Faculty of Natural and Agricultural Sciences

RULE BOOK 2017

Qwaqwa Campus

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UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
NATURAL AND AGRICULTURAL SCIENCES
NATUUR- EN LANDBOUWETENSKAPPE

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

RULE BOOK 2017

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Content

1. USING THE RULE BOOK

The Rule Book contains information that will enable students to plan their undergraduate as well as postgraduate studies in the Faculty of Natural and Agricultural Sciences, University of the Free State (UFS). The information can be divided into three sections, namely general administrative information, academic learning programmes and module content.

In the first section students will find:

- Contact details of the academic administration officials in the Dean's office and at the student administration in the George du Toit Administration Building.
- Contact details of the different programme directors where students can get academic advice and assistance when choosing an appropriate learning programme. Consultations outside registration periods (January and July) are only available per appointment.
- Qualification types, the structure and the constitution of the qualifications.
- Core competencies for graduates.

The second section consists of:

- Faculty rules.
- Qualifications offered by the Faculty.
- Learning programmes for different qualifications.
- Transitional Rules.

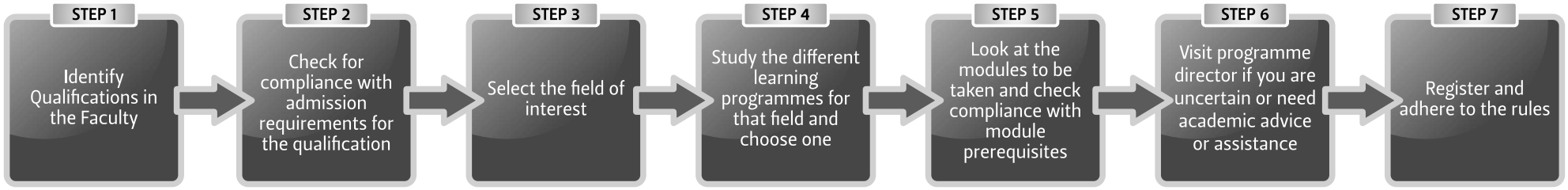
The third section contains module content information:

- Department in which modules are offered.
- Module code, NQF Level, number of credits and CESM categories.
- Prerequisites, module name and contact sessions.
- Content of the module and the method of assessment.

The Rule Book describes students' rights and obligations. The academic programmes must be regarded as part of the agreement between the Faculty and the students. Students registering for a programme in the Faculty must adhere to the General Rules For Undergraduate Qualifications, Postgraduate Diplomas, Bachelor Honours Degrees, Master's Degrees, Doctoral Degrees, Higher Doctorates, Honorary Degrees and the Convocation (General Rules) as well as the Rules of the Faculty of Natural and Agricultural Sciences. Students will only be allowed to register if they comply with all the admission requirements.

It is important to note that even though the outcomes of academic programmes will remain unchanged from the first time of registration, minor changes to learning programmes, modules and module content may occur so that the Faculty of Natural and Agricultural Sciences can ensure the relevance of the degrees. Students must therefore consult the new Rule Book every academic year before registration to ensure alignment with updated curricula, as the Faculty updates the Rule Book to keep abreast of the latest scientific developments as well as national directives. It is the student's **responsibility** to be fully conversant with these rules.

Students need to follow these steps when determining the modules for which they have to register:



2. CONTACT DETAILS: OFFICE OF THE DEAN AND ACADEMIC ADMINISTRATION – BLOEMFONTEIN CAMPUS

POSITION	DEAN	FACULTY MANAGER	LEARNING AND TEACHING MANAGER	NATURAL SCIENCES UNDERGRADUATE AND BACHELOR HONOURS	AGRICULTURE AND BUILDING SCIENCES	MASTER'S AND DOCTORAL DEGREES
NAME	Prof. Danie Vermeulen	Ms Lee-Ann Frazenburg	Ms Elzmarie Oosthuizen	Ms Meriam Jogom Ms Chantelle Joseph	Ms Epefia Maboa Ms Bertha Motloung	Ms Simone Williams
BUILDING	Room 9, Biology Building http://www.ufs.ac.za/natagri	Room 11, Biology Building	Room 10, Biology Building	Glass doors B1/B6, George du Toit Administration Building	Glass doors, A3/Room N143 George du Toit Administration Building	Room 315 / 322A, George du Toit Administration Building
TELEPHONE NR	051 401 2482	051 401 3199	051 401 2934	051 401 9271	051 401 2943	051 401 2943 / 9360
E-MAIL	dean@ufs.ac.za	damonsle@ufs.ac.za	oosthuizenem@ufs.ac.za	Jogommm@ufs.ac.za	maboaemb@ufs.ac.za	bassonmg@ufs.ac.za

