Physiology 411	3 + ½	(8)
			<hr/>
			15 + 4 (43)

**Second semester**

PGW 400	Seminar 400	2 + 0	(4)
PGW 421	Research Methodology 421	3 + 1	(9)
PGW 422	Irrigation 422	3 + 1	(9)
PLG 421	Pest Control 421	2 + 1	(7)
PLG 422	Nursery and Seed Pathology 422	1 + ½	(4)
	Optional Course(s) min	3 + 1	(9)
			<hr/>
			14 + 4½ (42)

A minimum of **343** credits is required to obtain the degree.

**7.4 Sustainable Resource Utilisation (Code 03130330)**

**Third year of study**

**First semester**

GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
GKD 318	Soil Chemistry 318	2 + 1	(7)
LKM 312	Microclimatology 312	2 + ½	(6)

WDE 310	Principles of Veld Management 310	2 + ½	(6)
LEK 210	Agricultural Economics 210	3 + 0	(6)
VKU 210	Animal Science 210	2 + ½	(6)
Optional course:			
AGR 313 or TBK 314	Primary Food Crops 313 or Tropical and Subtropical Fruit Cultivation 314	2 + ½	(6)
		<u>2 + ½</u>	<u>(6)</u>
		15 + 4	(44)

### Second semester

AGR 323	Diverse Crops 323	2 + ½	(6)
WDE 320	Planted Pasture and Fodder Crops 320	2 + ½	(6)
LEK 320	Agricultural Economics 320	3 + 1	(9)
BME 120	Biometry 120	3 + 1	(9)
Optional course:			
TBK 320	Deciduous Fruits 320	2 + ½	(6)
or			
VKU 221 and VKU 222	Animal Science 221 and Animal Science 222	1 + ½	(4)
		<u>2 + 0</u>	<u>(4)</u>
		<u>12 + 3½</u>	<u>(37)</u>
or		13 + 3½	(38)

### Fourth year of study

#### First semester

PGW 400	Seminar 400	2 + 0	(4)
PPK 411	Crop Physiology 411	3 + ½	(8)
OKW 413	Weed Science 413	3 + 1	(9)
PGW 411	Environment Management 411	2 + 1	(7)
GKD 414	Soil and Environmental Processes 414	2 + 1	(7)
BOT 215	Plant Ecological Techniques 215	<u>0 + 1</u>	<u>(3)</u>
		12 + 4½	(38)

#### Second semester

PGW 400	Seminar 400	2 + 0	(4)
PGW 421	Research Methodology 421	3 + 1	(9)
PGW 422	Irrigation 422	3 + 1	(9)
PGW 423	Land-use Planning 423	3 + 1	(7)
WDE 421	Pasture Evaluation 421	2 + ½	(6)
		<u>Minimum optional course credits</u>	<u>(6)</u>
		13 + 2½	(41)

A minimum of **328** credits is required to obtain the degree.

## 7.5 Pasture Science (Code 03130350)

### Third year of study

#### First semester

AGR 313	Primary Food Crops 313	2 + ½	(6)
WDE 310	Principles of Veld Management 310	2 + ½	(6)
VKU 210	Animal Science 210	2 + ½	(6)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)



LKM 312	Microclimatology 312	2 + ½	(6)
LEK 210	Agricultural Economics 210	3 + 0	(6)
	Minimum optional course credits		(6)
		<u>13 + 3</u>	(43)

**Second semester**

BME 120	Biometry 120	3 + 1	(9)
LEK 320	Agricultural Economics 320	3 + 1	(9)
VKU 221	Animal Science 221	1 + ½	(4)
VKU 222	Animal Science 222	2 + 0	(4)
AGR 323	Diverse Crops 323	2 + ½	(6)
TBK 320	Deciduous Fruits 320	2 + ½	(6)
WDE 320	Planted Pasture and Fodder Crops 320	<u>2 + ½</u>	(6)
		15 + 4	(44)

**Fourth year of study****First semester**

PGW 400	Seminar 400	2 + 0	(4)
PPK 411	Crop Physiology 411	3 + ½	(8)
OKW 413	Weed Science 413	3 + 1	(9)
WDE 412	Turf Grass Management 412	2 + ½	(6)
PGW 411	Environmental Management 411	2 + 1	(7)
VKU 211	Animal Science 211	<u>2 + ½</u>	(6)
		14 + 3½	(40)

**Second semester**

PGW 400	Seminar 400	2 + 0	(4)
PGW 421	Research Methodology 421	3 + 1	(9)
PGW 422	Irrigation 422	3 + 1	(9)
PGW 423	Land-use Planning 423	3 + 1	(7)
WDE 421	Pasture Evaluation 421	<u>2 + ½</u>	(6)
		13 + 3½	(35)

A minimum of **329** credits is required to obtain the degree.

**8. Study programme in Animal Science (Code 03130140)****First year of study****First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 181 or	General Physics 181; or	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 114 or	Calculus 114 or		
WTW 134	Mathematics 134	<u>4 + 1</u>	(11)
		16 + 4	(44)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)

At least **two** choices (at least 22 units) from:

ZEN 122	Introductory Zoology 122	4 + 1	(11)
*MBY 120	Introductory Microbiology 120	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
WTW 126 and 28 or Linear Algebra 126 and Calculus 128 or			
WTW 144	Mathematics 144	4 + 1	(11)
		<u>16 + 4</u>	(44)

\* Recommended

### Second year of study

#### First semester

BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
DAN 210	Animal Anatomy 210	2 + ½	(6)
DFS 210	Animal Physiology 210	2 + ½	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
VKU 210	Animal Science 210	2 + ½	(6)
		<u>16 + 4½</u>	(47)

#### Second semester

BCM 226	Lipid and Nitrogen Metabolism 226	2 + ½	(6)
BCM 227	Biosynthesis of Macromolecules 227	2 + ½	(6)
BME 120	Biometry 120	3 + 1	(9)
DAN 220	Animal Anatomy 220	2 + ½	(6)
DFS 220	Animal Physiology 220	2 + ½	(6)
GTS 226	Introductory Population Genetics 226	2 + ½	(6)
VDG 220	Nutrition 220	3 + ½	(8)
VKU 220	Animal Science 220	1 + 0	(2)
		<u>17 + 4</u>	(49)

### Third year of study

#### First semester

BME 210	Biometry 210	3 + 1	(9)
DAN 310	Animal Anatomy 310	1 + ½	(4)
DFS 311	Animal Physiology 311	2 + 0	(4)
LEK 210	Agricultural Economics 210	3 + 0	(6)
RPL 310	Reproduction Science 310	1 + ½	(4)
VEG 301	Nutrition Science 301	3 + ½	(8)
VNE 310	Animal Ecology 310	1 + 0	(2)
WDE 310	Principles of Veld Management 310	2 + ½	(6)
		<u>16 + 3</u>	(43)

#### Second semester

BCH 421	Biochemistry 421	1 + 0	(2)
BME 220	Biometry 220	3 + ½	(9)
DFS 320	Growth Physiology 320	2 + ½	(6)
RPL 320	Reproduction Science 320	2 + ½	(6)
TLR 320	Animal Breeding 320	2 + ½	(6)
VEG 301	Nutrition Science 301	3 + ½	(8)
WDE 320	Planted Pasture and Fodder Crops 320	2 + ½	(6)
		<u>15 + 3</u>	(43)

**Fourth year of study**

**First semester**

TLR 411	Animal Breeding 411	2 + ½	(6)
VGE 411	Nutrition Science 411	4 + ½	(10)
VKD 410	Pig Science 410	1 + ½	(4)
VKF 411	Animal production pharmacology 411	3 + 0	(6)
VKU 411	Seminar 411	1 + 0	(2)
VKU 412	Research methodology 412	1 + 0	(2)
WLK 410	Wool Science 410	2 + ½	(6)
PVK 410	Poultry Science 410	2 + ½	(6)
		<u>16 +</u>	<u>2½ (42)</u>

**Second semester**

GVK 420	Large Stock Science 420	2 + ½	(6)
KVK 420	Small Stock Science 420	2 + ½	(6)
VGE 421	Nutrition Science 421	3 + ½	(8)
VGE 423	Nutrition Science 423	3 + ½	(8)
VSX 420	Meat and Dairy Science 420	2 + ½	(6)
WKE 420	Wildlife Science 420	2 + ½	(6)
TLR 420	Animal Breeding 420	2 + ½	(6)
		<u>16 +</u>	<u>3½ (46)</u>

A minimum of **358** credits is required to obtain the degree.

**9. Study programme in Animal Science/Pasture Science (Code 03130250)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 181 or	General Physics 181; or	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 114 or	Calculus 114 or		
WTW 134	Mathematics 134	4 + 1	(11)
		<u>16 +</u>	<u>4 (44)</u>

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
GTS 122	Introductory Genetics 122	4 + 1	(11)
BOT 120	Introductory Botany 120	4 + 1	(11)
<b>One</b> choice from:			
ZEN 122	Introductory Zoology 122	4 + 1	(11)
*MBY 120	Introductory Microbiology 120	4 + 1	(11)
WTW 126 &	Linear Algebra 126 and		
128 or	Calculus 128 or		
WTW 144	Mathematics 144	4 + 1	(11)
		<u>16 +</u>	<u>4 (44)</u>

\*Recommended

**Second year of study**

**First semester**

BCM 216	Proteins and Enzymes 216	2 + ½	(6)
BCM 217	Carbohydrate Metabolism 217	2 + ½	(6)
BOT 217	Plant Growth Control Mechanisms 217	1 + 0	(2)
DFS 210	Animal Physiology 210	2 + ½	(6)
DAN 210	Animal Anatomy 210	2 + ½	(6)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
VKU 210	Animal Science 210	2 + ½	(6)
		<u>14 + 3½</u>	(41)

**Second semester**

BCM 226	Lipid and Nitrogen Metabolism 226	2 + ½	(6)
BCM 227	Biosynthesis of Macromolecules 227	2 + ½	(6)
BOT 227	Introductory Ecology 227	1 + 0	(2)
BOT 229	Introductory Plant Physiology 229	1 + 1	(5)
DFS 220	Animal Physiology 220	2 + ½	(6)
DAN 220	Animal Anatomy 220	2 + ½	(6)
GTS 226	Introductory Population Genetics 226	2 + ½	(6)
VKU 220	Animal Science 220	1 + 0	(2)
VDG 220	Nutrition 220	3 + ½	(8)
		<u>16 + 4</u>	(47)

**Third year of study**

**First semester**

GKD 213	Introductory Soil Science 213	3 + 1	(9)
WDE 310	Principles of Veld Management 310	2 + ½	(6)
DAN 310	Animal Anatomy 310	1 + ½	(4)
DFS 311	Animal Physiology 311	2 + 0	(4)
RPL 310	Reproduction Science 310	1 + ½	(4)
VEG 301	Nutrition Science 301	3 + ½	(8)
AGR 313	Primary Food Crops 313	2 + ½	(6)
LEK 210	Agricultural Economics 210	3 + 0	(6)
VNE 310	Animal Ecology 310	1 + 0	(2)
		<u>18 + 3½</u>	(49)

**Second semester**

GKD 228	Soil Fertility 228	2 + 1	(7)
BOT 326	Plant Productivity 326	2 + 1	(7)
WDE 320	Planted Pasture and Fodder Crops 320	2 + ½	(6)
TLR 320	Animal Breeding 320	2 + ½	(6)
VEG 301	Nutrition Science 301	3 + ½	(8)
BME 120	Biometry 120	3 + 1	(9)
		<u>14 + 4½</u>	(43)

**Fourth year of study**

**First semester**

PGW 401	Seminar 401	1 + 0	(2)
PGW 411	Environment Management 411	3 + 1	(7)
VEG 410	Nutrition Science 410	3 + ½	(8)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
VKU 411	Seminar 411	1 + 0	(2)

VKU 412	Research Methodology 412	1 + 0	(2)
BME 210	Biometry 210	3 + 1	(9)
At least <b>one</b> from:			
OKW 413	Weed Science 413	2 + ½	(6)
TLR 411	Animal Breeding 411	2 + ½	(6)
TLR 412	Animal Breeding 412	2 + ½	(6)
WLK 410	Wool Science 410	2 + ½	(6)
		<u>16 + 4</u>	<u>(43)</u>

### Second semester

PGW 401	Seminar 401	1 + 0	(2)
WDE 421	Pasture Evaluation 421	2 + ½	(6)
VEG 421	Nutrition Science 421	3 + ½	(8)
BME 220	Biometry 220	3 + ½	(9)
LIR 421	Agricultural Engineering 421	3 + 1	(9)
At least <b>ten</b> credits from:			
GVK 420	Large Stock Science 420	2 + ½	(6)
KVK 420	Small Stock Science 420	2 + ½	(6)
PGW 422	Irrigation 422	3 + 1	(9)
PGW 423	Land-use Planning 423	3 + 1	(7)
WKE 420	Wildlife Science 420	2 + ½	(6)
AGV 421	Communication 421	2 + 0	(4)
		<u>12 + 2½</u>	<u>(42)</u>

A minimum of **335** credits is required to obtain the degree.

## 10. Study programme in Food Science and Technology (Code 03130370)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
PHY 131	General Physics 131	4 + 1	(11)
MLB 111	Molecular and Cell Biology 111	4 + 1	(11)
WTW 134	Mathematics 134	4 + 1	(11)
		<u>16 + 4</u>	<u>(44)</u>

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
MBY 120	Introductory Microbiology 120	4 + 1	(11)
WTW 144	Mathematics 144	4 + 1	(11)
			(11)
		<u>[12 + 3]</u>	<u>(44)</u>

### Second year of study

#### First semester

BCM 216 and Proteins and Enzymes 216; and			
BCM 217	Carbohydrate Metabolism 217	4 + 1	(12)
FSG 110	Physiology 110	3 + 0	(6)
LEK 210	Agricultural Economics 210	3 + 0	(6)
OBS 111	Business Management 111	3 + 0	(6)
VDW 211	Food Science 211	2 + 1	(7)
CIL 171	Computer Literacy 171		(2)

CIL 172	Computer Literacy 172	<u>2</u>
		17 + 2 (41)

**Second semester**

BCM 226 and Lipid and Nitrogen Metabolism 226; and BCM 227	Biosynthesis of Macromolecules 227	4 + 1 (12)
FSG 120	Physiology 120	3 + 0 (6)
LEK 220	Agricultural Economics 220	3 + 0 (6)
CIL 173	Computer Literacy 173	<u>2</u>
VDG 120	Nutrition 120	3 + 0 (6)
VDW 222	Food Science 222	2 + ½ (6)
VDW 223	Food Science 223	<u>2 + ½ (6)</u>
		18 + 2 (44)

**Third year of study**

**First semester**

LPR 311	Processing 311	3 + 0 (6)
VDW 332	Food Science 332	3 + 1 (9)
VDG 211	Nutrition 211	3 + 2/3 (8)
VDW 314	Food Science 314	2 + 1 (7)
VDW 315	Food Science 315	2 + ½ (6)
VDW 432	Food Science 432	<u>1 + 1 (5)</u>
		14 + 4 (41)

**Second semester**

BME 120	Biometry 120	3 + 1 (9)
MBY 225	Food Microbiology 225	2 + 1 (7)
VDW 324	Food Science 324	2 + 1 (7)
VDG 320	Nutrition 320	3 + 2/3 (8)
VDW 343	Food Science 343	<u>2 + 1 (7)</u>
		12 + 4 2/3 (38)

**Fourth year of study**

**First semester**

VDW 400	Food Science 400	2 + 0 (4)
VDW 411	Food Science 411	2 + 1 (7)
VDW 416	Food Science 416	2 + ½ (6)
VDW 418	Food Science 418	3 + 1 (9)
VDW 431	Food Science 431	2 + 1 (7)
LPR 312	Processing 312	<u>2 + ½ (6)</u>
		13 + 4 (39)

**Second semester**

AGV 421	Communication 421	2 + 0 (4)
LEK 320	Agricultural Economics 320	3 + 1 (9)
VDW 400	Food Science 400	2 + 0 (4)
MBY 425	Food Microbiology 425	2 + 1 (7)
VDW 442	Food Science 442	2 + 1 (7)
VDW 444	Food Science 444	<u>3 + 1 (10)</u>
		13 + 3½ (40)

A minimum of **331** credits is required to obtain the degree.

**V. BACCALAUREUS SCIENTIAE AGRICULTURAE HONORES (BSc(Agric)(Hons))**

Also consult General Regulations G.16 to G.29.

**Ag.14**

**Requirement for admission**

Subject to the stipulations of General Regulations G1.3 en G.62, the BSc(Agric) degree is a requirement: On the understanding that a candidate who obtained an average of less than 60% in the courses of the major subjects in the final year of study for the bachelor's degree, may be admitted to honours studies only with the Dean's approval on the recommendation of the Head of the Department concerned. Additional requirements may be prescribed by the Head of the Department.

**Ag. 15:**

The BSc(Agric)(Hons) degree is offered in the following fields of specialisation: Agrarian Extension, Agricultural Economics, Mechanised Agriculture, Agronomy, Biochemistry, Entomology, Food Science and Technology, Genetics, Horticulture, Microbiology, Ornamental Horticulture, Pasture Science, Plant Pathology, Soil Science, Weed Science.

**Ag.16**

**Residence**

All honours students must study at the University for a minimum of two semesters.

**Ag.17**

**Curricula**

The BSc(Agric)(Hons) extends over at least two semesters and comprises the following:

- (1) Advanced lectures, literature study and seminar presentations in the courses of the major subject and related disciplines. The Head of Department may also require students to complete special assignments or practical work during university vacations. A research project of limited scope as well as specific assignments and/or practical work will form part of the curriculum where applicable.
- (2) Ancillary courses, as approved by the Dean on the recommendation of the Head of Department. These ancillary courses may be taken concurrent with the student's major courses.
- (3) Details regarding the various fields of specialisation are published in the post-graduate brochure of the Faculty.

**Ag.18**

**Examinations and pass requirements:**

- (a) The examinations in the ancillary courses must be passed before or concurrent with the examinations in the courses of the major subjects, unless the Board of the Faculty decides differently.
- (b) General Regulation G.12.2 applies for the calculation of marks.
- (c) The student must pass all the prescribed courses in order to obtain the BSc(Agric)(Hons) degree.
- (d) The BSc(Agric)(Hons) degree is conferred with distinction if a student obtains an average of at least 75% in the courses of the major subject(s) and an average of at least 65% in all the prescribed courses.

## VI. MAGISTER SCIENTIAE AGRICULTURAE [MSc(Agric)]

Also consult General Regulations G.30 to G.44.

### Ag.19

#### (a) Requirements for admission

Subject to the stipulations of General Regulations G.1.3 and G.62, the BSc(Agric)(Hons) degree with an average of 60% in the final year of the major subject is a requirement for admission to the MSc(Agric) degree. Additional requirements may be stipulated by the Head of Department.

#### (b) Fields of specialisation

The MSc(Agric) degree is conferred in the following fields of specialisation:

Agronomy	Biochemistry
Entomology	Genetics
Mechanised Agriculture	Soil Science
Agricultural Economics	Agrarian Extension
Microbiology	Weed Science
Plant Biotechnology	Plant Pathology
Horticulture	Animal Science (Production Management,
Food Science and	Production Physiology, Animal Breeding
Technology	Animal Production, Meat Science
Pasture Science	and Animal Nutrition)

#### (c) Duration

Duration of study is at least two years of uninterrupted full-time study (or the part-time equivalent) at this University.

#### (d) Residence

The Dean may on the recommendation of the Head of the Department concerned, set particular requirements concerning residence during master's degree studies.

#### (e) Curricula

The curriculum for the MSc(Agric) degree consists of:

- (i) a dissertation; and  
further study in the major subject, supplemented by ancillary course/s as may be required by the Dean, on the recommendation of the Head of Department. These ancillary course/s, if required, may be taken concurrent with the major subject. Students who hold the BSc(Agric)(Hons) degree, may be exempted from further ancillary courses.
- (ii) A total of 16 credits is required for the MSc(Agric) degree, of which 8 are for the dissertation.
- (iii) A student who has been registered for at least two semesters and who has obtained at least half of the credits for the MSc(Agric) degree, including the research project, may apply to have a BSc(Agric)(Hons) degree conferred on him or her *pro forma*.

#### (f) Examinations and pass requirements

- (i) The final examinations for the MSc(Agric) may only be taken at the end of the second year of study.



- (ii) The examinations in the ancillary courses, if required, must be passed before or concurrent with the examinations in the major subject, unless the Board of the Faculty decides differently.
- (iii) General Regulation G.12.2, as well as paragraph 5 of the Faculty regulations pertaining to examination admission and pass requirements, are applicable to the calculation of marks.
- (iv) A student must pass all prescribed courses as well as the dissertation to obtain the MSc(Agric) degree.
- (v) The degree is conferred with distinction on a student who obtains a final average of at least 75%, provided that all the members of the Examination Commission indicate in writing that they have no objection against the degree being conferred with distinction.

**(g) General**

Students should take particular note of the maximum period of registration (General Regulation G.32.4), as well as of the requirement regarding submission of a draft article/articles for publication (General Regulation G.61).

**VII. BACCALAUREUS INSTITUTIONIS AGRARIAE (BInstAgrar)**

The degree is only offered in English.

**Ag.20**

The BInstAgrar curriculum is constituted from one of the study programmes indicated below:

1. Study programme in Agronomy/Horticulture
2. Study programme in Animal Production
3. Study programme in Agricultural Economics
4. Study programme in Land-use Planning
5. Study programme in Plant Protection
6. Study programme in Food Processing
7. Study programme in Extension
8. Study programme in Pasture Science/Agronomy

**Ag.21**

**Requirements for admission**

A matriculation exemption certificate (refer to details on page 5 of this publication). Also consult page 7 of this publication for information on M scores and other requirements.

**Ag.22**

**Duration**

The minimum duration of study is four years.

**Ag.23**

**Examinations and promotion**

- (a) A student may be admitted to courses of the following semester or year of study, if he or she complies with the prerequisites for the courses concerned of the following semester or year of study. (Consult Reg. Ag. 1.)

- (b) A student is promoted to the following year of study if:
  - (i) not more than thirty credits will be transferred to the following year, unless the Dean, on the recommendation of the Head of Department, decides to the contrary; and
  - (ii) no first year courses are transferred to the final year of study.
- (c) A student who does not qualify for promotion to the following year of study, retains credit for the courses already passed and may be admitted by the Dean, on the recommendation of the Head of Department, to courses of the following year of study to a maximum of thirty credits, provided that there are no timetable clashes.
- (d) A student who has failed only one year course or two semester courses in the final year but has obtained a combined mark of 40% therein, may be admitted to a special examination in the course(s) concerned at the end of the first semester of the following year.
- (e) A major subject is passed with distinction if the student obtains an average of at least 75% in the courses of that major subject.
- (f) The BlnstAgrar degree is conferred with distinction on a student who obtains a weighted average of at least 75% in the courses of the major subjects in the third and the fourth year of study, as well as a weighted average of at least 65% in the other courses of the third and the fourth year of study.

## Ag.24

### Compilation of the curricula

#### 1. General

The digits which appear after each course indicate the number of lectures and practicals per week. A practical followed by a  $\frac{1}{2}$  usually implies one practical every two weeks. The figure in brackets indicates the number of "credits":

1 lecture per week = 2 "credits"  
 1 x 3 - hour practical per week = 3 "credits"

The minimum number of "credits" required for a degree, are indicated in the footnote at the end of each curriculum.