3. CONTACT DETAILS

3.1 PROGRAMME DIRECTORS – BLOEMFONTEIN CAMPUS

Programme	Architecture	Agricultural Sciences	Agricultural Economics Agricultural Management	Biochemistry	Botany, Plant Breeding, Plant Health Ecology, Plant Pathology, Environmental Rehabilitation	Computer Science & Informatics	Consumer Science	Disaster Management	Environmental Management	Extended and UPP Agricultural Sciences	Genetics, Behavioural Genetics, Human Molecular Biology,
Name	Mr Jako Olivier	Prof. Japie van Wyk	Dr Antonie Geyer	Dr Frans O'Neill	Dr Botma Visser	Mr Jaco Marais	Prof. Hester Steyn	Ms Olivia Kunguma	Mrs Theresa Soci	Ms Elzmarie Oosthuizen	Mrs Z Murray
Building	Room 26, ARG111, Architecture Building	Room LG 3. G02, Agriculture Building	Room LG 1.129 Agriculture Building	Room 5, Biotechnology Building	Room 134, Biology Building	Room WWG210, Mathematical Sciences Building	Room LG 9.106, Agriculture Building	Room LG3.105 Agriculture Building	Room LG10.103 Agriculture Building	Room 10, Biology Building	Room 6 Genetics Building
Telephone Nr	051 401 2332	051 401 2677	051 401 9053	051 401 7553	051 401 3278	051 401 2929	051 401 2304	051 401 2721	051 401 2863	051 401 2934	051-4012776
E-mail	olivierji@ufs.ac.za	vanwykjb@ufs.ac.za	geyerac@ufs.ac.za	oneillFH@ufs.ac.za	visserb@ufs.ac.za	maraisj@ufs.ac.za	steynhj@ufs.ac.za	KungumaO@ufs.ac.za	avenantmf@ufs.ac.za	oosthuizenem@ufs.ac.za	MurrayZ@ufs.ac.za

Programme	Geography	Geology	Geohydrology	Mathematical Sciences	Mathematical Statistics and Actuarial Science	Microbiology, Microbial Biotechnology	Physics, Chemistry	Quantity Surveying and Construction Management	Sustainable Agriculture	Urban and Regional Planning	UPP and Extended Natural Sciences	Zoology and Entomology
Name	Ms Eldalize Kruger	Ms Justine Magson	Mrs Amy Allwright	Mr Christiaan Venter	Dr Michael J. von Maltitz	Prof. Koos Albertyn	Dr Johan Venter	Dr Benita Zulch	Dr Johan van Niekerk	Dr Thulisile Mphambukeli	Mr. Pieter Bothma	Dr Candice Jansen van Rensburg
Building	Room GEO 2.2, Geography Building	Room GG 305, Geology Building	Room 21 Institute for Grandwater studies(IGS)	Room WWG 121, Mathematical Sciences Building	Room W102, Mathematical West Block	Room C101, Biotechnology Building	Room CEM 101, Chemistry Building	Room 6, Quantity Surveying and Construction Management	Room 1B 68 Agriculture Building	Room 11, ARG11, Architecture Building	Dean's Office: Natural and Agricultural Sciences	Room D119a, Biology Building
Telephone Nr	051 401 2185	051 401 2373	051 401 3481	051 401 2320	051 401 2609 / 2933	051 401 2223	051 401 3336	051 401 3849	051 401 3765	051 401 3530	083 542 9995	051 401 9357
E-mail	krugere@ufs.ac.za	MarkramJ1@ufs.ac.za	MatthewsAJ@ufs.ac.za	venterc@ufs.ac.za	vmaltitzmj@ufs.ac.za	albertynj@ufs.ac.za	venterja@ufs.ac.za	zulchbg@ufs.ac.za	vNiekerkJA@ufs.ac.za	mphambukelit@ufs.ac.za	BothmaPJ@ufs.ac.za	JvRensC@ufs.ac.za