#### 2. PRESCRIBED CURRICULA FOR THE VARIOUS STUDY PROGRAMMES AND YEARS OF STUDY

##### First year (common to all the study programmes)

###### First semester

BLG 150	Introductory Plant Biology 150	3 + 1	(9)
CIL 171	Computer Literacy 171	3 + $\frac{2}{3}$	(2)
CIL 172	Computer Literacy 172	3 + $\frac{2}{3}$	(2)
CIL 173	Computer Literacy 173	3 + $\frac{2}{3}$	(2)
EKN 151&152	Economics 151 & 152		(6)
ENG 103	English 103	2 + 0	(3)
SCI 150	Natural Science 150	5 + 0	(10)
STK 151&152	Statistics 151 & 152 * or		(6)
WTW 101	Mathematics 101†		(5½)
		19 + $1\frac{2}{3}$	(49½)
	or		(40)

###### Second semester

BLG 160	Introductory Animal Biology 160	3 + $\frac{1}{3}$	(7)
BLG 260	General Microbiology 260	3 + $\frac{1}{3}$	(7)

ENG 103	English 103	2 + 0	(3)
GTS 124	Genetics 124	4 + 1	(11)
SCI 160	Natural Science 160	5 + 0	(10)
WTW 101	Mathematics 101†		(5½)
		<hr/>	
		[17 + 1¾]	(38)
	or		(43½)

† Consult the syllabi.

\* Students who do not qualify for admission to STK 151,152, have to register for STK 153 and 163 additionally.

**NB:** Depending on the matriculation examination results, a student may follow alternative courses in consultation with the Head of Department and with approval of the Dean. Course credits from the first year of the extended program may be presented for this purpose.

## 2.1 Study programme in Agronomy/Horticulture (Code 03136001)

### Second year of study

#### First semester

PPK 210	Introduction to Plant Production 210	3 + 1	(9)
AGR 313	Primary Food Crops 313	2 + ½	(6)
TBK 314	Tropical and Subtropical Fruit Cultivation 314	2 + ½	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
LEK 210	Agricultural Economics 210	3 + 0	(6)
CIL 171&172	Computer Literacy 171 & 172		(4)
		<hr/>	
		15 + 3	(40)

#### Second semester

AGR 323	Diverse Crops 323	2 + ½	(6)
TBK 320	Deciduous Fruits 320	2 + ½	(6)
GKD 228	Soil Fertility 228	3 + 1	(9)
LEK 220	Agricultural Economics 220	3 + 0	(6)
CIL 171&172	Computer Literacy 171 & 172		(2)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
		<hr/>	
		13 + 3	(36)

### Third year of study

#### First semester

OKW 413	Weed Science 413	3 + 1	(9)
TBK 410	Citrus Cultivation 410	3 + 1	(9)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
AGV 410	Agrarian Extension 410	2 + 0	(4)
STZ 311	Nursery Management 311	2 + ½	(6)
		<hr/>	
		12 + 3½	(35)

#### Second semester

STZ 320	Ornamental Plants 320	2 + ½	(6)
LEK 320	Agricultural Economics 320	3 + 1	(9)
BME 120 or*	Biometry 120 or Optional course*	3 + 1	(9)
AGV 421	Communication 421	2 + 0	(4)
LBU 325	Agroclimatology 325	3 + 1	(9)
		<hr/>	
		13 + 3½	(37)

\* Students who have passed STK 151 and 152, must choose an optional course.

#### Fourth year of study

##### First semester

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	4 + 0	(8)
Choice of <b>two</b> of the following:			
AGR 481	Production Systems: Grain Crops 481	3 + 1	(9)
HSC 483	Production Systems: Tropical and Subtropical Fruit Production 483	3 + 1	(9)
LBU 481	Applied Land-use Planning 481	<u>3 + 1</u>	<u>(9)</u>
		14 + 2	(34)

##### Second semester

ARD 483	Social Dimensions 483	4 + 0	(8)
AGR 482	Production Systems: Legumes and Tuberous Plants 482	3 + 1	(9)
HSC 484	Production Systems: Temperate Fruit Production 484	3 + 1	(9)
LBU 482	Land-use Planning: Project 482	<u>3 + 1</u>	<u>(8)</u>
		13 + 3	(34)

A minimum of **289** credits is required to obtain the degree.

## 2.2 Study programme in Animal Production (Code 03136011)

#### Second year of study

##### First semester

LEK 210	Agricultural Economics 210	3 + 0	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
WDE 210	Veld Management Practices 210	2 + ½	(6)
LIR 410	Agricultural Engineering 410	2 + 1	(7)
VKU 210	Animal Science 210	<u>2 + ½</u>	<u>(6)</u>
		12 + 3	(34)

##### Second semester

APZ 221	Production Physiology 221	3 + ½	(7½)
LEK 220	Agricultural Economics 220	3 + 0	(6)
AGV 421	Communication 421	2 + 0	(4)
WDE 320	Planted Pasture and Fodder Crops 320	2 + ½	(6)
VDW 222	Food Science 222	2 + ½	(6)
BME 120	Biometry 120	<u>3 + 1</u>	<u>(9)</u>
		15 + 2½	(38½)

#### Third year of study

##### First semester

AGV 410	Agrarian Extension 410	2 + 0	(4)
WDE 421	Pasture Evaluation 421	2 + ½	(6)
APZ 311	Livestock Breeding 311	2 + ½	(5½)
APZ 312	Production Physiology 312	2 + ½	(5½)

APZ 313	Livestock Nutrition 313	$\frac{4 + \frac{1}{2}}{12 + 2}$	$\frac{(9\frac{1}{2})}{(30\frac{1}{2})}$
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**Second semester**

LEK 320	Agricultural Economics 320	3 + 1	(9)
APZ 321	Livestock Products 321	2 + 0	(4)
APZ 324	Animal Nutrition 324	4 + $\frac{1}{2}$	(9 $\frac{1}{2}$ )
APZ 325	Livestock Breeding 325	2 + 0	(4)
LIR 422	Agricultural Engineering 422	<u>2 + 1</u>	<u>(7)</u>
		13 + 2 $\frac{1}{2}$	(33 $\frac{1}{2}$ )

**Fourth year of study**

**First semester**

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	4 + 0	(8)
APZ 412	Livestock Ecology 412	3 + 1	(9)
LBU 481	Applied Land-use Planning 481	<u>3 + 1</u>	<u>(9)</u>
		14 + 2	(34)

**Second semester**

ARD 483	Social Dimensions 483	4 + 0	(8)
APZ 422	Livestock Management 422	3 + 1	(9)
APZ 423	Livestock Management 423	3 + 1	(9)
LBU 325	Agroclimatology 325	<u>3 + 1</u>	<u>(9)</u>
		13 + 3	(35)

A minimum of **283** credits is required to obtain the degree.

**2.3 Study programmes in Agricultural Economics**

The study programmes in Agricultural Economics offer a choice from one of the following combinations:

1. Agronomy/Horticulture (03136021)
2. Animal Production (03136031)
3. Pasture Science/Agronomy (03136041)

**Second year of study**

**First semester**

As listed under the study programme for the selected major combination (1-3).

**Second semester**

As listed under the study programme for the selected major combination (1-3).

**Third year of study**

**First semester**

LEK 310	Agricultural Economics 310	3 + 0	(6)
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Choice of **one** of the following combinations (depending on selection in the second year (1-3)).

**1. Agricultural Economics combination with Agronomy/Horticulture**

OKW 413	Weed Science 413	3 + 1	(9)
TBK 410	Citrus Cultivation 410	3 + 1	(9)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
AGV 410	Agrarian Extension 410	3 + 0	(6)
		<u>14 + 3</u>	(37)

or

**2. Agricultural Economics combination with Animal Production**

APZ 311	Livestock Breeding 311	2 + ½	(5½)
APZ 312	Production Physiology 312	2 + ½	(5½)
APZ 313	Livestock Nutrition 313	4 + ½	(9½)
WDE 424	Pasture Evaluation 424 (C.S. from 421)	1 + ½	(4)
AGV 410	Agrarian Extension 410	3 + 0	(6)
		<u>15 + 2</u>	(36½)

or

**3. Agricultural Economics combination with Pasture Science/Agronomy**

APZ 313 or	Livestock Nutrition 313 or	4 + ½	(9½)
OKW 413	Weed Science 413	3 + 1	(9)
AGR 313	Primary Food Crops 313	2 + ½	(6)
AGV 410	Agrarian Extension 410	2 + 0	(4)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
		<u>12 + 2½</u>	(32)
	or	13 + 1½	(32½)

**Second semester**

As listed under the study programme for the selected major combination (1-3).

**Fourth year of study**

**First semester**

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	3 + 1	(9)
LEK 410	Agricultural Economics 410	4 + 0	(8)
LEC 414	Resource Economics 414	3 + 0	(6)
	Choice of <b>one</b> from the following, depending on selected major combination:		
ARG 481	Production Systems: Grain Crops 481	3 + 1	(9)
HSC 483	Production Systems: Tropical and Subtropical Fruit 483	3 + 1	(9)
LBU 481	Applied Land-use Planning 481	3 + 1	(9)
APZ 412	Livestock Ecology 412	3 + 1	(9)
WDE 481	Veld Management 481	3 + 1	(9)
		<u>17 + 2</u>	(40)

**Second semester**

ARD 483	Social Dimensions 483	4 + 0	(8)
LEK 421	Agricultural Economics 421	4 + 0	(8)
Choice of three of the following, depending on the selected major combination:			
AGR 482	Production Systems: Legumes and Tuber Crops 482	3 + 1	(9)
HSC 484	Production Systems: Temperate Fruit Production 484	3 + 1	(9)
or			
APZ 422	Livestock Management 422	3 + 1	(9)
APZ 423	Livestock Management 423	3 + 1	(9)
or			
WDE 482	Forage Crops and Production 482	3 + 1	(9)
WDE 483	Integration of Plant and Animal Production 483	3 + 1	(9)
		<u>3 + 1</u>	(9)
		13 + 2	(32)

A minimum of **298** credits is required to obtain the degree.

**2.4 Study programme in Land-use Planning (Code 03136051)**

**Second year of study**

**First semester**

GKD 213	Introductory Soil Science 213	3 + 1	(9)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
APZ 211	Production Physiology 211	3 + ½	(7½)
LEK 210	Agricultural Economics 210	3 + 0	(6)
WDE 210	Veld Management Practices 210	2 + ½	(6)
		<u>14 + 3</u>	(37½)

**Second semester**

GKD 228	Soil Fertility 228	3 + 1	(9)
PLG 220	Introductory Plant Pathology 220	2 + 1	(7)
LEK 220	Agricultural Economics 220	3 + 0	(6)
BME 120 or*	Biometry 120 or *	3 + 1	(9)
AGV 421	Communication 421	2 + 0	(4)
WDE 320	Planted Pastures and Fodder Crops 320	2 + ½	(6)
		<u>15 + 3½</u>	(41)

\* Students who have passed STK 151 and 152, must choose an optional course.

**Third year of study**

**First semester**

GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
AGR 313	Primary Food Crops 313	2 + ½	(6)
LIR 410	Agricultural Engineering 410	2 + 1	(7)
AGV 410	Agrarian Extension 410	2 + 0	(4)

PGW 411	Environmental Management 411	$2 + 1$ (7)
		$10 + 3\frac{1}{2}$ (31)

**Second semester**

LEK 320	Agricultural Economics 320	$3 + 1$ (9)
PGW 422	Irrigation 422	$3 + 1$ (9)
LBU 325	Agroclimatology 325	$3 + 1$ (9)
AGR 323	Diverse Crops 323	$2 + \frac{1}{2}$ (6)
		$11 + 3\frac{1}{2}$ (33)

**Fourth year of study**

**First semester**

ARD 481	Agricultural and Rural Development Principles 481	$4 + 0$ (8)
ARD 482	Resources and Development 482	$4 + 0$ (8)
GKD 485	Land Sustainability Evaluation 485	$3 + 1$ (9)
LBU 481	Applied Land-use Planning 481	$3 + 1$ (9)
		$14 + 2$ (34)

**Second semester**

ARD 483	Social Dimensions 483	$4 + 0$ (8)
GKD 487	Resource Surveying 487	$3 + 1$ (9)
LBU 482	Land-use Planning: Project 482	$0 + 3$ (9)
WDE 483	Integration of Plant and Animal Production 483	$3 + 1$ (9)
		$10 + 5$ (35)

A minimum of **290** credits is required to obtain this degree.

**2.5 Study programme in Plant Protection (Code 03136061)**

**Second year of study**

**First semester**

AGR 313	Primary Food Crops 313	$2 + \frac{1}{2}$ (6)
PPK 210	Introduction to Plant Production 210	$3 + 1$ (9)
GKD 213	Introductory Soil Science 213	$3 + 1$ (9)
LEK 210	Agricultural Economics 210	$3 + 0$ (6)
		$11 + 2\frac{1}{2}$ (30)

**Second semester**

ZEN 122	Introductory Zoology 122	$4 + 1$ (11)
GKD 228	Soil Fertility 228	$3 + 1$ (9)
LEK 220	Agricultural Economics 210	$3 + 0$ (6)
PLG 220	Introductory Plant Pathology 220	$2 + 1$ (7)
TBK 221	Introductory Horticulture 221	$3 + 1$ (9)
		$15 + 4$ (42)

**Third year of study**

**First semester**

OKW 413	Weed Science 413	$3 + 1$ (9)
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TBK 314	Tropical and Subtropical Fruit Cultivation 314	2 + ½	(6)
TBK 410	Citrus Cultivation 410	3 + 1	(9)
STZ 311	Nursery Management 311	2 + ½	(6)
MBY 312	Taxonomy of Fungi 312	<u>2 + 1</u>	<u>(7)</u>
		12 + 4	(37)

### Second semester

LEK 320	Agricultural Economics 320	3 + 1	(9)
AGR 323	Diverse Crops 323	2 + ½	(6)
PLG 321	Introductory Phytobacteriology 321	1 + ½	(4)
LBU 325	Agroclimatology 325	3 + 1	(9)
PLG 221	Introductory Plant Virology 221	2 + ½	(6)
BME 120 or*	Biometry 120 or <i>optional course</i> *	<u>3 + 1</u>	<u>(9)</u>
		14 + 4½	(43)

\*Students who have passed STK 151 and 152 must take TBK 320 Deciduous Fruit 320.

### Fourth year of study

#### First semester

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	4 + 0	(8)
MBY 416	Basic Microbial Ecology 416	2 + 1	(7)
PLG 412	Parasitology and Epidemiology 412	2 + 1	(7)
AGV 410	Agrarian Extension 410	<u>2 + 0</u>	<u>(4)</u>
		14 + 2	(34)

#### Second semester

ARD 483	Social Dimensions 483	4 + 0	(8)
ZEN 320 and	Insect Pest Management 320 and		
ZEN 321	South African Insect Pests 21	4 + 2	(14)
PLG 421	Disease Control 421	2 + 1	(7)
PLG 422	Nursery and Seed Pathology 422	1 + ½	(4)
AGV 421	Communication 421	<u>2 + 0</u>	<u>(4)</u>
		13 + 3½	(37)

A minimum of **300 or 297** credits is required to obtain this degree.

## 2.6 Study programme in Food Processing (Code 03136071)

### Second year of study

#### First semester

LEK 210	Agricultural Economics 210	3 + 0	(6)
OBS 111	Business Management 111	3 + 0	(6)
PPK 210	Introduction to Plant Production 210	3 + 1	(9)
VDW 211	Food Science 211	2 + 1	(7)
VOV 200	Food Processing 200	<u>1 + 0</u>	<u>(2)</u>
		12 + 2	(30)

**Second semester**

AGV 421	Communication 421	2 + 0	(4)
LEK 220	Agricultural Economics 220	3 + 0	(6)
VDG 120	Nutrition 120	3 + 0	(6)
VDW 222	Food Science 222	2 + ½	(6)
VDW 223	Food Science 223	2 + ½	(6)
VOV 200	Food Processing 200	1 + 0	(2)
		<hr/>	
		13 + 1	(30)

**Third year of study**

**First semester**

AGV 410	Agrarian Extension 410	2 + 0	(4)
VDW 315	Food Science 315	2 + ½	(6)
VDW 314	Food Science 314	2 + 1	(7)
VDW 332	Food Science 332	3 + 1	(9)
VDW 432	Food Science 432	1 + 1	(5)
VOV 300	Food Processing 300	1 + 0	(2)
		<hr/>	
		11 + 3½	(33)

**Second semester**

BME 120 or *	Biometry 120 or optional course	3 + 1	(9)
MBY 225	Food Microbiology 225	2 + 1	(7)
LEK 320	Agricultural Economics 320	3 + 1	(9)
VDW 324	Food Science 324	2 + 1	(7)
VOV 300	Food Processing 300	1 + 0	(2)
		<hr/>	
		11 + 4	(34)

\* Students who have passed STK 151 and 152, must choose an optional course.

**Fourth year of study**

**First semester**

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	4 + 0	(8)
VOV 471	Food Processing 471	2 + 0	(4)
VOV 485	Food Processing 485	3 + 0	(6)
VDW 418	Food Science 418	3 + 1	(9)
VDW 431	Food Science 431	2 + 1	(7)
		<hr/>	
		18 + 2	(42)

**Second semester**

ARD 483	Social Dimensions 483	4 + 0	(8)
VOV 471	Food Processing 471	2 + 0	(4)
VOV 472	Food Processing 472	½+ 2	(7)
VDW 442	Food Science 442	2 + 1	(7)
VDW 425	Food Science 425	2 + ½	(6)
VDW 444	Food Science 444	3 + 1	(10)
		<hr/>	
		13½+ 4½	(42)

A minimum of **288** credits is required to obtain this degree.

**2.7 Study programme in Extension (Code 03136081)**

The study programme for Extension consists of (a) courses from one of the following fields of specialisation: Agronomy/Horticulture, Animal Production, Land-use Planning, Food Processing, Pasture Science/Agronomy (second and third year) and (b) Extension (fourth year of study).

**Second and third year of study:**

As listed for the selected major combination.

**Fourth year of study**

**First semester**

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	4 + 0	(8)
AGV 481	Philosophy of Extension, Organisation and Management 481	4 + 0	(8)
AGV 482	Leadership and Group Dynamics 482	4 + 0	(8)
		<u>16 + 0</u>	<u>(32)</u>

**Second semester**

AGV 485	Community Extension and Development 485	3 + 1	(9)
AGV 487	Extension Planning 487	3 + 1	(9)
AGV 488	Evaluation of Extension 488	4 + 0	(8)
AGV 489	Adoption and Diffusion 489	4 + 0	(8)
		<u>14 + 2</u>	<u>(34)</u>

A minimum of **290** credits is required to obtain this degree.

**2.8 Study programme in Pasture Science/Agronomy (Code 03136091)**

**Second year of study**

**First semester**

PPK 210	Introduction to Plant Production 210	3 + 1	(9)
WDE 210	Veld Management Practices 210	2 + ½	(6)
GKD 213	Introductory Soil Science 213	3 + 1	(9)
LEK 210	Agricultural Economics 210	3 + 0	(6)
APZ 212	Animal Production Physiology 212 (C.S. from 211)	2 + ½	(5½)
		<u>13 + 3</u>	<u>(35½)</u>

**Second semester**

AGR 323	Diverse Crops 323	2 + ½	(6)
WDE 320	Planted Pastures and Fodder Crops 320	2 + ½	(6)
GKD 228	Soil Fertility 228	3 + 1	(9)
LEK 220	Agricultural Economics 220	3 + 0	(9)
AGV 421	Communication 421	2 + 0	(4)
	Optional course units at least		(6)
		<u>12 + 2</u>	<u>(40)</u>

**Third year of study**

**First semester**

APZ 313	Livestock Nutrition 313	4 + ½	(9½)
OKW 413	Weed Science 413	3 + 1	(9)
AGR 313	Primary Food Crops 313	2 + ½	(6)
AGV 410	Agrarian Extension 410	3 + 0	(6)
GKD 317	Soil Classification and Mapping 317	2 + 1	(7)
		<u>14 + 3</u>	<u>(37½)</u>

**Second semester**

WDE 424	Pasture Evaluation 424 (C.S. from 421)	1 + ½	(4)
LEK 320	Agricultural Economics 320	3 + 1	(9)
APZ 321	Livestock Production 321	2 + 0	(4)
BME 120*	Biometry 120 or optional course	3 + 1	(9)
LBU 325	Agroclimatology 325	3 + 1	(9)
		<u>12 + 3½</u>	<u>(35)</u>

\* Students who have passed STK 110, must choose an optional course.

**Fourth year of study**

**First semester**

ARD 481	Agricultural and Rural Development Principles 481	4 + 0	(8)
ARD 482	Resources and Development 482	4 + 0	(8)
Choice of <b>two</b> from the following:			
AGR 481	Production Systems: Legumes and Tuberous Plants 481	3 + 1	(9)
WDE 481	Veld Management 481	3 + 1	(9)
LBU 481	Applied Land-use Planning 481	3 + 1	(9)
		<u>14 + 2</u>	<u>(34)</u>

**Second semester**

ARD 483	Social Dimensions 483	4 + 0	(8)
Choice of <b>three</b> from the following:			
AGR 482	Production Systems: Legumes and Tuberous Plants 482	3 + 1	(9)
WDE 482	Forage Crops and Production 482	3 + 1	(9)
WDE 483	Integration of Plant and Animal Production 483	3 + 1	(9)
LBU 482	Project in Land-use Planning 482	3 + 1	(9)
		<u>13 + 3</u>	<u>(35)</u>

A minimum of **293** credits is required to obtain this degree.

**VIII. BACCALAUREUS INSTITUTIONIS AGRARIAE HONORES (BInstAgrar(Hons))**

Also consult General Regulations G. 16 to G. 29.

**Ag. 25**

**(a) Admission requirements**

Subject to the stipulations of General Regulations G.1.3 and G.62, a candidate must hold the BInstAgrar degree or an appropriate bachelor's degree to be admitted to the

BlnstAgrar(Hons). Additional courses, other than the honours courses may be prescribed by the Dean, on the recommendation of the head(s) of the department(s) concerned.

**(b) Fields of specialisation**

The BlnstAgrar(Hons) degree is conferred in the following fields of specialisation:

Agricultural Economics;  
 Animal Production;  
 Extension;  
 Food Processing;  
 Home Economics;  
 Land Development;  
 Land-use Planning;  
 Plant Production;  
 Plant Protection;  
 Plant Quarantine;  
 Rural Development Planning;  
 Rural Development and Ecotourism;  
 Rural Engineering Technology;  
 Sustainable Ecological Management;  
 Sustainable Insect Management;  
 Sustainable Plant Genetic Resources Management; and

Certain combinations of these fields of specialisation are also possible.

- (c)** Training is offered full-time, and in certain fields of specialisation also on part-time basis. The course material extends over at least two semesters for full-time students, while the part-time course extends over at least four semesters.
- (d)** The curriculum consists of a minimum of eight courses, which include the following:
- A common core of three courses, ARD 781, 782 and 783 are compulsory for all fields of specialisation, except in the case of the Extension option, for which only ARD 781 and 782 are compulsory. Credit for equivalent courses already passed may be considered, in which case suitable alternative courses will be prescribed by the Dean in consultation with the relevant Head of the Department concerned.
  - The prescribed course work in the student's field of specialisation. Credit for equivalent courses already passed may be considered, in which case suitable alternative courses will be prescribed by the Dean in consultation with the Head of the Department concerned.
  - Additional courses required for the particular field of specialisation, as stipulated by the Dean in consultation with the Head of the Department concerned.
- (e)** A student must obtain an average of at least 75 % in the examination(s) of the major course(s), with at least 65 % in all other courses to pass with distinction.

<b>IX. MAGISTER INSTITUTIONIS AGRARAE ( MlnstAgrar)</b>
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Also consult General Regulations G. 30 to G. 44.

**Ag. 26**

**Admission requirements**

- (a)** Subject to the stipulations of General Requirements G.1.3 and G. 62, a candidate must hold the BlnstAgrar(Hons) or an appropriate honours degree for admission to the MlnstAgrar degree course. Additional courses may be prescribed by the Dean

on the recommendation of the Head of Department. A candidate with an average mark of less than 60 % for the honours degree will only be admitted to MInstAgrar study with the approval of the Dean, on the recommendation of the Head of the Department.

**(b) Fields of specialisation**

The same fields of specialisation as for the BInstAgrar(Hons) apply.

**(c) The curriculum consists of further study in the field of specialisation and a dissertation, or alternatively an essay, which encompasses research conducted by the student under supervision of a member of the academic staff.**

**(d) The degree is conferred with distinction on a student who obtains a final average mark of at least 75 %.**

**General**

Students must take particular note of the maximum period of registration (General Regulation G.32.4), as well as of the requirement regarding submission of a draft article/articles for publication (General Regulation G. 61).

<b>X. PHILOSOPHIAE DOCTOR: (PhD)</b>
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Also consult General Regulation G. 45 to G. 55.

**Ag. 27**

**Admission to study**

Subject to the stipulations of General Regulations G.1.3 and G. 62, the MSc, MSc(Agric), MInstAgrar degree or another appropriate master's degree is a requirement for admission.

**Ag. 28**

**Residence**

Doctoral students may be required to reside at the University for further study on the recommendation of the Head of Department and with the approval of the Dean. Unless the Dean decided otherwise, this period must be devoted to full-time study.

**Ag. 29**

**Curriculum**

The curriculum for the PhD degree consists of:

- (i) theoretical knowledge of the major subject and such ancillary courses as may be required; and
- (ii) a thesis.

**Ag. 30**

**Examinations and pass requirements**

**(a) Examinations is governed by General Regulation G. 52.**

**(b) To obtain the PhD degree a student must:**

- (i) pass the examinations and prescribed courses as stipulated in the study programme;
- (ii) pass the thesis; and
- (iii) pass a final examination based on the thesis and general knowledge of the subject.

**General**

Students must take particular note of the maximum period of registration (General Regulation G. 47), as well as of the requirements regarding the submission of a draft article/articles for publication (General Regulation G. 61).

**XI. DOCTOR SCIENTIAE: DSc (Code 03260001)**

**Ag. 31**

The degree is conferred by virtue of publications.  
(Also consult General Regulation G. 56)

**XII. BACCALAUREUS SECUNDAE EDUCATIONIS (SCIENTIAE) [BSecEd(Sci)]**

**Ag. 32**

**Admission requirements**

Matriculation certificate with matriculation exemption. Also consult page 7 of this publication for information on the M score and other requirements.

**Ag. 33**

**Duration**

The minimum duration of the study is four years.

**Ag. 34**

**Examinations and promotion**

- (a) A student may be admitted to courses on the following semester or year of study, if he or she complies with the prerequisites of the specific courses of the following semester or year of study. (Consult Reg. Ag. 1.)
- (b) A student is promoted to the following year of study if:
  - (i) not more than thirty credits will be transferred to the following year, unless the Dean, on the recommendation of the Head of Department, decides to the contrary; and
  - (ii) no first year courses are transferred to the final year of study.
- (c) A student who does not qualify for promotion to the following year of study, retains credit for the courses already passed and may be admitted by the Dean, on the recommendation of the Head of Department, to courses of the following year of study to a maximum of thirty credits, provided that there are not timetable clashes.
- (d) A student who has failed only one year course or two semester courses in the final year but has obtained a combined mark of 40 %, may be admitted to a special examination in the course(s) concerned at the end of the first semester of the following year.
- (e) A major subject is passed with distinction if the student obtains an average of at least 75 % in the courses of that major subject.
- (f) The BSecEd(Sci) degree is conferred with distinction on a student who obtains a weighted average of at least 75 % in the prescribed year course at 300 level, as well as in one subject didactics and in Science Education 400, with a weighted average of at least 65 % in the other courses of the third and the fourth year of study.

**Ag. 35**

**Compilation of the curriculum:**

**1. General**

A minimum of 280 credits is required to comply with the requirements for the BSecEd(Sci) degree.

The BSecEd(Sci) curriculum may only be taken within the framework of the study programmes as set out below. The Dean may, however, approve variations of the study programme. Optional courses are normally chosen from the courses which appear in the BSc, BSc(Agric) and BInstAgrar study programmes. Only suitable subject options will lead to admission to honours study. The study programme General Biology and Agriculture Extension does not normally lead to admission to honours studies, but may, with suitable subject options, grant admission to the BInstAgrar(Hons) programme. The degree programme may also grant admission to the BEd degree course which is presented by the Faculty of Education. Consult the admission requirements of the various honours degree study programmes as well as the BEd degree study programme.

**Please note:** *Special Biology option:* A special option with regard to Biology may be taken. Should the school subject Biology only be taken up to 200 level, the combination of subjects may be made from the following courses: BLG 150, 160, 250, FSG 220 and BOT 227. This combination will not, however, grant admission to subjects at 300 level and will thus not lead to completion of the degree course, unless a further combination of other courses is taken, which will lead to a year course at 300 level.

A student may, in consultation with the Dean, follow courses not referred to in Ag. 1, equivalent to a maximum of 22 credits only.

A year course consists of the equivalent of two consecutive semester courses.

**All BSecEd(Sci) curricula consist of the following:**

**(a) Major Subjects**

The curriculum is compiled from the equivalent of at least 7 year courses apart from the compulsory education courses of which at least one must be taken up to 300 level and at least two school subjects up to 200 level. The combination of WTW 114 or WTW 134 or WTW 101 and PHY 131 or PHY 101 is regarded as a year course. The equivalent of one other year course must be included, which can be the subject didactic of a third school subject.

**(b) Recognised school subjects**

Course	Level	Modules
Biology††	100	BLG 150, 160; or MLB 111 and ZEN 122 or BOT 120
Biology††	200	BLG 250, FSG 220 and BOT 227; or appropriate modules in Botany or Zoology/Entomology at 200 level
Chemistry*	100	CMY 112, 122 or CMY 101, 102



Course	Level	Modules
Chemistry*	200	CMY 282, CMY 283, CMY 284, CMY 285
Physics*	100	PHY 171; or 181; or PHY 101, 102
Physics*	200	PHY 213, PHY 214, PHY 215, PHY 221, PHY 223, PHY 224
Physical Science*	200	Combination of appropriate modules in Chemistry and Physics at 200 level, on the recommendation of the Head of Department and the approval of the Dean.
Geography	100	GGY 131, GGY 132, GGY 141, GGY 142
Geography	200	GGY 231, GGY 232, GGY 241, GGY 242
Agriculture	100	AGC 150, AGC 160
Agriculture	200	AGC 250, AGC 260
Computer Science	100	COS 110, COS 120
Computer Science	200	COS 212, COS 213, COS 221, COS 222
Mathematics	100	WTW 114, 126, 128; or WTW 134, 144; or WTW 101, 126, 128
Mathematics	200	WTW 211, WTW 218, WTW 215, WTW 289

**Please note:**

All modules, as indicated, must be passed to be recognised as a school subject.

†† The combination BLG 150, 160, 250, FSG 220 and BOT 227 is recognised as Biology at 200 level, but does not grant admission to Biology courses at 300 level. The combination MLB 111, BOT 120 or ZEN 122, together with applicable second year courses can lead to admission to courses at 300 level. The combination of courses at 100 level in Botany and Zoology is recognised as one school subject only and credit will only be given if a full year course, which includes both Botany and Zoology, is passed at 100 level.

\* Physics, Chemistry and Physical Science courses at 100 level are recognised as one school subject only and credit will only be given if a full year course, of both Physics and Chemistry at 100 level, is passed.

**(c) Professional Studies**

Professional Studies consists of the prescribed Subject Didactics and the Educational Community Project (SCE 301), Sciences (SCI 101 or 102) and the Educational Community Project (SCE 200).

**(d) Education**

Education consists of Science Education (SCE 200, 300 and 400).

**(e) Teaching Practice**

Teaching experience is gained through:

- (i) attending demonstration lessons;
- (ii) School Practice 302 and 402;
- (iii) prescribed Subject Didactics courses; and
- (iv) Educational Community Project (SCE 301).

**(f) Language Endorsement**

Students must demonstrate the ability to teach in at least two of the official languages, of which one must be either English or Afrikaans.

**(g) Religious Instruction (SCE 170)**

A requirement of the Department of Education. A student can, on the grounds of conscientious objections, apply for exemption but will then be required to take a course of at least 4 credits instead of Religious Instruction.

**2. PRESCRIBED CURRICULA FOR THE STUDY PROGRAMMES AND YEARS OF STUDY**

Study programmes in:

1. Biology Education
2. General Biology and Agriculture Education

**2.1 Study program in Biology Education (Code 03135001)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4	+	1	(11)
WTW 114 or	Mathematics 114 or				
WTW 134	Mathematics 134	4	+	1	(11)
MLB 111	Molecular and Cell Biology111	4	+	1 <sup>1/3</sup>	(11)
SCI 102	Sciences 102	2	+	1	(6)
FSG 110	Physiology 110	3	+	0	(6)
		14		4 <sup>1/3</sup>	(45)

**Second semester**

CMY 122	General Chemistry 122	4	+	1	(11)
BOT 120 or	Introductory Botany or				
ZEN 122	Introductory Zoology 122	4	+	1	(11)
SCI 102	Sciences 102	2	+	1 <sup>1/3</sup>	(6)
FSG 120	Physiology120	3	+	0	(6)
Additional optional course: one of					
	PHY 131 (First semester)*,				
	WTW 144 or WTW 126, 128,				
	BOT 120 or ZEN 122,				
	MBY 120, GTS 122				
				(11)	
		[13		+ 3 <sup>1/3</sup>	](45)

\* A student who has passed PHY 131 in the first semester, will be exempted from these optional courses in the second semester.

**Second year of study**

**First semester**

SCE 200	Science Education 200	2	+	1 <sup>1/3</sup>	(5)
SCE 170	Religious Instruction 170	1			(2)
SCE 471	Subject Didactics 471	2	+	1	(7)
Optional courses from BOT, ZEN at 200 level		4	+	2	(14)

Second school subject as year course at 200 level (excluding Biology), minimum credits	<u>7</u>
	9 + 3 <sup>1</sup> / <sub>3</sub> (35)

**Second semester**

SCE 200 Science Education 200	2 + 1 <sup>1</sup> / <sub>3</sub> (5)
SCE 170 Religious Instruction 170	1 (2)
SCE 471 Subject Didactics 471	2 + 1 (7)
Optional courses from BOT, ZEN at 200 level	4 + 2 (14)
Second school subject as chosen in the 1 <sup>st</sup> sem.	<u>7</u>
	7 + 3 <sup>1</sup> / <sub>3</sub> (35)

**Third year of study**

**First semester**

SCE 300 Science Education 300	2 + 1 <sup>1</sup> / <sub>3</sub> (8)
SCE 301 Educational Community Project 301	(5)
SCE 302 School Practice 302	(11)
TED 400 Language Endorsement 400	(0)
Subject didactics for second school subject: <b>one</b> option from	
SCE 472 Subject Didactics of Geography 472	
SCE 473 Subject Didactics of Agriculture 473	
SCE 474 Subject Didactics of Physical Science 474	
SCE 475 Subject Didactics of Computer Science 475	
SCE 476 Subject Didactics of Mathematics 476	<u>2 + 1 (7)</u>
	4 + 2 <sup>1</sup> / <sub>3</sub> (31)

**Second semester**

SCE 300 Science Education 300	2 + 1 <sup>1</sup> / <sub>3</sub> (8)
SCE 301 Educational Community Project 301	(5)
SCE 302 School Practice 302	(11)
TED 400 Language Endorsement 400	(0)
Subject didactics as chosen in the first semester	<u>2 + 1 (7)</u>
	4 + 2 <sup>1</sup> / <sub>3</sub> (31)

**Fourth year of study**

**First semester**

SCE 400 Science Education 400	2 (8)
SCE 402 School Practice 402	(5)
Minimum optional course credits at 300 level	(14)
Optional course in consultation with the Dean*	<u>(6)</u>
	2 (33)

\* The equivalent of a year course at any level: It is recommended that students choose an official language as optional course. A student who has passed a third school subject at 300 level, may choose a third applicable subject didactics.

**Second semester**

SCE 400 Science Education 4000	2 (8)
SCE 402 School Practice 402	(5)
Minimum optional course at 300 level	(14)
Optional course as chosen in the first semester	<u>(6)</u>
	2 (33)

A minimum of 280 credits is required to obtain the degree.

## 2.2 Study programme in General Biology and Agriculture Education (Code 03135002)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
WTW 114 or	Mathematics 114 or		
WTW 134	Mathematics 134	4 + 1	(11)
AGC 150	Soil Science and Plant Production 150	4 + 1	(11)
BLG 150	Introductory Plant Biology 150	3 + 1	(9)
SCI 102	Sciences 102	2 + 1 <sup>1</sup> / <sub>3</sub>	(6)
		<u>17 +</u>	<u>5<sup>1</sup>/<sub>3</sub></u> (48)

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
AGC 160	Animal Science and Agricultural Economics 160	4 + 1	(11)
BLG 160	Introductory Animal Biology 160	3 + 1 <sup>1</sup> / <sub>3</sub>	(7)
SCI 102	Sciences 102	2 + 1 <sup>1</sup> / <sub>3</sub>	(6)
	Additional optional course: <b>one of</b> PHY 131 (First semester)*, WTW 144 or WTW 126, 128		<u>(11)</u>
		13 +	3 <sup>2</sup> / <sub>3</sub> (46)

\* Students who pass PHY 131 in the first semester, are exempted from choosing an optional course in the second semester.

### Second year of study

#### First semester

SCE 200	Science Education 200	2 + 1 <sup>1</sup> / <sub>3</sub>	(5)
SCE 170	Religious Instruction 170	1	(2)
BLG 250	Molecular Biology 250	3 + 1 <sup>1</sup> / <sub>3</sub>	(7)
AGC 250	Plant and Animal Production 250	3 + 1	(9)
	<b>One</b> subject didactics from:		
SCE 471	Subject didactics of Biology 471	2 + 1	(7)
SCE 473	Subject didactics of Agriculture 473	2 + 1	(7)
		<u>11 +</u>	<u>3<sup>2</sup>/<sub>3</sub></u> (30)

#### Second semester

SCE 200	Science Education 200	2 + 1 <sup>1</sup> / <sub>3</sub>	(5)
SCE 170	Religious Instruction 170	1	(2)
FSG 220	Physiology 220	3 + 1 <sup>1</sup> / <sub>3</sub>	(7)
BOT 227	Introductory Ecology 227	1	(2)
AGC 260	Resource Utilisation 260	3 + 1	(9)
	Subject didactics as chosen in the first semester	2 + 1	(7)
		<u>12 +</u>	<u>2<sup>2</sup>/<sub>3</sub></u> (32)

**Third year of study**

**First semester**

SCE 300	Science Education 300	2	+	1 <sup>1</sup> / <sub>3</sub>	(8)
SCE 301	Educational Community Project 301				(5)
SCE 302	School Practice 302				(11)
TED 400	Language Endorsement 400				(0)
	Remaining subject didactics from:				
SCE 471	Subject didactics of Biology 471				
SCE 473	Subject didactics of Agriculture 473	<u>2</u>	+	<u>1</u>	(7)
		4	+	2 <sup>1</sup> / <sub>3</sub>	(31)

**Second semester**

SCE 300	Science Education 300	2	+	1 <sup>1</sup> / <sub>3</sub>	(8)
SCE 301	Educational Community Project 301				(5)
SCE 302	School Practice 302				(11)
TED 400	Language Endorsement 400				(0)
	Subject didactics as chosen in the first semester:	<u>2</u>	+	<u>1</u>	(7)
		4	+	2 <sup>1</sup> / <sub>3</sub>	(31)

**Fourth year of study**

**First semester**

SCE 400	Science Education 400	2			(8)
SCE 402	School Practice 402				(5)
	Minimum optional course credits at 300 level				(14)
	Optional course in consultation with the Dean*				(6)
		<u>[2]</u>			(33)

\* The equivalent of a year course at any level: It is recommended that students choose an official language as optional course. A student who has passed a third school subject at any level, may choose a third applicable subject didactics.

**Second semester**

SCE 400	Science Education 400				(8)
SCE 402	School Practice 402				(5)
	Minimum optional course credits at 300 level				(14)
	Optional course as chosen in the first semester				(6)
		<u>[2]</u>			(33)

A minimum of **280** credits is required to obtain the degree.

**XIII. DIPLOMA IN EDUCATION WITH SPECIALISATION IN SCIENCES FOR THE SECONDARY PHASE – DipEd(Sci)**

**Ag. 36**

**Admission requirements**

As for BSecEd(Sci). Students who have been enrolled for BSecEd(Sci), BSc, BSc(Agric) or the extended programme for BSc, BSc (Agric) or BSecEd(Sci) may be considered for DipEd(Sci) studies. Applicable subjects will be transferred to the diploma.

**Ag. 37**

**Duration**

Three years of full-time studies.

**Ag. 38**

**Examinations and promotion**

- (a) A student may be admitted to courses on the following semester or year of study, if he or she complies with the prerequisites of the specific courses of the following semester or year of study. (Consult Reg. Ag. 1.)
- (b) A student is promoted to the following year of study if:
  - (i) not more than thirty credits will be transferred to the following year, unless the Dean, on the recommendation of the Head of Department, decides to the contrary,
  - (ii) no first year courses are transferred to the final year of study.
- (c) A student who does not qualify for promotion to the following year of study, retains credit for the courses already passed and may be admitted by the Dean, on the recommendation of the Head of Department, to courses of the following year of study to a maximum of thirty credits, provided that there are no timetable clashes.
- (d) A student who has failed only one year course or two semester courses in the final year but obtained a combined mark of 40 %, may be admitted to a special examination in the course(s) concerned at the end of the first semester of the following year.
- (e) A major subject is passed with distinction if the student obtains an average of at least 75 % in the courses of that major subject.
- (f) The DipEd(Sci) diploma is conferred with distinction on a student who obtains a weighted average of at least 75 % in the prescribed year course at 200 level, as well as in one subject didactics, Science Education 300, and School Practice 302, and at least 65 % in each course of the third year of study.

**Ag. 39**

**Compilation of the curriculum**

**1. General**

A minimum of 196 credits is required to comply with the requirements for the DipEd(Sci) diploma.

The DipEd(Sci) curriculum may only be taken within the framework of the study programmes as set out below. The Dean may, however, approve variations of the study programme. Optional courses are normally chosen from the courses which appear in the BSc, BSc(Agric) and BInstAgrar study programmes.

**Please note:** *Special Biology option:* A special option with regard to Biology may be taken. Should the school subject Biology be taken up to 200 level only, the combination of subjects may be compiled from the following courses: BLG 150, 160, 250, FSG 220 and BOT 227. This combination will not, however, grant admission to subjects at 300 level and will thus not lead to completion of the diploma, unless a further combination of other courses, which will lead to a year course at 300 level, is taken.

A student may, in consultation with the Dean, follow courses not referred to in Ag. 1, equivalent to a maximum of 22 credits only.

A year course consists of the equivalent of two consecutive semester courses.

The DipEd(Sci) curricula is compiled as follows:

**(a) Major Subjects**

The curriculum is compiled from the equivalent of at least 5 year courses as well as the compulsory education courses of which at least one must be taken up to 200 level and at least one school subject up to 200 level. The combination of WTW 114 or WTW 134 or WTW 101 and PHY 131 or PHY 101 is regarded as a year course.

**(b) Recognised School Subjects**

Refer to Reg. Ag. 35(1)(b)

**(c) Professional Studies**

Professional Studies consists of the prescribed Subject Didactics and the Educational Community Project 301 (SCE 301), Sciences 101 or 102 (SCI 101 or 102) and the Educational Community Project 200 (SCE 200).

**(d) Education**

Education consists of Science Education 200 and 300 (SCE 200 and 300).

**(e) Teaching Practice**

Teaching experience is gained through:

- (i) Attending demonstration lessons;
- (ii) School Practice 302;
- (iii) Prescribed Subject Didactics courses; and
- (iv) Educational Community Project 301 (SCE 301).

**(f) Language Endorsement**

Students must demonstrate the ability to teach in at least two official languages, of which one must be either English or Afrikaans.

**(g) Religious Instruction (SCE 170)**

A requirement of the Department of Education. A student can, on the grounds of conscientious objections, apply for exemption but will then be required to take a course of at least 4 credits instead of Religious Instruction.

**(2) PRESCRIBED CURRICULA FOR THE STUDY PROGRAMMES AND YEAR OF STUDY**

Study programmes in:

- 1. Biology Education
- 2. General Biology and Agriculture Education

**2.1 Study program in Biology Education (Code 03120001)**

**First year of study**

**First semester**

CMY 112	First course in Chemistry 112	4	+	1	(11)
WTW 114 or	Mathematics 114 or				
WTW 134	Mathematics 134	4	+	1	(11)
MLB 111	Molecular and Cell Biology111	4	+	1	(11)
SCI 102	Sciences 102	2	+	1 <sup>1</sup> / <sub>3</sub>	(6)
FSG 110	Physiology 110	3	+	0	(6)
		14	+	4 <sup>1</sup> / <sub>3</sub>	(45)

**Second semester**

CMY 122	General Chemistry 122	4 + 1	(11)
BOT 120 or	Introductory Botany or		
ZEN 122	Introductory Zoology 122	4 + 1	(11)
SCI 102	Sciences 102	2 + $1\frac{1}{3}$	(6)
FSG 120	Physiology120	3 + 0	(6)
Additional optional course: <b>one</b> of			
PHY 131 (First semester)*,			
WTW 144 or WTW 126, 128,			
BOT 120 or ZEN 122,			
MBY 120, GTS 122			
			(11)
			<hr/>
			[13 + $3\frac{1}{3}$ ] (45)

\* A student who has passed PHY 131 in the first semester, will be exempted from these optional courses in the second semester.

**Second year of study**

**First semester**

SCE 200	Science Education 200	2 + $\frac{1}{3}$	(5)
SCE 170	Religious Instruction 170	1	(2)
SCE 471	Subject Didactics 471	2 + 1	(7)
Optional courses from BOT, ZEN at 200 level		4 + 2	(14)
Second school subject as year course at 200 level (excluding Biology), minimum credits			(7)
			<hr/>
			9 + $3\frac{1}{3}$ (35)

**Second semester**

SCE 200	Science Education 200	2 + $\frac{1}{3}$	(5)
SCE 170	Religious Instruction 170	1	(2)
SCE 471	Subject Didactics 471	2 + 1	(7)
Optional courses from BOT, ZEN at 200 level		4 + 2	(14)
Second school subject as chosen in the first semester			(7)
			<hr/>
			9 + $3\frac{1}{3}$ (35)

**Third year of study**

**First semester**

SCE 300	Science Education 300	2 + $1\frac{1}{3}$	(8)
SCE 301	Educational Community Project 301		(5)
SCE 302	School Practice 302		(11)
TED 400	Language Endorsement 400		(0)
Subject didactics for second school subject: one option from:			
SCE 472	Subject Didactics of Geography 472		
SCE 473	Subject Didactics of Agriculture 473		
SCE 474	Subject Didactics of Physical Science 474		
SCE 475	Subject Didactics of Computer Science 475		
SCE 476	Subject Didactics of Mathematics 476	2 + 1	(7)
			<hr/>
			4 + $2\frac{1}{3}$ (31)

**Second semester**

SCE 300	Science Education 300	2 + $1\frac{1}{3}$	(8)
SCE 301	Educational Community Project 301		(5)



SCE 302	School Practice 302	(11)
TED 400	Language Endorsement 400	(0)
	Subject didactics as chosen in the first semester	$\frac{2}{4} + \frac{1}{2\frac{1}{3}}$ (7)
		$\frac{7}{31}$ (31)

A minimum of **196** credits is required to obtain the diploma.

## 2.2 Study programme in General Biology and Agriculture Education (Code 03120002)

### First year of study

#### First semester

CMY 112	First course in Chemistry 112	4 + 1	(11)
WTW 114 or	Mathematics 114 or		
WTW 134	Mathematics 134	4 + 1	(11)
AGC 150	Soil Science and Plant Production 150	4 + 1	(11)
BLG 150	Introductory Plant Biology 150	3 + 1	(9)
SCI 102	Sciences 102	2 + $1\frac{1}{3}$	(6)
		<u>17 + <math>5\frac{1}{3}</math></u>	(48)

#### Second semester

CMY 122	General Chemistry 122	4 + 1	(11)
AGC 160	Animal Science and Agricultural Economics 160	4 + 1	(11)
BLG 160	Introductory Animal Biology 160	3 + $\frac{1}{3}$	(7)
SCI 102	Sciences 102	2 + $1\frac{1}{3}$	(6)
	Additional optional course: one of PHY 131 (First semester)*, WTW 144 or WTW 126, 128		<u>(11)</u>
		13 + $3\frac{2}{3}$	(46)

\* Students who have passed PHY 131 in the first semester, will be exempted from choosing an optional course in the second semester.