3.2 ACADEMIC ADMINISTRATION AND PROGRAMME DIRECTORS – QWAQWA CAMPUS

Programme	ASSISTANT DEAN QWAQWA	FACULTY OFFICER: QWAQWA	UPP and Extended Natural Sciences	Biological Sciences	Mathematics and Computer Science and Informatics	Physics, Chemistry
Name	Dr Tom Ashafa	Ms Mpho Leripa	Ms Lea Koenig	Dr Emile Bredenhand	Mr Teboho Lesesa	Mr Richard Ocaya
Building	Natural Science Building	Room 5, Science Building	NAS111, Natural Science Building	Room 2032/R, Science Building	Room LB2014, Library Building	Room 0007, Science Building
Telephone Number	058 718 5134	058 718 5132	058 718 5207	058 718 5322	058 718 5235	058 718 5301
E-mail	ashafaaot@ufs.ac.zz	leripamp@ufs.ac.za	koenigL@ufs.ac.za	bredenhande@ufs.ac.za	lesesaT@ufs.ac.za	ocayaRO@ufs.ac.za

4. ACADEMIC STAFF

	AGRICULTURAL ECONOMICS (051 401 2824)	**ANIMAL, WILDLIFE AND GRASSLAND SCIENCES** (051 401 2211)	**SOIL, CROP AND CLIMATE SCIENCES** (051 401 2212)	**CONSUMER SCIENCE**
Professor	Prof. B.J. Willemse	Prof. G.N. Smit, Prof. H.A. Snyman, Prof. J.B. van Wyk, **Prof. F.W.C. Neser***	***Prof. C.C. du Preez** Prof. L.D. van Rensburg	
Professors Extraordinary		Prof. M.M. Scholtz,		
Associate Professor	Prof. B. Grové		Prof. C.W. van Huyssteen	***Prof. H.J.H. Steyn**
Affiliated Professors			Prof. S. Walker	
Affiliated Associate Professor		Prof. F.B. Bercovitch, Prof. V.P Ducrocq, Prof. J.P.C Greyling	Prof. M. Tsubo, Prof. R. van Antwerpen	
Senior Lecturer	***Dr H. Jordaan (Acting)**	Dr M.D. Fair	Dr J. Allemann, Dr J.H. Barnard , Dr G.M. Ceronio, Dr G.M. Coetzer, Dr A.C. Franke, Dr E. Kotzé, Dr E.van der Watt, Dr J.J. Van Tol	
Lecturers	Dr N. Matthews, Dr A.A. Ogundeji, Mr F.A. Maré, Mr J.I.F. Henning, Mr P. Mokhatla, Mr H.N. van Niekerk	Dr P.J. Malan, Mr F.H. de Witt, Mr O.B. Einkamerer, Dr F. Deacon, Mr M.B Raito, Dr A.Y Chulayo	Ms M.P Aghoghovwia, Ms L. de Wet Mr A.S. Steyn, Dr W.A Tesfhuneg, Mr P.C Tharaga	Dr I. van der Merwe, Dr J.F. Vermaas, Dr N. Cronje
Junior Lecturers	Mr W.A. Lombard, Ms M. Venter	Dr B.B. Janecke, Mr G. Jense van Rensburg		Ms J.S. van Zyl, Ms P.Z. Swart, Ms N. Tinta
Lecturers Units	Ms P. Madende		Ms V.N Mathinya	
Research Associate			Prof. J.C. Pretorius	
Junior Researcher	Dr Y.T. Batha			
Agricultural Engineering	Mr J.J. van Staden			

	ARCHITECTURE (051 401 2332)	**QUANTITY SURVEYING AND CONSTRUCTION MANAGEMENT** (051 401 2248)	**URBAN AND REGIONAL PLANNING** (051 401 2486)	**ENGINEERING SUBJECTS** (051 401 7665)
Professor			Prof. V.J. Nel	
Associate Professor	Prof. J. Noble	***Prof. K. Kajimo-Shakantu**		Prof H.J. Marx
Affiliated Professor			Prof. J.J. Steyn	
Senior Lecturers	Ms M. Bitzer, Ms P.N. Tumubweinee, Ms A. Wagener Mr J. L. du Preez, Dr G. Bosman	Dr B.G. Zulch	***Dr M.M. Campbell**	Mr L.F. Lagrange
Lecturers	Mr J.W. Ras, Mr. J. H. Nel, Mr H. Raubenheimer, Mr Z.G. Wessels	Mr P.M. Oosthuizen, Ms M. Els, Dr T Froise, Ms T Bremer, Ms E. Jacobs, Ms O.R.C. du Preez (contract lecturer)	Dr T Mphambukeli, Mr T Stewart	Mr. B.J. Swart Mr R.J. Homann
Junior Lecturers	***Mr H.B. Pretorius**, Mr J.I. Olivier, Mr D.P.G. van der Merwe	Mr H du Plessis, Mr R Seedat, Me K Tswhane	Mr S Donoon-Stevens Mr KS Mocwagae	Mr N.C. Bernstein
Research Fellow		Prof. J.J.P Verster	Dr YB Mashalaba	

	CHEMISTRY (051 401 9212)	**COMPUTER SCIENCE AND INFORMATICS** (051 401 2754)	**GENETICS** (051 401 2595)	**GEOGRAPHY** (051 401 2255)	**GEOLOGY** (051 401 2515)	**MATHEMATICS AND APPLIED MATHEMATICS** (051 401 2691)	**MATHEMATICAL STATISTICS AND ACTUARIAL SCIENCE** (051 401 2311)
Distinguished Professor							
Senior Professor						***Prof. J.H. Meyer**	Prof. M.S. Finkelstein
Professor	**Prof. A Roodt**		***Prof. J.P. Grobler**				Prof. R. Schall
Adjunct Professor		Prof E. Nel					Dr J.M. van Zyl
Professor Researcher							
Professors Extraordinary							
Professors	Prof. J.C. Swarts, Prof. B.C.B. Bezuidenhoudt, Prof. J. Conradie	***Prof. P.J. Blignaut**					
Associate Professors	**Prof. W. Purcell*** Prof. H.G. Visser, Prof. K von Eschwege	Prof. T. Beelders			Prof. W.P. Colliston, Prof. M. Tredoux,	Prof. T.M. Acho, Prof. T. Vetrik	
Affiliated Professors	Prof. D. Ferreira, Prof. K. Swart, Prof. T. van der Merwe, Prof. S. Otto, Prof. J.M. Botha		Prof. T.E. Turner		Prof. D.E. Miller, Prof. R. Scheepers, Prof. G.Germs		
Affiliated Associate Professors	Prof. G. Fouché, Prof. G.Steyl		Prof. A. Kotzé		Prof. L. Jacobson Prof. R. Schouwstra		
Senior Lecturers	Dr S.L. Bonnet, Dr J.A. Venter, Dr E.H.G. Langner, Dr E. Erasmus	Dr L. de Wet, Dr J.E. Kotze,	Dr K. Ehlers, Dr GM Marx,	***Dr C.H. Barker** Dr J.J le Roux	**Dr F. Roelofse***	Ms J.S. van Niekerk, Dr S. Dorfling	Dr L van der Merwe, ***Mr F.F. Koning,** Dr D. Chikobvu, Dr A. Verster
Senior Lecturer-researcher	Dr A. Brink, Dr M. Schutte-Smith, Dr E. Müller				Dr H.E. Praekelt		
Lecturers	Dr L. Twigge, Dr R. Shago, Dr A. Wilhelm, Ms A-L. Manicum	Ms E.H. Dednam, Dr A.J. Burger, Mr W. Nel, Mr R. Brown, Mr R.C. Fouché. Mr W.S.J. Marais. Mr J-P du Plessis, Mr D. Wium, M T Nkalai	Mr M.F. Maleka, Mr J.A. Viljoen, Ms S-R Schneider, Ms Z. Odendaal, Ms H. Bindeman, Dr E Mwenesongole, Ms L. Wessels	Ms E. Kruger, Ms T.C. Mehlomakhulu, Dr R.T. Massey, Ms A. Pretorius, Mr A.J. van der Walt, Ms L. Rudolph, Ms E. Nkoee	Mr A.I. Odendaal, Dr R. Hansen	Ms A.F. Kleynhans, Mr C. Venter, Mnr M. Fasondini, Mnr B.E de Klerk, Dr A. Kriel, Dr E. Ngounda	Mr A.M. Naudé, Dr M.J. von Maltitz, Mr S. van der Merwe, Ms E. Girmay, Ms W. Oosthuizen, Ms Z. Ludick, Dr M. Sjölander, Mr J. Blomerus, Mr J. Venter
Affiliated Lecturers			Dr D.L. Dalton, Lt.-Col. A. Lucassen				
Junior Lecturers		Ms M.J.F. Botha,		Ms A. Pretorius, Mr AJ. van der Walt	Ms J. Magson, Ms T. Mapholi, Mr R. Rentel, Ms R. Makhadi	Ms A. Swart	
Subject Coordinators	Dr C. Marais, Ms R. Meintjes						
Academic Facilitators	Ms. M du Plessie Ms. B van Tonder Ms. C de Kkerk						