### Second year of study

#### First semester

SCE 200	Science Education 200	2 + $\frac{1}{3}$	(5)
SCE 170	Religious Instruction 170	1	(2)
BLG 250 or	Molecular Biology 250	3 + $\frac{1}{3}$	(7)
AGC 250	Plant and Animal Production 250	3 + 1	(9)
	One subject didactics from:		
SCE 471	Subject didactics of Biology 471	2 + 1	(7)
SCE 473	Subject didactics of Agriculture 473	<u>2 + 1</u>	<u>(7)</u>
		11 + $3\frac{2}{3}$	(30)

#### Second semester

SCE 200	Science Education 200	2 + $\frac{1}{3}$	(5)
SCE 170	Religious Instruction 170	1	(2)
FSG 220	Physiology 220	3 + $\frac{1}{3}$	(7)
BOT 227 or	Introductory Ecology 227 or	1	(2)

AGC 260	Resource Utilisation 260	3 + 1	(9)
	Subject didactics as chosen in the first semester	<u>2 + 1</u>	(7)
		12 + 2 <sup>2</sup> / <sub>3</sub>	(32)

### Third year of study

#### First semester

SCE 300	Science Education 300	2 + 1 <sup>1</sup> / <sub>3</sub>	(8)
SCE 301	Educational Community Project 301		(5)
SCE 302	School Practice 302		(11)
TED 400	Language Endorsement 400		(0)
	Remaining subject didactics from:		
SCE 471	Subject didactics of Biology 471		
SCE 473	Subject didactics of Agriculture 473	<u>2 + 1</u>	(7)
		4 + 2 <sup>1</sup> / <sub>3</sub>	(31)

#### Second semester

SCE 300	Science Education 300	2 + 1 <sup>1</sup> / <sub>3</sub>	(8)
SCE 301	Educational Community Project 301		(5)
SCE 302	School Practice 302		(11)
TED 400	Language Endorsement 400		(0)
	Subject didactics as chosen in the first semester:	<u>2 + 1</u>	(7)
		4 + 2 <sup>1</sup> / <sub>3</sub>	(31)

A minimum of **196** credits is required to obtain the diploma.

## SYLLABI

### GENERAL

#### (MLB 111) Molecular and Cell Biology 111: (4 l.p.w. + 1p) (11 credits)

Molecular and Cell Biology. Introductory study of the ultra-structure, function and composition of representative cells and cell components. General principles of cell metabolism, molecular genetics, cell growth, cell division and differentiation.

#### CIL 171, 172, 173) Computer Literacy 171, 172, 173

Presented by the Damelin Computer School.

#### Joint courses for BlnstAgrar

(BLG 150) **Introductory Plant Biology 150** - Consult Department of Botany.

(BLG 160) **Introductory Animal Biology 160** - Consult Department of Zoology and Entomology.

(BLG 260) **General Microbiology 260** - Consult Department of Microbiology and Plant Pathology.

**(EKN 151, 152) Economics 151, 152** - Consult heading: Courses offered by other Faculties in this publication.

**(ENG 103) English 103** - Consult heading: Courses offered by other Faculties in this publication.

**(GTS 124) Genetics 124** - Consult Department of Genetics.

**(SCI 150) Natural Science 150** - Consult heading: Courses offered by other Faculties in this publication.

**(SCI 160) Natural Science 160** - Consult heading: Courses offered by other Faculties in this publication.

**(SCI 161) Physics 161** - Consult heading: Courses offered by other Faculties in this publication.

**(STK 110) Statistics 110** - Consult heading: Courses offered by other Faculties in this publication.

**(STK 131) Statistics 113** - Consult heading: Courses offered by other Faculties in this publication.

**(STK 123) Statistics 123** - Consult heading: Courses offered by other Faculties in this publication.

**(LBU 325) Agroclimatology 325 (3 l.p.w. + 1 p.) (9 credits)**

Climate of Southern Africa. Irradiation and energy balance. Hydrologic cycle with special reference to downpour and evaporation from vegetative surfaces. Wind breaks and frost control. Influence of climate on farming systems. Instrumentation and measurement of downpour, evaporation, radiation, temperature, humidity and wind.

**(LBU 481) Applied Land-Use Planning 481 (3 l.p.w. + 1 p.) (9 credits)**

Principles and techniques for collection and interpretation of physical, sociological and economic data required for the drafting of a land-use plan; principles of interaction with experts from different disciplines; drafting of an integrated land-use plan; consideration of alternatives; the systems approach to land-use planning; planning with, and not for, people.

**(LBU 482) Land Use Planning Project 482 (3 p.) (9 credits)**

Practical drafting of a land-use plan for a selected field of study; defending of the proposed plan in an oral examination before a panel of examiners.

**(ARD 481) Agricultural and Rural Development Principles 481 (4 l.p.w.) (8 credits)**

Agriculture and economic development; agricultural development and structural change in less developed areas; economic and social theory of agricultural development; sources of accelerated change in agriculture - investment in technology, institutions and human capital; policy and programmes for agricultural development; acceleration of agricultural development; agricultural development in Southern Africa - policy and programmes.

**(ARD 482) Resources and Development 482 (4 l.p.w.) (8 credits)**

Overview of the most important physical-biological agricultural resources - soil, water, climate, topography, plant species, animal species; differences in characteristics, quality and vulnerability; understanding optimal land-use; resource conservation; general ecological principles; examples of problems caused by misapplication of physical-biological resources and land-use during development planning; principles of meaningful transfer of technology.

**(ARD 483) Social Dimensions 483 (4 l.p.w.) (8 credits)**

The time-delay phenomenon; man as key dimension in change; the nature, objectives and ethics of development and extension; change in conduct, adoption and diffusion of innovations; agricultural communication; approaches to development and programming; group dynamics, leadership and community participation; the agent of change and its authenticity; consequences of change.

<b>DEPARTMENT OF AGRICULTURAL ECONOMICS, EXTENSION AND RURAL DEVELOPMENT</b>
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**(AGV 410) Agrarian Extension 410: (2 l.p.w.) (4 credits)**

The objective, philosophy and ethics of extension. Technology and agricultural production. Distribution and diffusion of technology. Group dynamics, the functioning and handling of groups. Leadership, leadership functions and types. Extension organisation.

**(AGV 421) Communication 421: (2 l.p.w.) (4 credits)**

Communication: Definition and clarification of concepts. Theory and elements of communication. Verbal and non-verbal communication. Determinants of interpersonal communication. Abating factors impeding communication. Nature, classification and efficiency of communication channels.

**(AGV 481) Philosophy, Organisation and Management of Extension 481:  
(4 l.p.w) (8 credits)**

The history of agricultural extension; phases of development, extension in other countries; nature, philosophy and objectives of extension; ethics in extension; models of organisations; personnel management; administration; seminar.

**(AGV 482) Leadership and Group Dynamics 482: (4 l.p.w.) (8 credits)**

The group as channel and instrument in extension; definitions and characteristics; group formation; theories of group functioning; internal and external group dynamics; group techniques and evaluation; rural groups and their application; definitions and theories of leadership; types, kinds and functions of leadership; the extension officer as professional leader; opinion leadership; training of leaders; seminar.

**(AGV 485) Community Extension and Development 485: (3 l.p.w. + 1 p.)  
(9 credits)**

The relation between rural sociology, community development and extension; physical and social structures of communities; cultural and value systems; social stratification; development as change; process and ethical norms; principles and functions of community development; development obstructions; method and models.

**(AGV 487) Extension Programming 487: (3 l.p.w. + 1 p.) (9 credits)**

Definitions, concepts and models; philosophy principles and assumptions, motives and tenets; institutional linkages with and participation of communities; reconnaissance surveys, problem identification and delineation; problem conceptualisation as technique: technical-economical and human conceptualisation, questionnaire construction, planning and analysis of surveys, formulation of objectives, identification of activities and activity planning, development of work calendar and planning of evaluation.

**(AGV 488) Evaluation of Extension 488: (4 l.p.w.) (8 credits)**

Meaning, extent and place of evaluation in extension; characteristics of a science (extension science); extension science; the process of research and evaluation; problem identification; theory and hypothesis; objectives; literature research and sources of information; sampling; methods and collection of data; criteria of efficiency; quality of measuring instruments; construction of scales; interviewing; statistical methods; research reporting; computer programming; practical exercises.

**(AGV 489) Adoption and Diffusion 489: (4 l.p.w.) (8 credits)**

The nature and purpose of extension; definitions; psychological foundations and dynamics of human behaviour; theories and models of decision-making and change in conduct; the field theory, theory and practice; characteristics and acceptance of innovations, factors determining behaviour, categories of acceptance. Diffusion: clarification of concepts; theory of concepts; models and factors influencing the flow of communication; findings and deficiencies of empirical research; seminar.

**(LEK 210) Agricultural Economics 210: (3 l.p.w.) (6 credits)**

Introductory farm management and production economics: the economic, social and natural environment and nature of agriculture. Basic production-economics. Production factors, management functions, profitability and farm planning. Basic theoretical principles of resource utilisation. Resource combination. Product combinations and costs. Introduction to agricultural financing and financial management. Risk and uncertainty. Profitability.

**(LEK 220) Agricultural Economics 220: (3 l.p.w.) (6 credits)**

Marketing of agricultural products and requisites. Evolution of agricultural marketing arrangements in South Africa. Market analysis: Price, income and cross elasticities, market structure, price determination, alternative ways of price determination, consumer behaviour. Futures markets.

**(LEK 310) Agricultural Economics 310: (3 l.p.w.) (6 credits)**

Agricultural policy: History of South African agriculture and historic development of agricultural policy. Aspects of agricultural policy: The role of agriculture in economic development. Macro economic policy and agriculture. Policy analysis: General equilibrium theory; pareto-optimality, welfare principles.

**(LEK 320) Agricultural Economics 320: (3 l.p.w. + 1 p.) (9 credits)**

Farm management economics: Introduction to farm management. Farm planning aids: Record system, sensitivity analysis, stochastic dominance, capital and cash-flow budgets, linear programming. Estate planning. Taxation. Business types. Labour and capital utilisation. Strategic farm management.

**(LEK 321) Agricultural Economics 321 (1 l.p.w) (6 units)**

Information economics and concepts underlying the functioning of financial markets, financial analysis of agri-businesses, capital theory and investment analysis, asset valuation, risk theory and portfolio analysis, risk management and pricing, lender-borrower relationships, structural issues in agriculture and rural financial markets.

**(LEK 410) Agricultural Economics 410: (3 l.p.w. + 1 p.) (9 credits)**

Empirical market analysis: Analytic framework for the analysis of market and marketing problems. Empirical analysis of supply and demand, price and price trends. Price difference and price changes. Price and quantity indices. International trade. The WTO and the Southern Africa customs union agreement: Policy and development implications. Research methodology.

**(LEK 421) Agricultural Economics 421: (3 l.p.w. + 1 p.) (9 credits)**

Production economics and planning: The production function, input-input and output-output relationships, cost functions. Economies of size. Time as production factor. The dynamics of farm management and planning. Farm analysis and programming. Resource economics: Resource availability, allocation and establishment; land settlement; resource decision making. Assignment.

**(LEK 422) Agricultural Economics 422: (3 l.p.w.) (6 credits)**

Agricultural development: Agricultural development planning and policy. The role of agriculture in economic development. The economics of subsistence agriculture in less developed areas. Theories and models of agricultural development. Policies and programmes for agricultural development. Agricultural development in Africa and Southern Africa.

**(LEC 414) Resource Economics 414: (3 l.p.w.) (6 credits)**

The nature of resource economics. Natural resources. Benefit-cost analysis. Welfare principles. Decision-making in public projects. Environmental economics. Seminars.

**DEPARTMENT OF ANIMAL AND WILDLIFE SCIENCE**

**Courses for BSc(Agric)**

**(DAN 210) Animal Anatomy 210: (2 l.p.w. + ½ p.) (6 credits)**

General plan of the animal body. Anatomy and histology of tissues, organs and systems in domestic animals. The skeleton, nervous system, skin, muscles, joints and circulatory system. Demonstrations on skeletons and animals.

**(DAN 220) Animal Anatomy 220: (2 l.p.w. + ½ p.) (6 credits)**

Anatomy of skeletal muscles, respiratory system and kidneys. Anatomy of the digestive systems of monogastric and ruminant animals. Dissections and demonstrations on carcasses and animals.

**(DAN 310) Animal Anatomy 310: (1 l.p.w. + ½ p.) (4 credits)**

Functional anatomy, growth and development of tissues and organ systems. Changes during maturation, reproduction, the post-partum period and lactation. Ageing and tissue changes with erosion diseases. The influence of hormones, production and reproduction on conformation and a critical evaluation of assessment of animals for functional efficiency.

**(DFS 210) Animal Physiology 210: (2 l.p.w. + ½ p.) (6 credits)**

Chemical composition of the animal body. Cells, tissues and systems in the animal body. Body water. Physiology of the nervous system, sensory organs, blood, circulatory system, respiration and endocrinology.

**(DFS 220) Animal Physiology 220: (2 l.p.w. + ½ p.) (6 credits)**

Neuro-endocrinology, acid-base balance, pH-homeostasis of the animal body, kidneys, Digestive physiology, lactation physiology and the RE-system.

**(DFS 311) Animal Physiology 311: (2 l.p.w.) (4 credits)**

Homeostasis and Homeorhesis in animals: Thermoregulation. Adaptation of glucose, lipid and protein metabolism in response to short and long-term changes in the supply and balance of nutrients and to changes in tissue-demand for nutrients during different physiological states. Deviations from normal homeostasis, metabolic diseases and the prevention thereof. Pathogenesis of inflammation and infections; immunity.

**(DFS 320) Growth Physiology 320: (2 l.p.w. + ½ p.) (6 credits)**

The underlying physiological processes in growth and development. Pre- and post-natal growth and factors which determine growth rate: growth curves, stimulants of growth, age, nutrition, race, gender, et al.

**(VDG 220) Nutrition 220: (3 l.p.w. + ½ p.) (8 credits)**

Nutrition in the context of growth, development and composition of organisms. Metabolic processes and control in the body. Overview of nutritional processes. The study of the fundamental principles of nutrient metabolism (including macro- and micro-nutrients and water) with reference to digestion, absorption, transport, excretion, functions, effect/s of an excess and/or a deficiency, recommendations and feed sources. Applications are made regarding man and animals.

Practical work: Experimental work and problem orientated tasks.

**(GVK 420) Large Stock Science 420: (2 l.p.w. + ½ p.) (6 credits)**

Industrial science and management of large stock. Revision of the principles of agricultural management. Aspects of business management of the large stock enterprise. Management programmes, production systems and techniques applicable to beef cattle, dairy cattle and horses. Design and planning of farm buildings and structures. Storage and handling of fodder. The handling and management of refuse. Hygiene and herd health programmes.

**(KVK 420) Small Stock Science 420: (2 l.p.w. + ½ p.) (6 credits)**

Small stock management, shearing organisation, sheds and equipment, pens, dipping, drinking and feeding facilities. Preparation and marketing of hides, mohair and karakul. Lambing seasons and herd management. Management programmes for the production of wool, meat, karakul pelt and mohair according to the particular ecological region and for conditions of drought. Herd health programmes.

**(PVK 410) Poultry Science 410: (2 l.p.w. + ½ p.) (6 credits)**

Applied poultry science: management of poultry species according to the respective production systems; management of nutrition and breeding; health and hygiene programmes; quality of poultry products.

**(RPL 310) Reproduction Science 310: (1 l.p.w. + ½ p.) (4 credits)**

Theriogenology, spermatogenesis, zoogenesis, the female sexual cycle. Species differences. Hormonal control of the sexual functions.

**(RPL 320) Reproduction Science 320: (2 l.p.w. + ½ p.) (6 credits)**

Artificial insemination. Semen collection techniques, the evaluation, dilution and conservation of semen. Collection, conservation and transfer of embryos. Collection of ova and in vitro fertilisation. Handling of apparatus and practical insemination, oestrus observation and determination of gestation.

**(TLR 320) Animal Breeding 320: (2 l.p.w. + ½ p.) (6 credits)**

Introduction to applied breeding of animals; basis of heredity: cells, chromosomes and gametes, genes and mutations. Phenotypical showing of genes and different forms of interaction between genes. Gene frequencies. Comparison of qualitative and quantitative heredity. Population genetics: biometrical concepts, population parameters and their calculation. Selection: efficiency, methods and aids. Breeding evaluation. Breeding systems.

**(TLR 411) Animal Breeding 411: (2 l.p.w. + ½ p.) (6 credits)**

Advanced theory in (co)variance estimations of characteristics in farm animals. Correlations of heredity and genetic correlations and their uses in breeding systems. Economically important characteristics. Index selection and estimation of indexes. Biometry of herd data: frequency distribution, normality, variances, scaling and transformations. Breeding values: estimation and use. Mating systems: inbreeding, hybridisation and assortive/disassortive mating in cattle; circumstances in which it can be used. Selection for growth efficiency, reproduction etc. Breeding structures and group breeding schemes.

**(TLR 420) Animal Breeding 420: (2 l.p.w. + ½ p.) (6 credits)**

Applied breeding: Performance testing of livestock, the associated legislation and administration. The analyses, interpretation and application of performance test data. Livestock breed societies and related industries.

**(VGE 301) Nutritional Science 301: (3 l.p.w. + ½ p.) (8 credits per semester)**

Digestion and metabolism of fodder. The division of food energy and food energy systems. Protein quality and requirements. Mineral and vitamin requirements. Nutrition standards. Voluntary intake. Water quality. Characteristics of fodder. Rumen function and microbial fermentation.

Practical work: In vivo and in vitro digestibility studies.

**(VGE 411) Nutritional Science 411: (4 l.p.w. + ½ p.) (8 credits)**

Specialised nutrition of monogastric animals: poultry, pigs, horses and selected freshwater aquatic organisms. The use of computer systems in feeding management.

**(VGE 421) Nutrition Science 421: (3 l.p.w. + ½ p.) (8 credits)**

Specialised small stock and game nutrition. Nutrition of rams, ewes and lambs for optimal production. Principles of creep feeding, drought feeding, winter and supplementary feeding. Feeding pen nutrition and final nutritional preparation of lambs. Influence of nutrition on wool, pelts and Angora wool. Nutrition of meat and milk goats. Fodder flow planning. Nutrition for contained game and extensive supplementary feeding. Feeding approach in respect of leaf and grass eaters. Habitat differences.

Practical work: Formulation of lowest cost rations and practical work with ruminants.



**(VGE 423) Nutrition Science 423: (3 l.p.w. + ½ p.) (8 credits)**

Specialised nutrition of beef and dairy cattle according to production systems. The use of computer systems in feeding management. The practicals will include compiling rations in terms of requirements and least cost formulations, specialised assignments and on-farm experimental training.

**(VKD 410) Pig Science 410: (1 l.p.w. + ½ p.) (4 credits)**

Industrial science and management of pigs - sow, boar and growing pigs. Production systems and feeding systems. Design and utilisation of housing facilities. Product quality and marketing. Hygiene and herd health programmes.

**(VKF 411) Animal Science Pharmacology 411: (3 l.p.w. + 0 p.) (4 credits)**

The pharmacology, laws, control and use of substances for animal production.

**(VKU 210) Animal Science 210: (2 l.p.w. + ½ p.) (6 credits)**

A global overview of the livestock industry. Historical background on the origin of animals. Principles of animal product production. Stock science. Animal production systems. Stock farming regions of South Africa. Practical work includes the introduction to general care and handling of farm stock.

**(VKU 211) Animal Science 211: (2 l.p.w. + ½ p.) (6 credits)**

General principles of breeding of farm stock, viz. large stock, small stock, poultry and pigs. Heredity and race improvement.

**(VKU 220) Animal Science 220: (1 l.p.w. + 0 p.) (2 credits)**

Introduction to the basic principles and terminology of large stock, small stock, pig and poultry production systems.

**(VKU 221) Animal Science 221: (1 l.p.w. + ½ p.) (4 credits)**

The management of farm stock. Reproduction, health, housing and farm structures. Production systems and general feeding. Supplementary nourishment. Economy of feeding.

**(VKU 222) Animal Science 222: (2 l.p.w.) (4 credits)**

The chemical composition of fodder. Digestive processes and the digestibility of fodder. The nutrition and nutritional requirements of farm stock. Basic composition of rations. Intensive and extensive feeding.

**(VKU 411) Seminar 411: (1 l.p.w. + 0 p.) (2 credits)**

Literature studies and seminars in Animal Science.

**(VKU 412) Research Methodology 412: (1 l.p.w. + 0 p.) (2 credits)**

Research methodology in Animal Science: Handling of queries, introduction to the problem, approach to problem solving, reporting. Practice.

**(VLE 401) Meat Science 401: (1 l.p.w.) (2 credits per semester)**

Seminars and discussions of special topics and new developments in the meat industry. Research methodology.

**(VLE 410) Meat Science 410: (2 l.p.w. + ½ p.) (6 credits)**

Meat species. Composition of carcass and meat. Evaluation. Muscle to meat. Slaughtering process. Quality, storage and preservation of meat. Eating quality and nutritional value. Hygiene. Marketing. The role of the producer, wholesale and retail dealers and the consumer. The Meat Board and the meat industry.

**(VNE 310) Animal Ecology 310 (1 l.p.w.) (2 credits)**

Animal ecology, interaction between genotype and environment. Animal-ecological factors which influence regional classification. Animal ecology factors which must be taken into consideration in the obtaining of the production factors, planning and management of the cattle farming enterprise. Conservation farming and adapted farming and management systems; environmental conservation.

**(VSX 420) Meat and Dairy Science 420: (2 l.p.w. + ½ p.) (6 credits)**

Meat industry. Meat species. Composition of carcass and meat, slaughtering process and meat quality. Hygiene and marketing. The role of the producer, wholesale and retail dealers and the consumer. Dairy industry. Composition and nutritional value of milk and factors that influence it. Lactation. Milk production, milk quality and marketing.

**(WKE 420) Wildlife Science 420: (2 l.p.w. + ½ p.) (6 credits)**

Introductory aspects of wildlife conservation, habitat managements, wildlife nutrition and keeping wildlife in game reserves.

**(WLK 410) Wool Science 410: (2 l.p.w. + ½ p.) (6 credits)**

Development of follicles and growth of wool. The morphology, physical and chemical characteristics of wool, mohair and cashmere fibres. The classing, marketing and processing of wool, mohair and cashmere. Physical testing. Regulations with regard to the classing and packaging of wool. Class standards of the NWGA.

**Courses for BlnstAgrar:**

**(APZ 221) Production Physiology 221: (3 l.p.w. + ½ p.) (7½ credits)**

General overview of the body of an animal. Anatomy and physiology of fibres, organs and systems. The physiological adaptation mechanisms of an animal, its reaction to the environment, digestion of food and absorption of nutrition.

**(APZ 311) Livestock Breeding 311: (2 l.p.w. + ½ p.) (5½ credits)**

Theory of population and quantitative genetics. Gene function and expression. Mendelic heredity. Gene frequencies. Qualitative hereditary characteristics in livestock.

**(APZ 312) Production Physiology 312: (2 l.p.w. + ½ p.) (5½ credits)**

Reproduction physiology, oogenesis, the oestrous cycle, female fertility, environmental stimuli and synchronising mechanisms, spermatogenesis, male fertility, functional fertility, venereal diseases and control, KI, transfer of embryo and growth.