	CHEMISTRY (058 718 5130)	COMPUTER SCIENCE AND INFORMATICS (058-718 5216)	GEOGRAPHY (058-718 5476)	MATHEMATICS AND APPLIED MATHEMATICS (058-718 5204)
QWAQWA-CAMPUS				
Affiliated Professors	Prof. A.S. Luyt			
Senior Lecturers			Dr G. Mukwada, Dr T.W. Okello	
Lecturers	Dr N.F. Molefe, Mr T.A. Tsotetsi, Ms M.A. Malimabe, Mr K. Mpitso	Mr R.M. Alfonsi, ***Dr R.D. Wario,** Mr A.G. Musa, Mr M.B. Mase, Mr G.J. Dollman	Ms M. Naidoo, ***Dr S.A. Adelabu**, Mr P.S. Mahasa, Dr MM Hansen	***Mr S.P. Mbambo,** Mr S. Nkosi
Junior Lecturers	***Mr R.G. Moji**	Mr B. Sebastian, Mr F.M. Radebe, Mr T. Lesesa	Ms N.M. Sekhele	Ms H.C. Faber

	MICROBIAL, BIOCHEMICAL AND FOOD BIOTECHNOLOGY (051 401 2396)		PHYSICS (051 401 2321)	PLANT SCIENCES (051 401 2514)			ZOOLOGY AND ENTOMOLOGY (051 401 2427)
	Division of Microbiology and Biochemistry	**Division of Food Science**		**Division of Plant Pathology**	**Division of Botany**	**Division of Plant Breeding**	
Senior Professor			Prof. H.C. Swart, Prof. P.J. Meintjes				
Professor	***Prof. M.S. Smit,** Prof.J.C.du Preez, Prof.J.Albertyn, Prof. R.R. Bragg, Prof.S.G.Kilian, Prof. E. van Heerden, Prof. B.C. Viljoen, Prof. C.H. Pohl-Albertyn	Prof.G.Osthoff	, ***Prof. J.J. Terblans,** Prof. W.D. Roos	Prof. N.W. McLaren Prof. Z.A. Pretorius Prof. W.J. Swart		Prof. M.T. Labuschagne	***Prof. L. Basson,** Prof. S. v.d. M. Louw
Professors Extraordinary							Prof. G.L. Prinsloo, Prof. L.J. Fourie
Associate Professors		Prof. A. Hugo, Prof. C.J. Hugo	Prof. M.J.H. Hoffman Prof. R.E. Kroon			***Prof. L. Herselman**	Prof. L.L. van As
Affiliated Professors	Prof. M.F. DeFlaun			Prof. P. Crous			
Affiliated Associate Professors	Prof. E.J. Lodolo		Prof. K.T. Hillie			Prof. R. Prins, Prof. J.B.J. van Rensburg	
Senior Lecturers	Dr H.G. O'Neill, Dr F.H. O'Neilll, Dr D. Opperman, Dr O.M. Sebolai	Dr J. Myburgh, Dr M. de Wit	Dr R.A. Harris	Dr W.H.P. Boshoff, Dr G.J. Marais	Dr G.P. Potgieter, Dr B. Visser	Dr A. van Biljon, Dr N.G. Lebaka, Dr S. Ramburan	Dr C.R. Haddad, Dr M. Ndlovu
Lecturers	Dr C.W. Swart-Pistor, Dr C.E. Boucher,	Dr C. Bothma	Dr B. van Soelen, Dr A Odendaal		Dr M. Cawood, Dr M. Jackson, Dr L. Joubert, Dr L. Mohase	Dr A. Minnaar-Ontong, Dr R. van der Merwe	Ms E.M.S.P. van Dalen, Mr H.J.B. Butler, Dr C. Jansen van Rensburg, Dr S Brink
Junior Lecturers	Mr W.P.D. Schabort				Ms M. Westcott		Mr V.R. Swart, Ms L. Heyns, Mr D Fourie
Research Associates					Prof P.J. du Preez, Prof. J.U. Grobbelaar, Dr S. Ramburan, Dr L. Rossouw, Dr A.M. Venter, Prof H.J.T. Venter		
Senior Researcher	Dr. G. Kemp		Dr E Coetsee-Hugo		Prof. L. Scott		
Researcher	Ms L. Steyn		Dr M Duvenhage				

QWAQWA-CAMPUS	MICROBIAL, BIOCHEMICAL AND FOOD BIOTECHNOLOGY		PHYSICS (058 718 5302)	PLANT SCIENCES (058 718 5332)			ZOOLOGY AND ENTOMOLOGY (058 7185324)
	Division of Microbiology and Biochemistry	Division of Food Science		Plant Pathology	Botany	Plant Breeding	
Professor			Prof. B.F. Dejene				
Senior Lecturers			Dr L.F. Koao		Dr A.O.T. Ashafa, Dr L.V. Komoreng, Dr S-L. Steenhuisen		Dr A. le Roux, Dr P. Voua Otomo
Lecturers			***Dr K.G. Tshabalala,** Mr R.O. Ocaya, Mr S.J. Motloung		***Dr R. Ngara,** Mr T.R. Pitso		***Dr P.M. Leeto,** Dr J. van As, Dr E. Bredenhand
Junior Lecturers							Ms M. van As
Associate Researchers					Dr A.O. Aiyegoro, Prof. R.O. Moffett		
Affiliated Researcher					Prof. D.A. Akinpelu		

	DiMTEC (051 401 2721)	CENTRE FOR MICROSCOPY (051 401 2264)	CENTRE FOR ENVIRONMENTAL MANAGEMENT (051 401 2863)	CENTRE FOR SUSTAINABLE AGRICULTURE, RURAL DEVELOPMENT AND EXTENSION (051 401 2163)	INSTITUTE FOR GROUNDWATER STUDIES (051 401 2175)
Director			***Ms M.F. Avenant (acting)**	***Dr J.A. van Niekerk**	***Mr E Lukas (acting)**
Professor	Prof. R Bragg, Dr D Sakulski				Prof. PAL le Roux
Associate Professor	Prof. B. Grové, ***Prof A. Jordaan**	***Prof. P.W.J. van Wyk**			Prof. A Atangana
Affiliated Professors			Prof. A. Turton		
Affiliated Associate Professors					Prof. K.T. Witthüser
Affiliated Researchers	Mr W.F Ellis				Prof. JF Botha, Ms YL Kotze
Senior Lecturer	Dr L. Terblanche, Dr D Chikobvu, Dr C Barker, Dr A.O Ogundeji			Mr JW Swanepoel, Me JH Ngwenya	Dr FD Fourie
Lecturers	Mr J. Belle, Ms A Ncube, Ms O Kunguma, Mr C Dreyer, Ms L de Wet. Dr H Booysen, Dr M. Schutte-Smith, Dr E. du Plessis, Mr S Carstens. Mr A Kesten		Dr F.T. Buschke, Dr O.O. Ololade, Ms S. Esterhuyse, Ms M. F. Avenant		Mr SS de Lange, Mr PH Lourens
Junior Lecturers	Ms L Nogabe Ms A van Rooyen Mr M. Procter, Mr T. Mudamburi				Ms A Allwright
	Ms O. Kunguma, Ms A. Ncube, Ms J. Belle, Mr A.O. Ogundeji				
Lecturers/Researchers					Dr M Gomo
Postdoctorate Researchers					Dr A. Atangana
Research Associate			Dr N.L. Avenant, Dr H. Bezuidenhout, Dr J. Brink, Dr D. Codron, Dr N.B. Collins, Mr P. Grundlingh, Dr J.R. Henschel, Dr F. Kruger Dr S. Mitchell, Prof. M.T. Seaman, Dr D.F. Toerien, Dr A. Weaver Dr P.C. Zietsman	Prof. A.E. Nesumvuni, Dr. B.D. Nkosi, Dr. E.M. Zwane, Dr. P Tirivanhu, Dr W Ntshangase	
Chief Scientist					