**(APZ 313) Livestock Nutrition 313: (4 l.p.w. + ½ p.) (9½ credits)**

Nutritional needs of ruminant and monogastric livestock according to type and physiological status, quality control of fodder, symptoms of nutritional deficits.

*Capita Selecta:* (A) Monogastric application (2 l.p.w. + ¼ p.)  
(B) Ruminant application (2 l.p.w. + ¼ p.)

**(APZ 321) Livestock Products 321: (2 l.p.w.) (4 credits)**

Quality parameters and factors which influence the quality of meat, wool, hair, milk and eggs, including possible risks to human health.

**(APZ 324) Stock Nutrition 324: (4 l.p.w. + ½ p.) (9½ credits)**

Applied nutrition and nutritional management in different production systems. Ration formulation. Feeds and feed additives.

**(APZ 325) Livestock Breeding 325: (2 l.p.w.) (4 credits)**

General principles in breeding of livestock (cattle, small stock and pigs). Heredity and breed improvement. Selection and mating systems. National livestock improvement schemes.

**(APZ 412) Livestock Ecology 412: (3 l.p.w. + 1 p.) (9 credits)**

Interaction between livestock and the environment: specific adaptation mechanisms and management of resources to optimize biological efficiency. Selected literature study and discussion classes.

**(APZ 422) Livestock Management 422: (3 l.p.w. + 1 p.) (9 credits)**

Functional drive in beef and dairy cattle, sheep and goats. Management programmes and intensive, extensive production systems. Seminars, discussions and literature studies on animal nutrition, breeding, production, planning and management systems and marketing.

**(APZ 423) Livestock Management 423: (3 l.p.w. + 1 p.) (9 credits)**

Functional management of pigs, poultry and aquaculture. Management programmes and production systems, seminars, discussions and literature studies on animal nutrition, breeding, production, planning and management systems and marketing.

<b>DEPARTMENT OF BIOCHEMISTRY</b>
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**(BCM 216) Proteins and Enzymes 216: (2 l.p.w. + ½ p) (6 credits)**

General structure-function relationships of proteins. Specific examples: myoglobin, haemoglobin, collagen and antibodies. Principles for purification and characterisation. Biocatalysis: the functioning, kinetics and regulation of enzymes. Practical work: buffer action; methods for the purification and determination of proteins.

**(BCM 217) Carbohydrate Metabolism 217: (2 lectures and ½ p) (6 credits)**

The properties of carbohydrates. Bio-energetics. Anaerobic and aerobic carbohydrate metabolism. Photosynthesis. The regulation of carbohydrate metabolism. Practical work: assay of glycolysis, respiration and oxidative phosphorylation.

**(BCM 226) Lipid and Nitrogen Metabolism 226: (2 lectures and ½ practical class) (6 credits)**

Lipids, membranes and lipid metabolism. Nitrogen metabolism: fixation, excretion, amino acid and nucleotide metabolism. Integration of carbohydrate, lipid and nitrogen metabolism.

Practical work: determination of glycerides, cholesterol, plant pigments, urea and activity of amino acid transferases.

**(BCM 227) Biosynthesis of Macromolecules 227: (2 lectures and ½ practical class) (6 credits)**

The metabolism of nucleic acids and proteins. The characteristics and action mechanisms of selected hormones.

Practical work: Determination and characterisation of nucleic acids.

**(BCM 228) Practical Work 228: (1 practical class) (Only for students majoring in Biochemistry) (3 credits)**

The isolation, purification, and determination of the kinetic characteristics of an enzyme.

**(BCM 312) Protein Chemistry 312: (2 l.p.w. + 1 p.) (7 credits)**

The chemistry and biochemistry of amino acids, peptides and proteins; protein structure and its determination; the isolation and characterisation of proteins.

**(BCM 321) Enzymology 321: (1 l.p.w. + 1 p.) (5 credits)**

Enzymology, including determination of activities, multi-substrate responses, enzyme kinetics, computer-assisted simulations and mechanistic models.

**(BCM 322) Biomembranes 322: (1 l.p.w. + 1 p.) (5 credits)**

The metabolism of glycerolipids, sphingolipids, cholesterol, lipoproteins; the composition, structure and transport mechanisms of biological membranes.

**(BCM 411) Molecular Biology of Nucleic Acids 411: (1 l.p.w. + 1 p.) (5 credits)**

Physical-chemical characteristics of nucleic acids and their building-blocks. Enzymology of DNA and RNA scission, joining, replication and synthesis. Principles of DNA and RNA isolation, hybridisation, sequence determination, gene mapping and blotting techniques. Introduction to DNA manipulation and vectors.

**(BCM 423) Immunobiochemistry 423: (2 l.p.w. + 1 p.) (7 credits)**

Chemical and biochemical views of immunology, the chemical nature and quantification of antigens and antibodies, molecular aspects of the recognition, processing and presentation of antigens and the histocompatibility complex, activation and regulation of the immune response.

**(BCH 311) Biochemistry 311: (1 l.p.w.) (2 credits)**

The composition, structure-function relationships, molecular mechanisms of action and metabolism of specialised systems such as the muscle, nerves, blood, connective tissue, eye and kidneys.

**(BCH 400) Biochemistry 400: (2 p. p. w.) (6 credits)**

Advanced biochemical research methodology.

**(BCH 412) Biochemistry 412: (2 l.p.w.) (4 credits)**

A study of metabolic control, including mechanisms of hormone functioning and second messengers, the thermodynamic and kinetic aspects of regulated enzymes and the integration of metabolic pathways under different energy conditions.

**(BCH 413) Biochemistry 413: (1 l.p.w.) (2 credits)**

Biochemical principles of nutrition, including carbohydrates, lipids, proteins, vitamins, nutritional disturbances and metabolic states of disease.

**(BCH 421) Biochemistry 421: (1 l.p.w.) (2 credits)**

The chemistry and biochemistry of foreign metabolites, including antibiotics, plant, animal and microbe toxins, tranquillizers, insecticides and rodenticides.

**(BCH 422) Biochemistry 422: (Equal to 1 l.p.w.) (2 credits)**

Seminars on the most recent developments in the different fields of Biochemistry.

**(BCH 424) Biochemistry 424: (1 l.p.w. + ½ p.) (4 credits)**

Physical-chemical characteristics of carbohydrates, including stereochemistry and structure determinations, chemical synthesis of oligonucleotides and glycopeptides, biosynthesis and characteristics of glycoproteins, lectins.

<b>DEPARTMENT OF BOTANY</b>
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**(BLG 113) Biology: Botany 113: (4 l.p.w. + 1 p.) (11 credits)**

Introductory Botany: morphology and anatomy; reproduction; cytology.

Plant taxonomy: five kingdom system; principles of taxonomy; regnum Monera, Protista, Fungi and Plantae.

Plant ecology: ecosystem; Southern African flora.

Plant physiology: energy; composition of matter; inorganic and organic compounds; photosynthesis; respiration; protein biosynthesis; water economy of plants; growth, movement and flower formation.

**(BLG 150) Introductory Plant Biology 150: (3 l.p.w. + 1 p.) (9 credits)**

Plant morphology and anatomy (structure), reproduction, plant taxonomy: principles of taxonomy, five kingdom system.

**Excursions**

Attendance of excursions as determined by the Head of the Department in BOT at the 200 as well as the 300 level, is compulsory for students with Botany in their study programme. Excursions may be organised over weekends and recesses.

**(BOT 120) Introductory Botany 120: (4 l.p.w. + 1 p.) (11 credits)**

Aspects of the carbon cycle: greenhouse effect, parasitic flowering plants. Reproductive biology: flowering, pollination, fertilisation, fruit and seed development, seed physiology. Mineral nutrition: essential elements, insectivorous plants. Secondary compounds: medicinal compounds. Morphology: roots, stems, leaves, flowers, fruits and seeds. Plant biodiversity and diagnostic characteristics of selected families.

**(BOT 213) Anatomy of Vascular Plants 213: (1 l.p.w. + 1 p.) (5 credits)**

Anatomy of vascular plants: cytology; build of vascular plants; function (physiology) and relationships (taxonomy); cell and tissue types of roots, stems and leaves; origin, differentiation and function of different tissue types; ecological adaptations.

**(BOT 214) Plant Conservation 214: (1 l.p.w.) (2 credits)**

Principles of plant geography and plant conservation; types and characteristics of plant diversity; botanical diversity in southern Africa; centres of plant endemism; mapping of plant diversity; invader plants; rare, threatened and extinct plants; red data lists.

Methods of diversity measurement. Conservation and management: in situ plant conservation (conservation areas); off-site or ex situ plant conservation (botanical gardens); modified areas (agricultural areas). International conventions and local conservation

legislation; conservation status of southern African vegetation types. Plant diversity and global climatic change.

**(BOT 215) Plant Ecological Techniques 215: (1 p) (3 credits)**

Quantitative plant ecological techniques: measurements and analysis of vegetation; plot and point methods; floristic composition, structure of vegetation, density, frequency, cover, bioweight and field condition.

**(BOT 216) Plant Diversity and Evolution 216: (1 l.p.w.) (2 credits)**

Introduction to plant taxonomy; homology versus analogy; tests for homology; principles of evolution; evolution of characters – the determination of primitive characters and evolutionary trends with reference to the Anthophyta; evolution of seed plants; evolution at molecular level.

**(BOT 217) Plant Growth Control Mechanisms 217: (1 l.p.w.) (2 credits)**

Influence of plant hormones on plant growth. Control of tropic and nastic movements: insect-eating plants, creepers and the kruidjie-roer-my-nie. Phototropism. Photoperiodism: Plants distinguish between seasons through measurements of daylength. Control of life processes through phytochrome.

**(BOT 224) Environmental Factors 224: (1 l.p.w.) (2 credits)**

Environmental factors: physical environmental factors such as soil, water, radiation, temperature, wind and fire, interactions between plants and particular environmental factors; morphological and physiological adaptations.

**(BOT 227) Introductory Ecology 227: (1 l.p.w.) (2 credits)**

Basic ecosystem concepts and processes: flow of energy, production, tropical levels, nutritional cycles. Dynamics and stability: plant growth and degradation. Biodiversity. Interaction of species. Man and ecology: pollution, resource utilisation and urban ecology.

**(BOT 228) Plant Utilisation 228: (1 l.p.w. + 1 p.) (5 credits)**

Taxonomy: classification, identification, nomenclature (species and cultivars). Plant families: economic potential. Southern African flora: distribution, diversity, economic potential. People and plants: food, medicine, fuel, horticulture, ornamental plants, landscape architecture, water, construction material, household utensils, cottage industry. Conservation and sustainable utilisation.

**(BOT 229) Introductory Plant Physiology 229: (1 l.p.w. + 1 p.) (5 credits)**

Water relations: diffusion and osmosis, osmotic properties, physiology of stomata, transpiration. Mineral nutrition: essential nutritional elements, sand and water cultures, mineral element deficiencies. Phloem transport: transport of organic materials in plants. Stress physiology: water, temperature, oxygen and salt stress. Basic laboratory techniques, preparation of solutions, determination of water and osmotic potential, spectrophotometry, bio-activity of medicinal compounds.

**(BOT 301) Research Report 301: (1 p. per semester) (3 credits per semester)**

A research report on a specific prescribed topic in Botany under supervision of a lecturer. The student must carry out independent literature surveys.

**(BOT 313) Reproductive Biology 313: (1 l.p.w. + ½ p) (4 credits)**

Reproductive biology of phanerogams: historical overview; functional flower morphology and phenology; reproductive systems (sexual, apomictic and vegetative); pollen and

stigma biology; pollination syndromes: advertising and reward by flowers, the plant to pollinator interaction, abiotic pollination; inbreeding, outbreeding and incompatibility.

**(BOT 316) Secondary Metabolites 316: (1 l.p.w.) (2 credits)**

Major groups of secondary metabolites: biosynthesis, role of these compounds in the protection of plants, synthesis of secondary compounds as defence against herbivory, secretions that attract predators of aphids. Medicinal compounds found in plants. Compounds responsible for the colour of flowers. Attraction of pollinators to plants.

**(BOT 317) Fungus Biology and Technology 317: (1 l.p.w. + 1 p.) (5 credits)**

Saprotrophs and ecosystems: the role of fungi in ecosystems, substrate groups and feeding strategies; the important fungi in ecosystems, microfungi, macrofungi, yeasts; fungi in communities and succession, fungus communities, substrate succession, important habitats. Parasitism and mutualism: fungi-plant relationships, fungi-animal relationships, fungi-other organism relationships. Fungi and biotechnology.

**(BOT 320) Population Dynamics 320: (1 l.p.w.) (2 credits)**

Plant demography; life tables; simple population models; regulation of plant populations; evolutionary ecology; interaction and competition; symbiosis and the recess.

**(BOT 323) Plant Systematics 323: (1 l.p.w.) (2 credits)**

Principles of plant systematics: principles of flowering plant classification; concept of species and family; development of plant taxonomy; cladistic approach and principles and rules on the naming of plants.

**(BOT 324) Classification and Identification 324: (1 l.p.w. + 1 p.) (5 credits)**

Sources of taxonomic information for the identification and classification of plants; contributions by morphology, anatomy, chemistry, cytogenetics, plant geography, ecology and fossils; role of herbarium and library.

Practical naming of plants: Southern African flora; diagnostic characteristics of family and species; keys; herbarium specimens.

**(BOT 325) Plant Community Ecology 325: (1 l.p.w. + 1 p.) (5 credits)**

Phytosociology: principles and methods for quantitative analysis, taxonomy, description and ecological interpreting of vegetation; Braun-Blanquet method for classification of vegetation; techniques of classification; computer techniques.

**(BOT 326) Plant Productivity 326: (2 l.p.w. + 1 p.) (7 credits)**

The mechanism of the photosynthetic capturing of light by leaf canopies and its relation to yield, drought adaptations by C<sub>4</sub>- and CAM-plants, photorespiration and harvest yield, plastid-cytosol interactions and carbon partitioning in plants, alternative respiration, growth- and maintenance respiration, infection process and the mechanism of nitrogen fixation, uptake of nitrate and ammonia and transport of nitrogen compounds in plants, plant reaction to the environment, coping of environmental stress by higher plants.

**BSc(Hons)**

One of the following sections in Botany must be studied, as field of specialisation:

(a) Ecology (b) Physiology (c) Mycology (d) Reproductive Biology (e) Taxonomy

**NB:** BLG 113 is only for BInstAgrar students and students in a teaching field of specialisation.

BLG 150 is only for BInstAgrar, BSc Extended Programme and BSc(Ed) students.

**DEPARTMENT OF FOOD SCIENCE**

**(VDW 211) Food Science 211: (2 l.p.w. + 1 p.) (7 credits)**

Introduction to Food Science. Food Science as discipline. How food is produced, processed and distributed. Nutrition. Constituents of foods. Food Quality. Food deterioration and control. Food processing and preservation. Food safety, risks and hazards. Selected food industries. Principles of food packaging. Food legislation and labelling. Food processing and the environment. Practical work: food processing and preservation; factory visits.

**(VDW 222) Food Science 222: (2 l.p.w. + ½ p.) (6 credits)**

Principles of food processing and preservation. Food processing steps: handling of raw material, cleaning, sorting and grading. Conversion processes: blending and emulsification, homogenisation, extrusion. Preservation methods: heat (blanching, pasteurisation and sterilisation); cold (refrigeration and freezing); concentration (evaporation); drying (freeze drying); irradiation; microwave heating. Shelf life of processed food. Practical work: demonstration of the above-mentioned processes; physical and sensory evaluation of processed food products; factory visits; one assignment per student to illustrate hurdle technology with regard to a food product.

**(VDW 223) Food Science 223: (2 l.p.w. + ½ p.) (6 credits)**

The origin of the dairy industry: its development and present scope in South Africa. The composition and nutritional value of milk. Microbiological aspects of milking; milk reception tests. Lactation. Mechanisation of the process of milking. Farm dairy buildings. Production, care, defects and purchase of milk. Economic considerations in milk production. Emphasis is placed throughout on the influence of the various aspects on the quality of milk.

Practical work: chemical and microbiological tests on milk; by-product recovery; visit to dairy facilities on experimental farm; manufacturing of some products.

**(VDW 314) Food Science 314: (2 l.p.w. + 1 p.) (7 credits)**

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

**(VDW 315) Food Science 315: (2 l.p.w. + ½ p.) (6 credits)**

Fruit and vegetable technology. Overview of structure and composition. Post-harvest physiology and biochemistry. Quality evaluation of fresh produce. Post-harvest handling: storage, packaging and transport; extension of shelf life of fresh and minimally processed products. Preprocessing. Processing and/or preservation: canning, freezing, dehydration, concentration, fermentation, juice extraction, irradiation. Quality evaluation of processed products.

Practical work: practical execution of the processes discussed above.

Determination of preprocessing on losses, colour and texture; inhibition of enzymic browning; bottling cans and retort pouches; juice extraction; freeze drying; factory visits; execution and reporting of a project on extended shelf life of a fresh juice or of minimally processed products.



**(VDW 324) Food Science 324: (2 l.p.w. + 1 p.) (7 credits)**

Food Chemistry. Chemistry of the minor food components: Vitamins, minerals, additives and contaminants. Chemical and nutritional aspects of food processing: implications of different processing techniques on food components. Functional properties of food components. Food analysis methodology.  
Practical work: Food analysis.

**(VDW 332) Food Science 332: (3 l.p.w. + 1 p.) (9 credits)**

Oil seeds and legumes. Morphology, composition, processability, functional characteristics and food applications of the most important legumes and oil-seeds (soy beans, peanuts, sunflower seed).  
Practical work: Factory practical work.

**(VDW 343) Food Science 343: (2 l.p.w. + 1 p.) (7 credits)**

Sugar, beverages and confectionary. Study of characteristics, processing equipment as well as formulations of ingredients which are used in the manufacture of sugar and chocolate confectionary. Non alcoholic beverages (fruit juices and milk excluded) and alcoholic beverages (wine, beer and spirits). Practical work: demonstration and viewing of appropriate equipment and processes. Factory visits. Manufacturing of products.

**(VDW 400) Food Science 400: (2 l.p.w.) (4 credits)**

Seminar. Reports on and discussions of special topics and new developments in the food industry.

**(VDW 411) Food Science 411: (2 l.p.w. + 1 p.) (7 credits)**

Dairy microbiology. The microbial population of milk and dairy products. Genera and species of micro-organisms important to the dairy industry. Microbiological defects in dairy products: their causes and prevention. Microbiological aspects of pasteurisation, sterilisation and cooling of milk. Starter cultures and sour milk beverages; monitoring of the COD content of factory discharges.  
Practical work: Microbiological analytical methods for the dairy industry. Handling of starter cultures. Tests for sterility of factory equipment and packaging materials.

**(VDW 416) Food Science 416: (2 l.p.w. + ½ p.) (6 credits)**

Animal food products. The red meat industry in South Africa. The composition of muscle tissue, the transformation from muscle to meat and the composition of meat. The slaughtering process and its effect on meat quality. The poultry and fishing industries in the RSA. The composition, processing, preservation and deterioration of poultry meat and fish. The use of eggs and preparation of egg products. Nutritional aspects of red and white meat.

**(VDW 418) Food Science 418: (3 l.p.w. + 1 p.) (9 credits)**

Science and technology of cereals. Sources of cereal products in the world. The physical-chemical composition of the grain of cereals. Storage of cereals. Nutritional value of cereals. Composition and uses of products of cereals. Milling and extraction processes. Baking technology. Malting technology. Production of RTE (ready to eat) breakfast cereals. Pasta technology. Alternative uses of cereals.  
Practical work: Visits to mills, extraction and baking processes. Laboratory analyses of components and products of grain. Experiments to determine the milling and baking quality of wheat. Rheological, chemical and baking tests of wheat.

**(VDW 425) Food Science 425: (2 l.p.w. + ½ p) (6 credits)**

Preservation and storage of meat. Meat processing and equipment. Decomposition of meat. Packaging. Quality characteristics of meat. Quality control and hygiene in the meat processing plant.

Practical work: Manufacturing of different meat products such as sausage, salami's and related fermented meat products, cured and emulsion type products. Visits to meat processing factories.

**(VDW 431) Food Science 431: (2 l.p.w. + 1 p) (7 credits)**

The technology of fluid, concentrated, dried and frozen dairy products. Requirements for milk supply and other ingredients. Principles for the preparation of products in this category. Possible defects: causes and prevention. Practical work: preparation of condensed milk, custard, ready to eat milk-based desserts, flavoured milk beverages and dairy fruitjuice mixtures. Analyses and evaluation of products. Factory practicals and visits.

**(VDW 432) Food Science 432: (1 l.p.w. + 1 p.) (5 credits)**

Sensory evaluation of food. Applications of sensory evaluation. Types of panels, types of tests and their specific functions. Selection and training of panel members. Statistical analysis and interpretation of data.

Practical work: Practical aspects and execution of sensory evaluation techniques, analysis and interpretation of data.

**(VDW 442) Food Science 442: (2 l.p.w. + 1 p) (7 credits)**

Quality control, assurance and management with specific reference to the HACCP concept. Product development: A study of the consecutive steps followed in the development of new food products. Packaging. Factory hygiene and sanitation.

Practical work: Product development.

**(VDW 444) Food Science 444: (3 l.p.w. + 4 hours p.) (10 credits)**

Fermented food products. The underlying scientific principles of cheese processing: quality and pretreatment of the milk supply; additions; treatment of the green cheese; ripening and packaging; mechanisation and automation of the manufacturing process; processed cheese; utilisation of whey. The technology of yoghurt and other fermented dairy beverages. Traditional African food products. The principles and practices in the malting, cooking and fermentation of sorghum, maize and millets in order to produce sour porridges and gruels. Manufacture of cottage cheese.

Practical work: chymosin function. Coagulation of milk in two ways and variation in further treatments to produce different varieties of cheese. Starter cultures. Manufacture of sour cream, yoghurt and other fermented dairy beverages. Analysis and evaluation of the respective products. Small scale processing, factory visits, basic analytical methods and quality control of traditional African food products.

**(VOV 200) Food Processing 200 (1 l.p.w.) (2 credits)**

Reports on and discussions of special topics on food processing.

**(VOV 300) Food Processing 300 (1 l.p.w.) (2 credits)**

Reports on and discussions of special topics on food processing.

**(VOV 471) Food Processing 471: (2 l.p.w.) (4 credits)**

Seminar. Reports on and discussion of special topics and new developments in food processing; a series of practical exercises to develop and improve technological expertise and communication skills.

**(VOV 472) Food Processing 471: ( $\frac{1}{2}$  l.p.w. + 2 p.) (7 credits)**

Food processing project. Practical exercise in the beneficiation of food raw materials by using the principles of food science and technology. The practical entails: planning, implementation and reporting.

**(VOV 485) Food Processing 485: (3 l.p.w.) (6 credits)**

Food processing design. A systems approach to effective food processing which includes the principles of food processing, as well as the provision and layout of equipment and requirements.

<b>DEPARTMENT OF GENETICS</b>
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**(GTS 122) Introductory Genetics 122: (4 l.p.w. + 1 p.) (11 credits)**

General genetics, cytogenetics and population genetics: concepts such as locus, alleles, dominance, epistasis, independent and linked genes, polygenes, blood groups and sex determination. Chromosome morphology, the karyotype and cell division. Introduction to population genetics (Hardy-Weinberg model).

**(GTS 124) Genetics 124: (4 l.p.w. + 1 p.) (11 credits)**

Only for BlnstAgrar students.

The principles on which the heredity of characteristics are based and the application of these principles and plant and animal breeding.

**(GTS 215) Molecular Genetics 215: (2 l.p.w. + 1 p.) (7 credits)**

Packaging, replication, expression and control of genetic material. Mechanisms for the creation of genetic variation (recombination, mutation and transposition).

**(GTS 217) Chemical and Analytical Meiosis 217: (2 l.p.w. + 1 p.) (7 credits)**

Chemical and physical structure of chromosomes in the interphase nucleus and during meiosis. Chiasmatic meioses, holocentric chromosome meioses and inverse meioses.

**(GTS 225) Microbial Genetics 225: (1 l.p.w. +  $\frac{1}{2}$  p.) (4 credits)**

Molecular genetics of bacteria, viruses and yeasts. Genetic mapping, transformation, conjugation, transduction, recombinant DNA technology.

**(GTS 226) Introductory Population Genetics 226: (2 l.p.w. +  $\frac{1}{2}$  p.) (6 credits)**

Basic applications in breeding and evolution. Change and gene frequencies: migration, mutation, selection and sampling. Heritability and selection progress in quantitative characteristics. Aspects of human genetics.

**(GTS 227) Cytogenetic Systems 227: (1 l.p.w. + 1 p.) (5 credits)**

Recombination and karyotype modifications, polyploidy and apomixis in plants, parthenogenesis in animals. The role of hybridisation in evolution.

**(GTS 314) Human Genetics 314: (2 l.p.w. + 1 p.) (7 credits)**

The human karyotype. Prevalence and origin of aberration syndromes. Pedigree charts and inheritance patterns. Single gene abnormalities. Introduction to globulin, immuno and cancer genetics.

**(GTS 316) Plant Breeding 316: (2 l.p.w. + 1 p.) 7 credits**

Breeding methods - self-pollinating, cross-pollinating and agamic procreative plants. Polyploids and aneuploids. Plant biotechnology. Breeding techniques for crops such as maize, wheat and potatoes.

**(GTS 325) Eukaryotic Gene Control 325: (1 l.p.w. + ½ p.) (4 credits)**

The control of gene expression in eukaryotic cells on the genome level as well as the levels of transcription, RNA processing, and translation. Control during cell differentiation and embryonic development.

**(GTS 326) Population Genetics 326: (1 l.p.w. + ½ p.) (4 credits)**

Quantitative Genetics: Basic biometrical principles in breeding and evolution. The theory of breeding systems and its applications in practice.

**(GTS 327) Cytotaxonomy 327: (2 l.p.w. + 1 p.) (7 credits)**

Cytotaxonomy and other applications of cytogenetics: mechanisms of isolation and the role of karyotype evolution. Speciation and the species concept. Utilisation of chromosome numbers, karyotype and meiosis analysis. Cytotaxonomic analysis of hybrid systems. Karyotype-phylogenetic pedigrees. Genome tracking in polyploid complexes.

**(GTK 401) Genetics 401: (2 l.p.w.) (4 credits per semester)**

Seminar course: one or more seminars in one of the subdisciplines of genetics. Participation in subject discussions, book reviews and article discussions.

**(GTK 402) Genetics 402: (2 l.p.w.) (4 credits per semester)**

Different themes in plant genetics, plant biotechnology, breeding, quantitative genetics and molecular genetics closely associated with one of the three agricultural study programmes in genetics, studied through formal lectures, discussion classes, self-tuition and essays.

**(GTK 403) Genetics 403 (1 l.p.w. + 2 p. per semester) (8 credits per semester)**

Training in research methodology and in advanced techniques in one course, or a combination of one of the following: Plant Biotechnology; Plant Breeding; Animal Breeding, recombinant DNA technology. A limited practical project in one of the three fields of specialisation (Plant Breeding, Animal Breeding, Molecular Genetics).

**(GTS 442) Advanced Plant Orientated Genetics 442: (2 l.p.w. + 1 p.) (7 credits)**

Advanced genetics with accompanying practicals, plant genomes, plant tissue culture, plant transformation as well as themes belonging to plant conservation, plant breeding and plant biotechnology.

<b>DEPARTMENT OF MICROBIOLOGY AND PLANT PATHOLOGY</b>
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**(BLG 260) General Microbiology 260: (3 l.p.w. + \_ p.) (7 credits)**

The diversity, general anatomy and morphology of bacteria, viruses and fungi. Basic nutritional requirements, physiology, control and use of micro-organisms.

**(MBY 120) Introductory Microbiology 120: (4 l.p.w. + 1 p.) (11 credits)**

Diversity, general anatomy and morphology of bacteria, viruses and fungi. Genetic material, DNA replication and plasmids. Basic nutritional requirements of micro-organisms and the effect of environmental factors on microbial growth. Micro-organisms as essential components of the ecosystem: symbiosis, pathogenesis and biological control.

Biochemical transformation of carbon, oxygen, nitrogen and sulphur in the soil, water and atmosphere. Food decay, food poisoning and preservation of food by micro-organisms. Isolation, identification and transfer of plant, animal and human pathogens. Physical and chemical control of microbial growth. Basic principles involved in disinfection and sterilisation. Applications of chemical and physical preservation.

**(MBY 211) Microbial Physiology 211 (3 l.p.w. + 1 p.) (9 credits)**

Structure, function and biosynthesis of subcellular structures of bacteria: cytoplasmic and outer membranes, peptidoglycan, teichoic acid, lipopolysaccharides, exopolysaccharides. Physiological implications of nutrition, transport of substances across the membrane. Growth kinetics in batch and continuous cultures. Effect of physical parameters on growth and survival. Control and killing of bacteria. Regulation of activity and expression, stress response. Exchange of genetic material. Catabolic metabolism of bacteria, generation of reducing power, electron transport and synthesis of ATP. Fermentative metabolism: alcohol, lactic acid, mixed acid, acetone-butanol acid fermentation. Aerobic conversion of hydrocarbons. Anaerobic respiration, methanogenesis, fixing of carbon by autotrophs. Biosynthesis of small molecules, nucleotides, amino acids, fatty acids. Chemical composition of fungi. Chemical and physical requirements for fungal growth. Primary and secondary metabolism. Reproduction of fungi.

**(MBY 215) Taxonomy of Bacteria 215: (2 l.p.w. + 1 p.) (7 credits)**

Position of bacteria in the kingdoms. Approaches to classification and identification. Diversity of bacteria. Practical identification of bacteria.

**(MBY 225) Food Microbiology 225: (2 l.p.w. + 1 p.) (7 credits)**

Food microbiology: problem identification of the microbiology of water, beverages, solid and semi-solid food. Characteristics of beneficial and harmful food microbials, including psychrophilic and thermophilic organisms. Factors influencing the activity of micro-organisms in food. Food preservation and sterilisation.

**(MBY 226) Industrial Microbiology 226 (2 l.p.w. + 1 p.) (7 credits)**

Economic aspects of industrial biotechnological processes. Biodiversity, isolation, screening methods and long-term preservation of cultures. Processes underlying industrial fermentations: energy transfer (heat energy, sterilization), mass transfer (nutrients, gases), modes of growth of micro-organisms, reactor design and operation, growth kinetics and yield, product recovery. Selected processes: production of enzymes, amino acids, antibiotics, fermented foods, polymers, solvents. Biodegradation, microbially influenced corrosion, bioremediation.

**(MBY 311) Fungal biotechnology 311 (1 l.p.w. + ½ p.) (4 credits)**

Application of fungi and fungal metabolites in industry and the environment, with emphasis on biotransformation of waste, bioremediation and new developments regarding industrial applications. Applied zymology.

**(MBY 312) Taxonomy of Fungi 312: (2 l.p.w. + 1 p.) (7 credits)**

Isolation, purification, conservation and preservation of fungi. Macro and micro morphology. Characteristics of the different fungal taxons and criteria for differentiation. Functioning and importance of selected fungal species.

**(MBY 313) Human-microbial interactions 313 (2 l.p.w.) (4 credits)**

Interactions between micro-organisms and man. Principles of disease as ecological phenomenon. The skin, respiratory channel, digestive system and urogenital tract as microbial habitat and its diseases.

**(MBY 323) Molecular Microbiology 323: (2 l.p.w. + 1 p.) (7 credits)**

Short revision of chemical structure and biological characteristics of nucleic acids, effect of environmental factors on this structure and the transfer of genetic information from DNA to proteins. Isolation, characterisation and synthesis of clonable DNA. Cloning vectors, plasmid incompatibility and control of copy number. Ligation of DNA fragments; modification of DNA points and different ligation strategies. Introduction and stable integration of foreign DNA in prokaryotic host cells. Direct and indirect methods for the identification of recombinant organisms. Introduction to the genetic manipulation of yeast cells.

**(MBY 324) Molecular Virology 324: (2 l.p.w. + 1 p.) (7 credits)**

Introduction to the viruses as a unique kingdom inclusive of their different hosts, especially bacteria, animals and plants; RNA and DNA viruses; viroids, tumour viruses and oncogenes, mechanisms of replication, transcription and protein synthesis; effect on hosts; viral immunology; evolution of viruses.

**(MBY 400) Seminar Course 400: (1 l.p.w.) (2 credits)**

Seminar course: each student must present one formal seminar per semester during the final year, on new developments in the field of study. The course also includes lectures on the writing and presentation of a seminar, article, the correct use of visual aids and short article discussions.

**(MBY 401) Practical Project 401: (1 p.) (3 credits)**

Practical project: a research project of limited extent under the supervision of one of the lecturers within the Department on either ecological or taxonomic or molecular or water or food microbiology or plant pathological topics.

**(MBY 416) Basic Microbial Ecology 416 (2 l.p.w. + 1 p.) (7 credits)**

General introduction to microbial ecology and the principles underlying all microbial ecosystems. Factors affecting micro-organisms; mutual relationships between micro-organisms and the role they play in different ecosystems (with special reference to soil microbial ecosystems). Interactions between micro-organisms and man, animals, insects and plants. Techniques in microbial ecological studies.

**(PLG 220) Introductory Plant Pathology 220: (2 l.p.w. + 1 p.) (7 credits)**

Influence of plant diseases on the national economy. Introductory mycology, bacteriology, virology, nematology and epidemiology as applicable to plant pathology. Ecology of soilborne disease organisms. Life cycles of typical disease-causing organisms. Principles of resistance in plants. The application and characteristics of fungicides. Practical aspects of isolation of plant pathogens and nematodes, purification and preservation of cultures and pathogenicity tests.

**(PLG 221) Introductory Plant Virology 221: (2 l.p.w. + ½ p.) (6 credits)**

Transfer of and infection by plant viruses. Insect vectors and interaction between insects, viruses and plants. Isolation, purification and characterisation of plant viruses. Serology and virus identification. Synergism and cross protection. Control of viral diseases.

**(PLG 321) Introductory Phytobacteriology 321: (1 l.p.w. + ½ p.) (4 credits)**

Introductory phytobacteriology. Symptomology and pathology of bacterial plant diseases. Insect transfer of phytobacteria. Methods for isolation, identification and handling of phytobacteria. Diagnostic techniques. Physiology of plant-associated bacteria.

**(PLG 412) Parasitology and Epidemiology 412: (2 l.p.w. + ½ p.) (6 credits)**

Parasitology: germination, penetration, colonisation and reproduction of plant pathogens. Factors affecting infection. Resistance in plants. The effect of viral, bacterial and fungal diseases on the physiological processes of plants.

Epidemiology: inoculum and calculation of inoculum. Initiation, progress and decline of epidemics. Mathematical principles of epidemics. Principles of predicting epidemics and models.

**(PLG 421) Disease Control 421: (2 l.p.w. + ½ p.) (6 credits)**

Principles of disease control: chemical, physical and biological control. Modern chemotherapy: characteristics of and methods for the application of fungicides. Non-chemical control: biological control, regulatory measures, cultivation practices, physical methods and integrated control.

**(PLG 422) Nursery and Seed Pathology 422: (1 l.p.w. + ½ p.) (4 credits)**

Principles of disease control in nurseries. Sanitation as control measure. Chemical and non-chemical control of diseases in nurseries. Indexing of mother plant material for viral and bacterial diseases. Production of disease-free plant material by tissue culture techniques and apical meristem grafting. Seed pathology: principles, detection and control of seed-borne diseases.

<b>DEPARTMENT OF PHYSIOLOGY</b>
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**(FLG 211) Introductory and Neurophysiology 211: (2 l.p.w. + ½ p.) (6 credits)**

Orientation in physiology, homeostasis, cells, tissues, muscle and neurophysiology and the special senses.

Practical work: Histology and experimental physiology.

**(FLG 212) Circulatory Physiology 212: (2 l.p.w. + ½ p.) (6 credits)**

Body fluids, haematology, cardiovascular physiology and the lymphatic system.

Practical work: Practical exercises and experimental physiology.

**(FLG 221) Lung and Renal Physiology. Acid-base balance and Temperature 221: (2 l.p.w. + ½ p.) (6 credits)**

Structure, gas exchange and secretory function of the lungs, structure, excretory and non-urinary function of the kidneys, acid-base balance, as well as the skin and body temperature control.

Practical work: Practical exercises and experimental physiology.

**(FLG 222) Digestion, Endocrinology and Reproductive Systems 222: (2 l.p.w. + ½ p.) (6 credits)**

Nutrition, digestion and metabolism, hormonal control of the body functions and the reproductive systems.

Practical work: Experimental physiology.

**(FLG 311) Applied Cellular Physiology 311: (1 l.p.w. + 1 p.) (5 credits)**

Study of cell morphology, functions of the cell organelles, synthesis of the various membrane and cytoskeleton proteins, activation of proteins through phosphorylation which is controlled by signal transduction mechanisms, processes involved in controlling cell numbers, background for cell based experiments and research.

**(FLG 312) Developmental Physiology 312: (2 l.p.w.) (4 credits)**

Studies on the physiological development and adaptations from the foetus through the aged.

**(FLG 313) Research methodology and Literature study 313: (1 l.p.w. + 1 p.) (5 credits)**

Research methodology, career planning, subject orientated literature studies and seminars. Practical work: Preparation of research protocol, gathering of information (literature) and writing of seminar.

**(FLG 321) Immunology 321: (1 l.p.w.) (2 credits)**

Introduction to basic, applied and integrated immunological mechanisms.

**(FLG 322) Industrial Physiology 322: (1 l.p.w. + ½ p.) (3 credits)**

Problem orientated course, with the emphasis on occupational health and safety in the industrial environment. Integration of different physiological systems are required. Practical work: Visiting a number of industries.

**(FLG 323) Physiological Control Systems and Modelling 323: (1 p.) (3 credits)**

An introduction to the theory of control systems and examples in physiology to explain them; simulation of physiological functions making use of signal-flow diagrams and mechanical, electrical and numeric models.

**(FLG 324) Exercise Physiology 324: (1 l.p.w. + ½ p.) (4 credits)**

Mechanisms of muscle contraction and energy sources. Cardio-respiratory changes, thermoregulation and other adjustments during exercise. Use and misuse of substances to improve performance.

Practical work: Applied practical work.

**(FLG 325) Nutrition Physiology 325: (1 l.p.w.) (2 credits)**

The importance of nutrients and micro-nutrients in the composition of a normal diet; the neuro-endocrine control of food-intake and special aspects of the functions in the digestive tract.

**(FLG 326) Research Project 326: (1 l.p.w. & 1 p.) (5 credits)**

Special techniques and research projects.

Only a limited number of students will, with departmental approval, be allowed to register for this module.

**(FLG 327) Higher Neurological Functions 327: (1½ p.) (5 credits)**

Tutorials and seminars on higher functions of the brain and interaction between the neurological, endocrine and immune systems.

Only students that follow the course in Human Physiology and Psychology, as well as a limited number of other students will, with departmental approval, be allowed to register for this module.



<b>DEPARTMENT OF PLANT PRODUCTION AND SOIL SCIENCE</b>
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**AGRICULTURAL CLIMATOLOGY****(LKM 221) Introduction to Agricultural Climatology 221: (2 l.p.w. + 0 p) (4 credits)**

Principles of climatology and their application in agriculture. Radiation balance. Hydrological cycle. General climatology and meteorology. Climate of South Africa. Adaptation of farming systems to the climate.

**(LKM 312) Microclimatology 312: (2 l.p.w. + ½ p) (6 credits)**

Temperature, humidity, turbulence and radiation in the micro environment and how crops can be influenced by it. Practical exercise in the uses of micro meteorological instrumentation as well as calculations of micro climatic variables through demonstrations and assignments.

**AGRONOMY****(AGR 313) Primary Food Crops 313: (2 l.p.w. + ½ p.) (6 credits)**

The cultivation and utilisation of important food and vegetable crops, such as grain, leguminous plants, potatoes, tomatoes and a few other vegetable crops. Botanical characteristics, growth requirements and exploitation of the plant-environment interaction by means of appropriate cultivation practices. Visits to marketing councils, research institutions and producers to get acquainted with grading regulations and topical practical problems.

**(AGR 323) Diverse Crops 323: (2 l.p.w. + ½ p.) (6 credits)**

The cultivation and utilisation of crops rich in oil and protein, fibre crops, tobacco, sugar-cane and other diverse crops. Botanical characteristics, growth requirements and exploitation of the plant-environment interaction by means of appropriate cultivation practices. Visits to marketing councils, research institutions and producers to get acquainted with grading requirements and practices.

**(AGR 481) Production Systems: Grain Crops 481: (3 l.p.w. + 1 p.) (9 credits)**

Integration of agronomic, pedological, botanical, economic and management considerations in crop production systems with a view to sustainable maximum economic yield. Case studies of specific grain crops.

(AGR 482) Production Systems: Legumes and Tuberous Plants 482: (3 l.p.w. + 1 p.) (9 credits)

**(AGR 482) Production Systems: Legumes and tuberous plants 482: (3 l.p.w. + 1 p.) (9 credits)**

Integration of agronomic, pedological, botanical, economic and management considerations in crop production systems with a view to sustainable maximum economic yield. Case studies of specific leguminous and tuberous plants.

**HORTICULTURE****(HSC 483) Production Systems: Tropical and Subtropical Fruit Production 483: (3 l.p.w. + 1 p) (9 credits)**

Integration of the seasonal phenology of tropical and subtropical fruit crops with management systems through a study of the appropriate botany, biochemistry and

physiology, as well as climate, soil, water and diseases, in order to achieve the maximum yield, quality and profit.

**(HSC 484) Production Systems: Temperate Fruit Production 484:**

**(3 l.p.w. + 1 p) (9 credits)**

Integration of the seasonal phenology of subtropical fruit crops with management systems through a study of the appropriate botany, biochemistry and physiology, as well as climate, soil, water and diseases, in order to achieve the maximum yield, quality and profit.

**(TBK 221) Introductory Horticulture 221: (3 l.p.w. + 1p) (9 credits)**

The South African horticulture industry. Horticultural systematics. Natural resources and horticultural production. Fundamental aspects such as choice of crops, growth, plant development, pruning, plant manipulation and reproduction.

**(TBK 314) Tropical and Subtropical Fruit Cultivation 314: (2 l.p.w. + ½ p) (6 credits)**

Climatic requirements, cultivation regions, economic importance of subtropical fruit types. Seasonal vegetative and reproductive phenology, as well as reserve status of nutritive elements. Reproduction techniques, orchard management, standards of ripening, crop and post-harvest handling.

**(TBK 320) Deciduous Fruit 320: (2 l.p.w. + ½ p) (6 credits)**

Climatic requirements (especially the need for cold), production regions and economic importance of deciduous fruit types. Seasonal vegetative and reproductive phenology as well as reserve status. Specialised pruning and training techniques. High density cultivation. Reproduction techniques, orchard management, standards of ripening, crop and post-harvest handling.

**(TBK 410) Citrus Cultivation 410: (3 l.p.w. + 1p) (9 credits)**

Climatic requirements, cultivation regions, economic importance. Commercially important cultivars and root-stocks, scion/root-stock interactions: influence on vegetative growth and fruit quality. Fruit morphogenesis studied anatomically and morphologically. The effect of fertilisation and irrigation on seasonal vegetative and reproductive phenology, as well as reserve status. Economically prominent diseases and pests.

## **ORNAMENTAL HORTICULTURE**

**(STZ 311) Nursery Management 311: (2 l.p.w. + ½ p) (6 credits)**

The nursery industry in South Africa. Controlled environments, glass houses and shade houses. Influence of climatic factors. Requirements for growth media and containers. Specialised technical aspects concerning the production of plants in the nursery. Economic aspects of the industry.

**(STZ 320) Ornamental Plants 320: (2 l.p.w. + ½ p) (6 credits)**

Climatic requirements, crop characteristics, reproduction, requirements for cultivation of trees, shrubs, creepers, ground covers, flowering plants and pot plants which are used as ornamental plants. Functional and aesthetic value of plants in the landscape. Pruning, training, transplanting and maintenance of ornamental plants.

Requirement: STZ 311 has to be taken before this course.

**PASTURE SCIENCE****(WDE 210) Veld Management Practices 210: (2 l.p.w. + ½ p) (6 credits)**

Different veld types in South Africa and their management. Collect, identify and study indigenous grass, shrub and tree species. Defoliation management of different plant types. The management of pastoral factors that may have an influence on animal production.

**(WDE 310) Principles of Veld Management 310: (2 l.p.w. + ½ p) (6 credits)**

The plant and its environment. Form, growth and development of different indigenous plants and their reaction to defoliation, fire and rest. Plant-animal interactions. Collection, identification and study of indigenous grass, shrub and tree species which play a role in natural pastures. Integration of pasture management and animal production objectives in adapted production systems for the different agro-ecological areas, focusing in particular on veld condition, grazing capacity and recuperation or reclamation of veld. Principles of veld management illustrated by visits to selected farms and by appropriate assignments.

**(WDE 320) Planted Pasture and Fodder Crops 320: (2 l.p.w. + ½ p) (6 credits)**

The cultivation of several pasture and fodder crops. The utilisation of planted pastures and fodder crops as grazing, hay, silage and foggage, in fodder production systems. Fodder budgeting. Radical pasture improvement. Practices involved in establishment, management and utilisation, introduced through demonstrations and assignments.

**(WDE 412) Turf Grass Management 412: (2 l.p.w. + ½ p) (6 credits)**

Choice and characteristics of suitable turf grass species, preparation of substrate, techniques of establishment and maintenance practices of sports grounds as well as in the reclamation of disturbed soil along roads and at open cast mines.

**(WDE 421) Pasture Evaluation 421: (2 l.p.w. + ½ p) (6 credits)**

Determination of veld condition and grazing capacity on the basis of botanical composition, grazing gradients, preference species and utilisation value. Evaluation of crops in terms of environmental adaptation, acceptance and adaptation to the system of utilisation, management needs and integration into production systems.

**(WDE 424) Pasture Evaluation 424: (1 l.p.w. + ½ p) (4 credits)**

Capita Selecta from Pasture Evaluation 421.

**(WDE 481) Veld Management 481: (3 l.p.w. + 1 p.) (9 credits)**

The development of veld management strategies through the integration of ecological and physiological principles with economic and sociological limitations, in order to achieve production objectives, while ensuring the reclamation and conservation of natural resources.

**(WDE 482) Forage Crops and Production 482: (3 l.p.w. + 1 p.) (9 credits)**

Identification of adapted fodder crops and pastures (including grass, leguminous plants, fodder trees and drought-resistant crops) for specific agro-ecological areas. Management practices with regard to establishment, fertilisation, irrigation and utilisation.

**(WDE 483) Integration of Plant and Animal Production 483: (3 l.p.w. + 1 p.) (9 credits)**

The role of crop rotation and leys in marginal areas to ensure sustainable production. Integration of fodder production with other agricultural enterprises to yield wood, vegetables/fruit/nuts, cash crops and animal products. Fodder supply to commercial and communal animal production systems.

## PLANT PRODUCTION

### **(PPK 210) Introduction to Plant Production 210: (3 l.p.w. + 1 p) (9 credits)**

The nature and extent of plant production in South Africa. Role of natural resources such as climate, farm-land and water in plant production. Natural veld and its utilisation. Management practices in crop cultivation such as crop rotation, agricultural seed, preparation of seed-beds, fertilisation, cultivation, irrigation, weed control and certain horticultural practices. Practical application of agronomic, horticultural and pasture management practices on university experimental farms and elsewhere illustrated by way of practicals, assignments and demonstrations.

### **(PPK 411) Crop Physiology 411: (3 l.p.w. + ½ p) (8 credits)**

The physiological basis of productivity, yield and quality, and the application of this knowledge in crop production. Influence of environmental conditions on growth and development. Growth functions and growth models. Physiology of defoliation. Case studies on agricultural, horticultural and grazing crops. Experiments conducted by students under controlled environmental conditions and on the farm-land to examine crop physiological principles.