*** Academic Departmental Head**

5. REVISED QUALIFICATION TYPES AND DEGREE CODES

Higher Education Qualifications Sub-Framework (HEQSF) contains eleven qualification types mapped on to the six levels of the National Qualifications Framework (NQF) offered by higher education institutions. Some levels have more than one qualification type. The following qualification types are presented at the Faculty of Natural and Agricultural Sciences, UFS:

UNDERGRADUATE QUALIFICATIONS				POSTGRADUATE QUALIFICATIONS			
Type of qualification	**Exit level**	**Minimum total credits**	**Credits and level**	**Type of qualification**	**Exit Level**	**Minimum total credits**	**Credits and level**
Advanced Diploma	7	120	Minimum 120 credits at Level 7	Postgraduate Diploma	8	120	Minimum 120 credits at Level 8
Bachelor's Degree	7	360	Minimum 120 credits at Level 7	Bachelor Honours Degree	8	120	Minimum 120 credits at Level 8
Professional Bachelor's Degree	8	480	Minimum 120 credits at Level 8	Master's Degree	9	180	Minimum 180 credits at Level 9
				Doctoral Degree	10	360	Minimum 360 credits at Level 10

Each of these qualifications are registered with SAQA and DHET and are linked to a unique degree code on the Programme and Qualification Mix (PQM) of the University of the Free State.

Table 1: Degree Codes

First	**Second**				**Third**				**Fifth**
Faculty	Exit level qualifier				Faculty specific				
4 - Natural Sciences 5 – Agriculture Science	1-4 Undergraduate		5-9 Postgraduate		**Natural Sciences**				Degrees with designator 0 = old and 1 = reviewed.
	*Certificates (Higher/ Advanced)	1	*Honours degree	6	Biological Sciences	1	Computer Science and Informatics	6	
	*Diplomas (360-credits/240-credits/ Advanced)	2	*Master's degree (Course work/ Professional)	7	Mathematical Sciences	2	Consumer Science	7	
	*B-degree (360-credit)	3	*Master's degree (Dissertation)	8	Chemical and Physical Sciences	3	Agricultural Sciences	8	
	*B-degree (480-credit)	4	*Doctorate (Research)	9	Geosciences	4	Building Sciences	9	
	*Postgraduate Diploma	5	*Doctorate (Professional)	0	Agricultural Economics	5	Other	0	

6. CONSTITUTION OF QUALIFICATIONS AND PROGRAMME CODES

The majority of the Bachelor's Degrees on offer at the Faculty of Natural and Agricultural Sciences consists of three years of study. The first year of study provides students with the opportunity to develop a broad scientific foundation and students are normally required to complete eight modules (at least 120 credits per year, four modules per semester). These modules serve as the foundation for specialisation in the subsequent years. In the second year of study, majors are selected (at NQF Level 6), supplemented with modules from supportive disciplines. Learning programmes provide students with the opportunity to select modules from related supportive disciplines to ensure purposeful qualifications. In the third year of study, students must specialise in two major fields of study, for example Physics and Chemistry, or Microbiology and Biochemistry, or Genetics and Botany (at NQF Exit Level 7), with a total of at least 60 credits completed for each major. Furthermore, students may also be required to complete other modules to ensure that they have the necessary knowledge and literacy required to function in a demanding academic environment. The diagram below indicates how degrees are constituted and how one qualification provides entry into a qualification at the next NQF Level.