## PLANT PRODUCTION AND SOIL SCIENCE/COLLECTIVE

### **(PGW 400) Seminar 400: (2 l.p.w. + 0 p) (4 credits)**

Requirements for scientific articles. Assessment of published information. Writing and presentation of seminars on topical subjects. The flow of scientific information in plant and soil sciences from the original researcher to the end user.

### **(PGW 401) Seminar 401 (1 l.p.w. per semester) (2 credits per semester)**

Requirements for scientific articles. Assessment of published information. Flow of scientific information in plant science from the researcher to the end user. Writing and presenting a seminar with the emphasis on pasture science aspects.

### **(PGW 411) Environmental Management 411: (2 l.p.w. + 1 p) (7 credits)**

Integrated environmental management. The concept of prime agricultural land. Soil erosion. Desertification. Catchment-area studies and management planning. Strip and open cast mining. Aspects of bush encroachment and condensation. Aspects of physical and chemical soil deterioration and pollution of water resources. Environmental legislation. Practical work: Laboratory and field studies concerning aspects covered in the lectures.

### **(PGW 421) Research Methodology 421: (3 l.p.w. + 1p) (9 credits)**

Experimental methods in field and pot experiments under controlled and field conditions. Analysis of experimental data according to standard techniques and their interpretation.

### **(PGW 422) Irrigation 422: (3 l.p.w. + 1 p) (9 credits)**

Soil-physical principles of the water balance and movement of water in soil. Plant-water relations and the forecasting of potential evapotranspiration. Water needs of crops and irrigation management. Basic principles in the design of irrigation systems. Practical handling of apparatus and visits to irrigation experiments and selected farms.

### **(PGW 423) Land-use Planning 423: (2 l.p.w. + 1 p) (7 credits)**

Interpretation of resource data. Land suitability evaluation for different uses of land. Special management requirements of different situations. Consideration of alternatives.

Quantitative and economic aspects of land-use planning. ALES. Aspects of conservation and environmental impact. Geographic Information Systems (GIS).

Practical work: Use and handling of maps. Aerial photogrammetry. Reporting and maps. Field excursions.

**(PGW 480) Project in Land-use Planning 480: (3 p) (9 credits)**

Practical composition of a land-use plan for a selected field of study; defending of the proposed plan during an oral exam before a panel of examiners.

## SOIL SCIENCE

**(GKD 213) Introductory Soil Science 213: (3 l.p.w. + 1 p.) (9 credits)**

Origin and development of soil, weathering and soil formation processes. Profile differentiation and morphology. Physical characteristics: texture, structure, soil water, atmosphere and temperature. Chemical characteristics: clay minerals, ion exchange, pH, buffer action, soil acidification and salinisation of soil. Soil fertility and fertilisation. Soil classification.

Practical work: Laboratory evaluation of simple soil characteristics. Field practical work on soil formation in the Pretoria area.

**(GKD 215) Soil Science 215: (2 l.p.w. + ½ p.) (6 credits)**

The appearance and characteristics of soils (a course for students in Agricultural Engineering).

**(GKD 228) Soil Fertility 228: (3 l.p.w. + 1 p.) (9 credits)**

Principles of plant nutrition. Essential plant nutrient elements. Soil as growth medium for plants. Macro element supply to plants. Micro elements. Deficiencies and toxicities. Evaluation of soil fertility.

Practical work: Laboratory evaluation of soil fertility. Simple pot experiments in glass house.

**(GKD 317) Soil Classification and Mapping 317: (2 l.p.w. + 1 p.+ field excursion) (7 credits)**

A taxonomic system for South Africa. USDA's Soil Taxonomy. Land suitability evaluation. Optimal resource utilisation. The conservation component. Ecological aspects. Ecotope, land types. Soil maps.

Practical work: Field practicals and compulsory excursion. Identification of soil horizons, forms and families. Land suitability evaluation. Elementary mapping exercise.

**(GKD 318) Soil Chemistry 318: (2 l.p.w. + 1 p) (7 credits)**

The more exact chemistry of soils systematically explained by understanding the particular chemical principles. Charge origin. Chemical equilibriums. Manifestations of sorption. Ion exchange. Acidic soils, brackish soils and the organic fraction of soil. The chemistry of the important plant nutrient elements P, K and N.

**(GKD 329) Soil Physics 329: (3 l.p.w. + 1 p) (9 credits)**

Structure and texture. Compacting and crusting. Sedimentation and sieve analyses for the determination of particle sizes. Physical and chemical characteristics of soil water; soil water potentials and their uses. Soil water dynamics. Laws of saturated and unsaturated flow. Hydrodynamic dispersion. Infiltration. Evaporation. Conduction of heat.

Practical work: Distribution of particle size, soil water retention curves, soil water determination. Measuring of infiltration.

**(GKD 414) Soil and Environmental Processes 414: (2 l.p.w. + 1 p) (7 credits)**

Chemical, physical and biological soil degradation (with the emphasis on pollution): types, causes, effects, combating. Biogeochemical element cycles. Sewage. Acid rain. Pesticides. Aspects of soil erosion. Practical work: Laboratory studies on the aspects of soil pollution.

**(GKD 415) Soil Mineralogy and genesis 415: (2 l.p.w. + 1 p) (7 credits)**

Pedogenetic processes. Soil forming factors. Clay mineralogy: Structure, nomenclature, classification and synthesis of clay minerals.

**(GKD 485) Land Suitability Evaluation 485: (3 l.p.w. + 1 p) (9 credits)**

Principles of land suitability evaluation; some important land suitability evaluation systems; concepts such as soil potential, ecotope, land types etc. Soil requirements and tolerances for some important soil uses.

**(GKD 487) Resource Surveying 487: (3 l.p.w. + 1 p) (9 credits)**

Techniques for the execution of detailed soil surveys (including field work and the composition of maps and reports); analysis of climatic data; field and capacity evaluation; analysis of water resources. Practical exercises in all of these aspects.

## WEED SCIENCE

**(OKW 413) Weed Science 413: (3 l.p.w. + 1 p) (9 credits)**

The role of weeds in South Africa. Herbicides in plants and soil. Characteristics and uses of herbicides. Weed control programmes in crops, natural veld, sports grounds and water. Control of invader plants. Interactions between weed and crops. Herbicides in the environment. Collection and description of weed species. Execution of experiments to demonstrate the functioning of herbicides. Practical acquaintance with herbicide formulations and methods of administration.

## DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

**(BLG 123) Biology 123: (3 l.p.w. + 1 p.) (9 credits)**

Introductory Zoology: the variety of animals; cells and membranes; cell ultrastructures and their functions; food acquisition, food processing and absorption; gas exchange; internal transport and distribution; principles of homeostasis; osmoregulation and excretion; nerve control and co-ordination; chemical control and co-ordination; reproduction and embryogenesis.

**(BLG 160) Introductory Animal Biology 160: (3 l.p.w. + \_ p) (7 credits)**

Study of animals and animal diversity. Functional morphology (structure) of vertebrates and insects. Animal development, evolution and the various kingdoms.

**(ZEN 122) Introductory Zoology 122: (4 l.p.w. + 1 p.) (11 credits)**

Principles of taxonomy and classification; characteristics of the animal phylums; morphological characteristics and the life cycles of parasitic and non-parasitic forms; agricultural pests; insects of medical importance; mammalian reproduction; positive and negative interactions between humans and animals; politics and human/animal relations/interactions.

**(ZEN 210) Development and Morphology 210 (2 l.p.w. + 1 p.) (7 credits)**

Comparison between the processes of cleavage, cleavage patterns; gastrulation and primary organ formation in amphioxus, amphibians; birds and mammals; organogenesis and placentation in mammals; growth analysis; tendencies in morphology, scaling and allometry; adaptations of the vertebrate skeleton, and the locomotory system.

**(ZEN 211) Invertebrate Biology 211 (2 l.p.w. + 1 p.) (7 credits)**

The origins of invertebrate diversity; modern invertebrate diversity; Uniramia as living fossils; Arachnida - phylogeny, biology and medical importance; insects and their lifestyles; insect movement; insect sensory systems; defence and attack in insects; insect adaptations to unfavourable conditions; marine invertebrates and environmental change; the inter-tidal zone-harsh environments and competition; freshwater habitats.

**(ZEN 215) Principles of Conservation Biology 215: (4 l.p.w.) (8 credits)**

Introductory concepts, conservation principles and ethics, what is biodiversity?, global biodiversity, extinction vulnerability, population processes: genetic and demographic processes, problems with small populations, causes of extinction, reserve design and reserve networks, the legal basis for conservation, management to reach conservation goals, people and parks, sustainable development, meeting conservation goals in an uncertain future.

**(ZEN 220) Animal Physiology 220 (2 l.p.w. + 1 p.) (7 credits)**

Introduction to control theory and homeostasis; circulation; blood and immunity; neurophysiology; muscle physiology; body fluids and water balance; respiration; digestion; reproduction; the insect integument; endocrinology; information processing.

**(ZEN 221) Mammalogy 221 (2 l.p.w. + 1 p.) (7 credits)**

Origin of mammals; evolution and dental characteristics; integument, support and movement; foods and feeding; environmental adaptations; reproduction; lactation; acoustical orientation; dispersal, habitat selection and migration; zoogeography; domestication and domesticated mammals.

**(ZEN 222) Insect Diversity 222 (2 l.p.w. + 1 p.) (7 credits)**

The extent of insect diversity; insect orders and important families; biological, medical, veterinary, agricultural and ecological importance is emphasised.

**(ZEN 225) Zoological Diversity in Southern African Biomes 225 (4 l.p.w.) (8 credits)**

Historical and ecological processes determining the distribution of animal diversity, the biome concept and the influence of climate, defining southern Africa's biomes, desert biome, Nama Karoo, Succulent Karoo, grassland biome, forest biome, fynbos biome, savanna, sub-Antarctic Marion Island.

**(ZEN 310) Ecology 310 (2 l.p.w. + 1 p.) (7 credits)**

The principles pertaining to the interaction of animals and their biotic and abiotic environments on the individual, population and community levels are studied according to the following: The scientific approach to ecology; evolution and ecology; the individual and its environment; the population; interaction between populations; regulation of population density; community ecology; demographic techniques; ecology as the science of environmental conservation; ecological controversies.

**(ZEN 311) Ecophysiology 311 (2 l.p.w. + 1 p.) (7 credits)**

The physical environment; climate and distributional patterns; costs of living; principles of nutritional ecology; principles of thermal biology; direct effects of temperature; rate compensation and capacity adaptations; body temperature and ectothermy; thermoregulation; endothermy and flight; adaptations to cold climates; terrestrial animals, humidity and desiccation; osmoregulation and excretion; ecophysiology, adaptation and history; ecophysiology and climate change.

**(ZEN 320) Insect Pest Management 320 (2 l.p.w. + 1 p.) (7 credits)**

General introduction to insect pest management; criteria for pest control; pest monitoring and prediction of outbreaks; traditional, physical, genetic, chemical, biological and integrated control; introduction to insect herbivory, host plant resistance, insect herbivory populations and community ecology; biological control of weeds.

**(ZEN 321) South African Insect Pests 321 (2 l.p.w. + 1 p.) (7 credits)**

The most important pests of South African crops, gardens and lawns.

**(ZEN 322) Evolution 322 (2 l.p.w. + 1 p.) (7 credits)**

History and evolutionary theory; Mendelian genetics and Hardy-Weinberg equilibrium; selection; adaptive profiles; Fisher's fundamental theorem; genetic drift; mutation; simple quantitative genetic characteristics; heritability; natural selection; adaptation; co-evolution; punctuated equilibrium; speciation; optimality theory; macro evolution; the new Biology; topographies; networks and self-organisation.

**(ZEN 323) Behavioural Ecology 323 (2 l.p.w. + 1 p.) (7 credits)**

History of classical ecology; hypothesis testing; predator-prey interactions; optimality theory; competition for resources and the evolution of sociality; sexual competition; parental care and mating systems; selfishness and altruism; animal communication.

**(ZEN 400) Entomology 400 (Seminar course) (2 credits)**

Self tuition of selected topics.

<b>SCIENCE EDUCATION</b>
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**Courses for BSecEd(Sci)**

**(AGC 150) Soil Science and Plant Production 150 (4 l.p.w. + 1 p.) (11 credits)**

Soil Science: The origin and formation of soils. The most important physical and chemical soil properties. Soil fertility and fertilisation. Soil classification. Resource utilisation. Plant Production: The spectrum of plant production in South Africa. Natural resources and plant production. Natural veld. Management practices in crop production. Practical applications of agronomic, horticultural and grassland science principles. Plant diseases and weed control.

**(AGC 160) Animal Studies and Agricultural Economics 160 (4 l.p.w. + 1 p.) (11 credits)**

Animal Studies: Principles of animal husbandry and livestock production. Different types of livestock, production regions and systems; genotype-environment interaction. Introduction to digestive, reproductive and growth physiology of livestock.

Agricultural Economics: Agriculture in the economy. Introductory farm management and production economics: the economic, social and natural environment and nature of the



farming enterprise. Production factors, management functions, profitability and farm planning. Basic theoretical concepts relating to source utilisation. Resource alternatives. Production combinations and costs. Risk and uncertainty. Profitability. Rural development.

**(AGC 250) Plant and Animal Production 250 (3 l.p.w. + 1 p.) (9 credits)**

Plant Production: The most important agronomic, horticultural, pasture and fodder crops in South Africa, with special reference to their cultivation.

Animal Production: General principles in the breeding of animals. Introduction to reproduction physiology. Nutrient requirements of ruminants and monogastric animals. Extensive and intensive animal production systems.

**(AGC 260) Resource Utilisation 260 (3 l.p.w. + 1 p.) (9 credits)**

Integrated resource management. Erosion. Desertification. Physical and chemical soil degradation. Pollution.

**(BLG 250) Molecular Biology 250 (3 l.p.w. + - p.) (7 credits)**

The cellular and genetic basis of life, including the chemical composition of cells, cell structure and function, cellular metabolism and energy, cellular reproduction and the chromosomal and molecular basis of heredity.

**(BLG 360) Human Physiology 360 (3 l.p.w. + - p.) (7 credits)**

Body systems (structure and functions). Circulatory physiology (body fluids, blood and cardio-vascular function). Nutrition, digestion and metabolism. Homeostasis, regulatory systems and body defence mechanisms. Reproduction.

**(SCE 170) Religious Education 170 (1 l.p.w.) (4 credits)**

Prominent Religions in South Africa, world views associated with these religions, the cultural role of religions, importance of holy days.

**(SCE 200) Science Education 200 (2 l.p.w. + - p.) (10 credits)**

Themes in Education which provide knowledge skills and values of a teacher able to promote a culture of learning:

Didactics: Education models. Outcomes based education. Factors influencing educational communication.

Education Psychology and Theories of Learning: Educational behaviour and psychological life. Home environment of the pupil. The development stage of the secondary school child. Theories of learning. Learning and studying. The reflective practitioner.

School Organisation: Classroom management. The educational system in South Africa. Educational law. Discipline and Punishment.

**(SCE 300) Science Education 300 (2 l.p.w. + 1<sup>-</sup> p.) (16 credits)**

Themes in education which provide the knowledge, skills and values of a teacher able to promote a culture of learning:

Philosophy of education: Theories and nature of learning. Strategies of teaching. Remedial teaching. The reflective practitioner. Curriculum planning and development. Current philosophies of education. Professionalisation and the Trade Union debate.

Educational technology and media: The role of media in teaching: technology, selection and integration.

Educational Communication: The nature of teaching communication. Areas of communication styles, public communication, as well as the relationship between teaching methods and effective communication. Language development. Cultural and gender issues.

Life Orientation and Counselling: Introduction to the foundations of counselling. A system of guidance (specifically in the secondary school). Some aspects of school guidance. Family guidance, career choice and associated problems. Community and social development, personal and self development, self management. Physical and sexual development. Career planning and development.

Practical: Model school to the equivalent of 1 week teaching practice will be arranged with the Centre for Science education.

**(SCE 400) Science Education 400 (4 l.p.w.) (16 credits)**

Themes in education which provide knowledge, skills and values of a teacher able to promote a culture of learning:

History of Education and comparative Education: Educational themes from a time perspective. Current educational practice. Curriculum planning and development.

Orthopedagogics: Theories on the nature of learning. Categories of learning and behaviour problems. Assessment of learning, methods, instruments and techniques. Manifestation of educational problems and remedial teaching. The reflective practitioner.

Sociology of Education: Contemporary problems experienced by youth, drug abuse, juvenile delinquency, environmental deprivation, youth suicide, anorexia nervosa, child abuse.

**(SCE 301) Educational Community Project 301 (10 credits)**

Students must demonstrate the ability to facilitate learning with particular emphasis on the application of team teaching, negotiation for resources, planning and implementation. Evaluation includes a dissertation by the student teacher, evaluation reports from a supervisor and participants. Additionally, the student teacher presents a report to peers in the form of a seminar. This contributes two weeks to Teaching Practice. The project is arranged in cooperation with the Centre for Science Education.

**(SCE 302) School Practice 302 (22 credits)**

School practice will be in the format of a continuous period of 11 weeks in a functioning school. Support materials demonstrate the possibilities and restrictions of educational technology and provide additional information to stimulate reflection, the cultivation of independent lifelong learning and challenging creativity and thinking skills. Final assessment of competence is based on a portfolio of artefacts and records of proof of the ability of student teachers to facilitate learning, reasoned arguments to motivate their assessment of their competences to facilitate learning.

**(SCE 402) School Practice 402 (10 credits)**

School practice will be in the form of an action research project in a functioning school over a continuous period of 5 weeks. The aim of the action research project is to analyse and evaluate the promotion of a culture of learning on the macro, meso and micro level in order to improve current practice. Dissertation and seminar.

**Subject Didactics**

Subject Didactics are presented in co-operation with relevant departments.

**(SCE 471) Subject Didactics of Biology 471 (2 l.p.w. + 1 p.) (14 credits)**

Nature and structure of the subject. Learning theory and strategies, whole class, group and individual learning. Methods to encourage independent study and a critical reasoning capacity in pupils. Remediation. Interpreting syllabi, negotiation and setting of objectives, evaluation, assessment and reflection. Identification and interpretation of resource

materials. Administration and keeping of records, planning and arranging the practical and laboratory-based learning experience. Environmental issues related to the subject. Career guidance. Laboratory safety and first aid.

Practical work: Model school to the equivalent of one week of teaching practice to be arranged in co-operation with the Centre for Science Education.

This course will be recognised if the school subject Biology has been passed on 200 level. Otherwise this course will be credited as (SCE 477) Subject Didactics General Science (Biology) 477.

**(SCE 472) Subject Didactics of Geography 472 (2 lectures + 1 p.) (14 credits)**

Nature and structure of the subject. Learning theory and strategies, whole class, group and individual learning. Methods to encourage independent study and a critical reasoning capacity in pupils. Remediation. Interpreting syllabi, negotiation and setting of objectives, evaluation, assessment and reflection. Identification and interpretation of resource materials. Administration and keeping of records, planning and arranging the practical and laboratory-based learning experience. Environmental issues related to the subject. Career guidance.

Practical: Model school to the equivalent of one week of teaching to be arranged in co-operation with the Centre for Science Education.

**(SCE 473) Subject Didactics of Agricultural Science 473 (2 lectures + 1 p.) (14 credits)**

Nature and structure of the subject. Learning theory and strategies, whole class, group and individual learning. Methods to encourage independent study and a critical reasoning capacity in pupils. Remediation. Interpreting syllabi, negotiation and setting of objectives, evaluation, assessment and reflection. Identification and interpretation of resource materials. Administration and keeping of records, planning and arranging the practical and laboratory-based learning experience. Environmental issues related to the subject. Career guidance. Laboratory safety and first aid.

Practical: Model school to the equivalent of one week of teaching practice to be arranged in co-operation with the Centre for Science Education.

**(SCE 474) Subject Didactics of Physical Science 474 (2 lectures + 1 p.) (14 credits)**

Nature and structure of the subject. Learning theory and strategies, whole class, group and individual learning. Methods to encourage independent study and a critical reasoning capacity in pupils. Remediation. Interpreting syllabi, negotiation and setting of objectives, evaluation, assessment and reflection. Identification and interpretation of resource materials. Administration and keeping of records, planning and arranging the practical and laboratory-based learning experience. Environmental issues related to the subject. Career guidance. Laboratory safety and first aid.

Practical: Model school to the equivalent of one week of teaching practice to be arranged in co-operation with the Centre for Science Education.

This course will be recognised if Physics or Chemistry has been passed on 200 level. Otherwise will this course be recognised as (SCE 478) Subject Didactics General Science (Physical Sciences) 477.

**(SCE 475) Subject Didactics of Computer Science 475 (2 lectures + 1 p.) (14 credits)**

Nature and structure of the subject. Learning theory and strategies, whole class, group and individual learning. Methods to encourage independent study and a critical reasoning capacity in pupils. Remediation. Interpreting syllabi, negotiation and setting of objectives, evaluation, assessment and reflection. Identification and interpretation of resource materials. Administration and keeping of records, planning and arranging the practical and

laboratory-based learning experience. Environmental issues related to the subject. Career guidance.

Practical: Model school to the equivalent of one week of teaching practice to be arranged in co-operation with the Centre for Science Education.

**(SCE 476) Subject Didactics of Mathematics 476 (2 lectures + 1 p.) (14 credits)**

Nature and structure of the subject. Learning theory and strategies, whole class, group and individual learning. Methods to encourage independent study and a critical reasoning capacity in pupils. Remediation. Interpreting syllabi, negotiation and setting of objectives, evaluation, assessment and reflection. Identification and interpretation of resource materials. Administration and keeping of records, planning and arranging the practical and laboratory-based learning experience. Environmental issues related to the subject. Career guidance.

Practical: Model school to the equivalent of one week of teaching practice to be arranged in co-operation with the Centre for Science Education.

**COURSES OFFERED BY OTHER FACULTIES**

**FACULTY OF HUMANITIES**

**(ENG 103) English 103: (2 l.p.w.) (3 credits)**

Lectures and tutorials with practical work on academic reading and writing in various subjects; previewing, skimming, close reading and summarizing of academic texts.

**(MTL 181) Medical Terminology 181 (3 l.p.w.)**

Medical terminology is a semester course. It is of use to any student who intends to study in a medical or a medically related field as well as fields of study which include human or animal anatomy.

The subject course is presented by the Academia Latina in collaboration with the Department of Ancient Languages. It is presented in the first as well as the second semester.

**(SLK 151) Psychological Perspectives 151 (2 lectures)**

**(SLK 152) Cognitive Processes 152 (2 lectures)**

**(SLK 153) Social Psychology I 153 (2 lectures)**

**(SLK 156) Development Systems Theory 156 (2 lectures)**

**(SLK 251) Personology 251**

**(SLK 252) Developmental Psychology I 252**

**(SLK 253) Developmental Psychology II 253**

**(SLK 254) Social Psychology II 254**

**(SLK 255) Perspective on the Family 255**

**(SLK 256) Psychological Assessment I 256**

**(SLK 351) Community Psychology I 351**

**(SLK 352) Abnormal Behaviour 352**

**(SLK 353) Critical Perspectives 353**

**(SLK 354) Community Psychology in Practice 354**

Consult Humanities Yearbook Part I.

## FACULTY OF NATURAL, AGRICULTURAL AND INFORMATION SCIENCES

Consult also PART I of the Rules and Syllabuses.

### **(SCI 150) Sciences 150 (5 lectures)**

Chemistry: Descriptive Inorganic Chemistry; characteristics and structure of matter, chemical compounds, chemical equations, radioactivity, gaseous state, oxidation, water and watery solutions, acids and bases, salts. (3 lectures per week)

Physics: History of mechanics and electricity. Use of mathematics in physics. Kinematics of a particle with constant acceleration. The concept of a force. Newton's laws of motion. (2 lectures per week)

### **(SCI 160) Sciences 160 (5 lectures)**

Chemistry: Introductory Organic Chemistry. Theory: Constitution, functional groups and classes of organic compounds, aromatic and heterocyclical compounds, macro molecules, carbohydrates, lipide, proteins, enzymes and nucleic acids. (3 lectures per week)

Physics: Equilibrium of a particle and a fixed body. Moment of a force. Work, energy and power. Momentum. Theory of heat. Electricity. (2 lectures per week)

### **(CMY 101) First course in Chemistry 101 (first semester: 4 lectures + 1 p. + 2 tutorials; second semester: 3 tutorials, 1 computer session)**

The same syllabus as for CMY 131. Lectures and practicals are presented together with CMY 131 during the first semester, with two additional tutor sessions per week. During the second semester, the course is enriched through repetition with three tutorial sessions and one computer session.

### **(CMY 102) General Chemistry 102 (first semester: 4 lectures (tutor and computer sessions will be determined annually by the lecturer); second semester: 4 lectures, 1x2 tutor sessions and 1p.)**

The same syllabus as for CMY 141. Lectures and practicals are presented together with CMY 141 during the second semester, with two additional tutorial sessions per week. During the first semester, the course is introduced by presenting three lecture/tutorial sessions and one computer session. Most of the content of the syllabus is therefore repeated during the second semester.

### **(CMY 131) First course in Chemistry 131 (4 lectures + 1 p.)**

Theory: General introduction to atoms, elements, nomenclature, chemical bonding and structure, chemical reactions, reaction stoichiometry, and chemical equilibrium (equilibrium systems, acids and bases, precipitation and complex formation).

Practical work: Synthesis, isolation, purification and properties of simple organic compounds, molecular structure (model-building sessions), and the quantitative and qualitative analysis of appropriate elements and compounds.

### **(CMY 141) General Chemistry 141 (4 lectures + 1 p.)**

Theory: General physical-inorganic chemistry: Physical behaviour of gases, liquids and solids, intermolecular forces, solutions, thermochemistry and chemical thermodynamics, electrochemistry. Descriptive inorganic chemistry: Main group and transition elements. Organic chemistry: Structure (bonding), nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds.

Practical work: Qualitative and quantitative analysis of appropriate elements and compounds, calorimetry, properties of solutions, electrochemical cells, molecular structure (model-building sessions) synthesis and properties of simple organic compounds.

**(CMY 112) First Course in Chemistry 112 (4 lectures + 1 p.)**

For Biological Sciences, Home Economics and Dietetics students

(If a student changes from one of these programmes to a BSc programme in Sciences, credit will only be given if a final mark of 60% was achieved)

Theory: General introduction to atoms, molecules, ions, compounds, chemical bonding, reaction equations, chemical equilibrium, acids, bases, reaction kinetics, sediment reactions, colloids and the three phases of matter.

Practical work: Synthesis of simple inorganic compounds and qualitative test for anions and cations.

**(CMY 122) General Chemistry 122 (4 lectures +1 p.)**

For Biological Sciences, Home Economics and Dietetics students

(If a student changes from one of these programmes to a BSc programme in Sciences, credit will only be given if a final mark of 60% was achieved)

Theory: Electro Chemistry, descriptive inorganic chemistry of certain main group elements. Organic chemistry: Nomenclature, functional groups, isomerism, introduction to typical organic reactions, carbohydrates, lipids, proteins and nucleic acids.

Practical work: Synthesis and characteristics of simple organic compounds

**(GGY 162) Remote Sensing 162 (1 p.)**

Use, interpretation and analysis of aerial photographs, satellite images and other remotely sensed data.

**(GGY 251) Raster GIS 251 (2 lectures + 1 p.)**

An introduction to Geographic Information Systems (GIS), types of GIS, data input, data analysis, data output and associated technology. Applications are investigated using a raster-based GIS.

**(PHY 181) General Physics 181 (4 lectures, 1p. (22 credits)**

Sem. 1: Units, vectors, one-dimensional kinematics, dynamics, work, balance, sound, fluids, heat, electricals potential and capacitance, optics, radio-activity.

Sem. 2: Two-dimensional kinematics, rotation movement, vibration and waves, the law of Gauss, circuits, magnetism, radiation.

The second semester is presented in English only.

This course is meant for students in the living (biological, medical, etc.) sciences.

**(PHY 131) General Physics 131 (4 lectures + 1 p.)**

This is the first semester of the PHY 181 course and is meant for students who require only one semester of Physics. The second semester of PHY 181 is presented only in English.

**(TRN 213) Site Surveying 213 (2 lectures + 1 p.)**

General surveying; instruments, their handling and adjusting; surveying systems and simple calculations; determining of levels; setting out of the works; tacheometry and plotting; scales, planimetry; areas and volumes; construction surveying; aerial photography.

**(VDG 120) Nutrition 120 (3 lectures)**

Socio-cultural factors that influence the forming of eating habits. The study of the eating habits of the different culture groups in Southern Africa. The use of dietary guides evaluating eating habits.

**(VDG 211) Nutrition 211 (3 lectures + 1 x 2 hour p.)**

Recommended daily dietary allowances - origin and application. Study of nutrients with regard to food sources, functions, metabolism, symptoms of deficiency, RDA recommendations. Energy metabolism. Theory of menu and meal planning.

**(VDG 320) Nutrition 320 (3 lectures + 1 x 2 hour p.)**

The role of nutrition in the life cycle. Specific problems related to nutrition, inter alia, tooth decay, obesity. Nutrition of the sportsman. Different conditions of malnutrition. Crash diets.

**(WTW 101) Mathematics 101 (4 lectures + 1 computer session + 1 tutor session)**

This course includes the syllabus of Calculus 114, as well as enrichment. Enrichment includes computer based modules.

Real numbers and the co-ordinate plane. Functions and their zeros. Polynomials. Exponential and logarithmic functions. Vector algebra. Limits and continuity. Calculus of single variable functions, rate of change, graph sketching, optimisation and applications. The first mean value theorem. The rule of L'Hospital. The determined and undetermined integral, the main theorem for integrals, the mean value theorem for integrals, integration techniques.

**(WTW 114) Calculus 114 (4 lectures + 1 tutorial of 3 hours)**

Vector algebra. Functions, limits and continuity. Differential calculus of single variable functions, rate of change, graph sketching, optimisation and applications. The mean value theorem. The rule of L'Hospital. Definite and indefinite integral, the fundamental theorem of calculus, the mean value theorem for integrals, integration techniques. This course also includes a formal technique mastering programme.

**(WTW 126) Linear Algebra 126 (2 lectures + 1 tutorial of 1½ hours)**

Matrices and their algebra, systems of linear equations, subspaces of  $\mathbb{R}^n$ , bases, determinants. Mathematical induction. Complex numbers and factorisation of polynomials.

**(WTW 128) Calculus 128 (2 lectures + 1 tutorial of 1½ hours)**

Important inverse functions. Integration techniques, improper integrals, numerical integration, elementary differential equations. Volume and surface areas, arc lengths. Conic sections. Elementary power series and Taylor's theorem. Plane curves, polar coordinates and vector-valued functions.

**GOLD FIELDS COMPUTER CENTRE FOR EDUCATION**

**(SCI 152) Computer and problem-solving skills 152 (2 l. + 2 p. van 2 hour p.w. ,14 weeks (6 credits)**

Computer literacy; administrative computer use; critical mind skills, mathematical problem solving with LOGO.

**(SCI 153) Academic Proficiency153 (1 l. per week, 7 weeks) (2 credits)**

Aims, time management, taking notes, mind charts, examination skills.

**(SCI 162) Computer and problem-solving Skills 162 (2 l. + 1 p. van 2 hour p. week, 14 weeks) (6 credits)**

Systems dynamics; computer modelling of dynamic elementary systems.

**(SCI 163) Basic research skills 163 (1 l. p. week, 7 weeks) (2 credits)**

Scientific findings; the scientific method; scientific publications; scientific ethics.

**BSc Extended programme**

**(EON 151) Basic Language Skills 151 (2 l.p.w., 7 weeks) (2 credits)**

Knowledge of basic grammar and basic vocabulary is revised, using documentary texts that are thematically subject related. In terms of skills the focus is placed on the development of receptive skills (listening and reading) on text level, while the development of the productive skills (speaking and writing) will also receive attention, but only on paragraph level.

**(EON 152) Basic Language Skills 152 (2 l.p.w., 7 weeks) (2 credits)**

Knowledge of general academic vocabulary is developed by means of general academic texts, that are thematically subject related. A foundation is laid in the knowledge of text, grammar and argumentation forms. All four the linguistic skills (listening, reading, speaking and writing) are practised on text level.

**(EON 153) Basic Language Skills 153 (2 l.p.w., 7 weeks) (2 credits)**

Knowledge of subject specific vocabulary is developed, using subject-specific academic and scientific texts. Basic knowledge of text, grammar and argumentation forms is broadened. Specific attention is given to the application of the two receptive skills (listening and reading) for academic purposes.

**(EON 154) Basic Language Skills 154 (2 l.p.w., 7 weeks) (2 credits)**

The focus is on developing and applying the four linguistic skills on text level for academic purposes. The two productive skills (speaking and writing) will receive special attention.

**FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES**

**(BME 120) Biometry 120: (3 l.p.w. and 1 p) (9 credits)**

Introductory course on the use of statistical methods in the biological and agricultural sciences: collection, summary and presentation of data. Concept of probability and test sample distributions. Testing of hypotheses. Design and analysis of experiments. Single correlation and regression. Simple contingency tables.

**(BME 210) Biometry 210: (3 l.p.w. and 1 p.) (9 credits)**

Multiple correlation and regression. Analysis and interpretation of factorial experiments. Single degree of freedom components. Sampling as additional source of variation. (With a view to practical work, attendance of a programming course is compulsory).

**(BME 220) Biometry 220: (3 l.p.w. and 1 p every 2nd week) (8 credits)**

Intertwining in factorial experiments. Partial repetitions of experiments. Split allotment designs. Hierarchical classifications. Covariance analysis (With a view to practical work, attendance of a programming course is compulsory).

**(EKN 110) Economics 110: (3 l.p.w.) (6 credits)**

Introduction to the study of economics, description of the economic system with specific reference to the Republic of South Africa, general principles of economic description,



economic subjects, objects and processes, the nature of economic activity in South Africa with reference to the economic structure and the business cycle. Economic theory: basic micro economic price determination, macro economic income determination, quantity theory, inflation, economic growth, the business cycles, economic development.

**(OBS 181) Business Management 181 (3 l.p.w.) (6 credits)**

**(OBS 182) Business Management 182 (3 l.p.w.) (6 credits)**

An overview of the business enterprise and the environment in which it operates. Entrepreneurship as well as the processes involved in setting up and managing a business. A broad overview of the business functions - general management, purchasing, human resource management, production, marketing, financial management, information management and the management of public relations. The role of technology and the management of innovation.

**(STK 151 and 152) Statistics 151 and 152**

**(STK 153 and STK 151) Statistics 153 and 151**

**(STK 163 and STK 152) Statistics 163 and 152**

**(WST 151) Mathematical Statistics 151**

**(WST 152) Mathematical Statistics 152**

Theory: Methods of sampling. Exploratory data analysis: Classification of data, graphical representations, descriptive measures. Calculating of probabilities. Introductory distribution theory and statistical inference: Point and interval estimation.

Practical work: Practical tasks related to theory.

## **FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT**

**(IGB 220) Engineering Management 220: (2 l.p.w. + 2 tutorials) (6 credits)**

Business management, human resource management, technology and innovation, decision analysis, systems engineering, manufacturing.

**(IGB 320) Engineering Management 320: (2 l.p.w. + 1 tutorial) (5 credits)**

Technology and innovation, decision analysis, systems engineering, entrepreneurship, project management, operations and maintenance.

**(LBC 420) Industrial Principles 420: (1 l.p.w. + 1 tutorial) (4 credits)**

Methodology of development design. Mechanisation, planning and management. Engineering models for agricultural production. Mathematical modeling of implement systems. Electricity on the farm.

**(LBP 420) Irrigation 420: (3 l.p.w. + tutorial + 1 p.) (10 credits)**

Water and soil suitable for irrigation. Plant, soil and water relations. Evaluation of irrigation systems and practices. Theory and design procedure for flood, sprinkler, drip and micro irrigation systems.

**(LGD 413) Soil Dynamics 413 (Capita Selecta from 410): (2 l.p.w. + ½ p.) (6 credits)**

Dynamic soil properties and its measuring, soil dynamics as applicable to soil cultivation and traction, soil compaction.

**(LGH 420) Soil Conservation and Hydrology 420 (Capita Selecta): (2 l.p.w.) (4 credits)**

Soil conservation: Erosion, and control measures to prevent it. Run-off control planning. Construction of earth dams. Planning and design of contour systems.

**(LHL 411) Hydraulics 411 (Capita Selecta) (2 l.p.w. + ½ p.) (6 credits)**

Turbines, centrifugal and other pumps for agricultural use. Design of drainage schemes and canal systems.

**(LIR 421) Agricultural Engineering 421: (3 l.p.w. and 1 p.) (9 credits)**

Hydrology: measurement of rain and determination of run-off. Hydraulics: waterflow in pipes and canals; pumps for agricultural use. Soil conservation: causes and effects of erosion; soil conservation measures. Agricultural production equipment: construction, use and application to various agricultural implements; mechanisation planning. Electricity: basic concepts, principles and applications.

**(LKW 222) Agricultural Power Units 222: (2 l.p.w. + 1 tutorial + ½ p.) (6 credits)**

Components of working principles of internal combustion engines. Gearboxes, differentials and final drives. Brake and steering systems. Hydraulic systems.

**(LLI 420) Rural Engineering 420: (3 l.p.w.) (6 credits)**

The planning, utilisation and management of natural resources in rural areas on a sustainable basis, planning and management of different irrigation systems, surface and subsurface drainage, soil and water conservation and structures, waste control and environmental planning.

**(LLS 410) Agricultural Structures 410: (3 l.p.w. + ½ p.) (8 credits)**

Building construction. Functional requirements for and design of farm-related structures; housing systems and handling facilities for different species of animals.

**(LPR 311) Processing 311: (3 l.p.w.) (6 credits)**

*Capita selecta* from LPR 320.

Food processing engineering. Mass and Energy Balance. Handling of fluids: theory and equipment. Centrifugation and Filtration. Storage and handling of solids. Basic instrumentation. Construction materials and their care. Cleaning-In-Position.

Practical work: Viewing and demonstration of appropriate equipment, factory visits.

**(LPR 312) Processing 312: (2 l.p.w. + ½ p.) (6 credits)**

*Capita selecta* from LPR 320.

Food processing equipment, heat transfer: convection, conduction and radiation. Heat exchanges. Pasteurisation, sterilisation and evaporation. Ovens and blast-furnaces. Generation and distribution of steam. Mass transfer: distillation, extraction, ion exchange, membrane techniques, drying. Instrumentation and drawings.

Practical work: viewing and demonstration of appropriate equipment. Factory visits.

(LPY 314 and 414) Practical training 314 and 414:

During or at the end of the second and third years of study, students undergo at least 6 weeks of prescribed practical training in the industry. A satisfactory report on the practical training must be submitted to the Faculty Administration within one week of registration.

**(LPW 410) Agricultural Production Equipment 410 (Capita Selecta): (2 l.p.w. + ½ p.) (6 credits)**

Aims of cultivation. Working principles and construction of different agricultural implements.

**(LSC 320) Project: Preparation 320: (1 tutorial per week) (1 credit)**

Identification of a suitable project for Project 402. Detailed literature study with accompanying report. Planning of project execution. Workshop practice.

**(LSC 402) Project 402: (1½ p. per week) (4 and 8 credits)**

Execution of the research project in chosen subject. Detailed project report. Presentation to SAIIE members

**(LSQ 313) Communication 313: (1 tutorial per week) (1 credit)**

Principles and forms of verbal and written communication. Delivering speeches on various subjects.

**(LXF 110 en 120) Forum 110 and 120: (1 tutorial per week) (1 credit each)**

A general information period involving students, external persons and lectures.

**(MIT 112) Engineering Drawing 112: (2 l.p.w. + 1 p.) (7 credits)**

Free hand sketch work covering: Perspective, isometric and orthographic drawings. Drawing conventions, graphic techniques and assembly drawings. Evaluation of drawings and error detection. True lengths, planes, projections and intersection curves. Practical applications of these techniques. Schematic representation in chemical, electrical, mechanical and civil engineering systems. Introduction to computer aided drawing of components including: Crosshatching, dimensioning and detailing.

**(MOW 121) Machine Design 121: (2 l.p.w. + 2 p.) (10 credits)**

Introduction to engineering design and innovation. Engineering aspects of parts and components, assembly of basic machine components with the aid of functional sketches.

**(MRV 122) Computer Literacy 122: (2 tutorials per week) (2 credits)**

Basic computer architecture: Central processing unit, instructions sets, memory, peripherals, operating systems, compilers and network architecture. Application software: Wordprocessor, spreadsheet and library/reference software. Numerical computation software: Introduction and use of an advanced numerical processing programme to solve general engineering problem solutions.

**(TKN 310) Terrain Construction 310 (Capita Selecta): (2 l.p.w. + 1 p.) (7 credits)**

Hydrology, water resources. Evaporation losses. Sedimentation. Water pollution and – purification. Soil losses. Hydraulics.

**(WKD 111) Atmospheric Processes 111: (2 l.p.w. & p.) (5 credits)**

Weather and climate. Composition of the atmosphere. Temperature distribution. Radiation. Atmospheric mass and pressure. Hadley and Walker circulation. ENSO. Climate change. The artificial greenhouse effect. Heat transfer. Urban and rural climates. Equation of state. Phases of water and latent heat. Vapor pressure. Dew point temperature and relative humidity. Cloud formation. Sensible heat. Acquisition of data from the South African Weather Bureau. Composition of a report and the submission of results.

Practical work: Climate statistics of South Africa. Instrumentation. Weather, pressure, temperature and wind observations.

**(WKD 112) Atmospheric Circulation 112: (2 l.p.w. + ° p.) (6 credits)**

Horizontal and vertical pressure differences and circulation. Convergence, divergence, convection and subsidence. Ozone. Pressure distribution. Parcel of air. Adiabatic processes. Angular velocity of the earth. Cyclones and anti-cyclones. Geostrophic wind.

Vapor pressure. Dry adiabatic-, wet adiabatic- and environmental temperature lapse rates. Development of clouds. Air mass thunder storms. Inter-tropical convergence zone (ITCZ). Monsoon rain. Frontal systems. Cut-off low. Coastal low. Jet streams. Tropical cyclones. Weather map analysis. Composition and submission of a report.  
Practical work: Visibility. Cloud classification. Synoptic reports. Graphical display of data. Synoptic map analysis.

**MEDALS AND PRIZES IN THE FACULTY**

<b>Name</b>	<b>Donor</b>	<b>Award</b>
Agrihold Trophy	Agrihold	To the final year BSc(Agric) student in Plant Pathology with the best performance in his or her major subject
Johan J Theron Trophy	Prof Johan J Theron	The best BSc student with Human Physiology as a major subject
Junior Captain Scott Commemorative Medal	South African Biological Society	To the student who submits the best MSc dissertation in a biological field and on a subject to be determined by the donor
AEASA Prize	Agricultural Economics Association of South Africa	To the best undergraduate student in Agricultural Economics, BSc(Agric), or BCom, who achieves an average mark of at least 70% in Agricultural Economics throughout the years of study
Margaretha Mes Medal	Botany Department	For the best BSc(Hons) student who obtains the degree with a pass mark of at least 65% and whose essay is based on an aspect of Plant Physiology
Merck Merit Award for Biochemistry (Honours)	Merck Chemicals (South Africa)	To the best student who obtains the Honours degree in Biochemistry with distinction
SAAB Junior Medal for Botany*	South African Association for Botany	For the best doctoral thesis submitted at a South African university by a person not older than 35 years
Schweickerdt Medal for Botany	The late Prof H G W J Schweickerdt	To the best BSc(Hons) student who obtained the degree with a pass mark of at least 65% and whose essay is based on an aspect of Botany other than Plant Physiology
ZSSA Prize for Zoology	Zoological Society of Southern Africa	To the Honours student who obtains the BSc(Hons) degree with the highest average mark, with the proviso that the degree is awarded with distinction
Zoological Society of Southern Africa Prize	Zoological Society of Southern Africa	To the best student in Zoology at 300 level
Genetics Honours Achievement Award	Genetics Department	To the best Honours student in Genetics
SA Genetics Society Hofmeyer-Van Schaik Prize	South African Genetics Society	To the best BSc(Agric) or BSc(Hons) student in the fourth year of study who achieves a final mark of at least 75% in Genetics

<b>Name</b>	<b>Donor</b>	<b>Award</b>
Margaretha Mes Commemorative Prize	South African Association of University Women (Pretoria branch)	To the best female student in Botany at the 300 level
A.M. Bosman Medal	Farmers' Weekly	To the most deserving post graduate student in Animal Science
H.B. Davel Medal	Farmers' Weekly	To the student who completes the BSc(Agric) degree most successfully
Medal of the South African Society of Crop Production	South African Society of Crop Production	To the best BSc(Agric) student in Crop Production
Dr and Mrs Geyer Floating Trophy	Dr and Mrs J W Geyer	Awarded to a student in the Faculty of Biology and Agricultural Sciences for academic excellence as well as other achievement
Citrus Bursary Floating Trophy	Citrus Bursary	To the best final year student in Plant Pathology or Microbiology with at least 70% as a final mark in the major subjects
J J Veenstra Floating Trophy	Mr J J Veenstra	To the Animal Sciences student who achieves distinction in both the theoretical as well as the practical aspects of the degree
SAAFoSt Academic Merit Award	South African Association for Food Science and Technology	To the most outstanding student in the final year of the BSc(Agric) degree with specialisation in Food Science
SASAS Prize	South African Society of Animal Science	To the most outstanding undergraduate in Animal Science
SASAS Transvaal Branch Award	South African Society of Animal Science	To the most outstanding undergraduate student in the third year of study in Animal Science
Koos van der Merwe/ AFMA Prize	Animal Feed and Manufacture Association	To a student in the final year of study for the best achievement in Animal Nutrition at any South African university*
SASAS Prize	South African Society of Animal Science	To the most outstanding post graduate student(s) in Animal Science at Master's and Doctoral level at any South African university
SAPBA Prize	South African Plant Breeders Association	To the best final year student in Plant Breeding
SASDT Meritorious Award	South African Society of Dairy Technology	To a student in the department of Food Science who achieves outstanding academic results, and who displays exceptional enthusiasm for the dairy component of the syllabus
Omnia Fertilizer Award	Omnia Fertilizer Incorporated	To the best final year student in Plant Production and Soil Science

<b>Name</b>	<b>Donor</b>	<b>Award</b>
Richards Bay Minerals Junior Prestige Award	Richards Bay Minerals	For best Honours student in Zoology
Richards Bay Minerals Junior Prestige Award	Richards Bay Minerals	For best achievement in Zoology at Master's level
Richards Bay Minerals Senior Award	Richards Bay Minerals	For best achievement in Zoology at Doctoral level
<b>Award in Agrarian Extension</b>		
Bronze Medal of Honour from the South African Society for Agricultural Extension	South African Society for Agricultural Extension	To the best Honours student in Agricultural Extension
<b>Wildlife Management</b>		
Van Schaik Prize in Wildlife Management	J L van Schaik Publishers	For the best achievement by a BSc(Hons) student in the final examination with specialisation in Wildlife Management
Welder Wildlife Foundation Texas Merit Award	Centre for Wildlife Research	To the best BSc(Hons) student with specialisation in Wildlife Management who achieved a final mark of at least 70%
<b>Other</b>		
SRC Medal of Honour	Student Representative Council	To the student who contributed most to the student community

\* Not limited to the Faculty of Biological and Agricultural Sciences

*The Afrikaans text of this publication is the official version and will be given precedence in the interpretation of the content.*