The Bachelor's Degree (B) makes provision for three fields of study, namely:	The Bachelor of Science (BSc) and the Bachelor of Science Honours Degree make provision for seven fields of study, namely:		The Bachelor of Science in Agricultural BSc (Agriculture) Degree makes provision for four fields of study, namely:
• Architecture • Agricultural Sciences • Consumer Sciences • Computer Information Systems	• Biological Sciences • Building Sciences • Chemical and Physical Sciences • Consumer Science	• Geosciences • Computer Science and Informatics • Mathematical Sciences	• Animal, Grassland and Wildlife Sciences • Food Science • Plant Breeding and Plant Pathology • Soil, Crop and Climate Sciences

In each field of study different modules can be combined as majors. The different combinations of majors, minors and supportive modules are referred to as learning programmes. The combination of modules are known as the curriculum for the specific learning programme and must comply with the minimum credits as indicated under the heading *5. Type of Qualifications*. Each learning programme has a unique Programme Code, which refers to a qualification on the UFS PQM, accredited by the CHE, and registered with SAQA and DHET and link to a specific Degree Code.

Table 2: Programme codes

First Digit	Second Digit	Third Digit					
Campus	**Faculty**	**Exit level qualifier**					
		1-4 Undergraduate			**5-9 Postgraduate**		
B – Bloemfontein Q – Qwaqwa	4 – Natural Sciences 5 – Agricultural Science	Certificates (Higher/ Advanced)	1	Postgraduate Diploma	5	Master's Degree (Dissertation)	8
		Diplomas (360-credits/240-credits/ Advanced)	2	Honours Degree	6	Doctorate (Research)	9
		B-degree (360-credit)	3	Master's Degree (Course work/ Professional)	7	Doctorate (Professional)	0
		B-degree (480-credit)	4				

Fourth Digit						Fifth Digit	
Natural Sciences fields of study				**Agriculture fields of study**				**Detail qualifiers**	
Biological Sciences	1	Computer Science and Informatics	6	Animal, Grassland and Wildlife Sciences	1	Agricultural Economics	5	All degrees except the ones listed below are zero (0)	0
Mathematical Sciences	2	Consumer Science	7	Food Science	2	Agricultural Management	6	Selection programmes with different admission requirements	1
Chemical and Physical Sciences	3	Agricultural Sciences	8	Plant Breeding and Plant Pathology	3	Agricultural Extension	7		
Geosciences	4	Building Sciences	9	Soil, Crop and Climate Sciences	4				
Agricultural Economics	5	Other	0						

7. ACADEMIC PLAN CODES

The coding system links to another level, the Academic Plan Code. This code consist of eight digits. The first four digits respond directly with the first four digits of the Degree Code. The last digits link to the different degrees as follows:

Advanced Diploma BC4200xx Advanced Diploma Agric. BC5200XX Bachelor BC4301xx Bachelor of Science BC43xxyy (xx and yy represent the TWO different majors	Bachelor of Science Agriculture BC54xxyy Bachelor Honours BC4600xx Bachelor of Science Honours BC5600xx Postgraduate Diploma BC4500xx Postgraduate Diploma Agric. BC5500xx	Master's by dissertation BC4802xx Master's by course work BC4703xx Master of Science by dissertation BC4800xx Master of Science by course work BC4701xx Master of Agricultural Sciences BC5800xx Master of Agricultural Sciences Structured BC5702xx	Doctor BC4902xx Doctor of Philosophy BC4900xx Doctor of Science BC4901xx
Bachelor of Science Extended Degree		**Bachelor of Agriculture Extended Degree**	**Higher certificate in NAS**
Mathematics and Chemistry BC4300E2	Mathematics and Finances BC5480E1	Agriculture Extended Degree BC5300E1	With specialisation in Mathematics and Chemistry BC410001 HCert in Agriculture BC510001

The first digits that indicate the degree can include one of the two digits representing a major. The subsequent digits represent either the selected two majors, or the major and minor in the case of the Bachelor of Science Agriculture degrees, or a single speciality area in the case of Bachelor Honours, Master's and Doctoral degrees. Each subject is identified by a two-digit code as provided in the table below.

Table 3: Identification codes of different disciplines

Actuarial Science	10	Behavioural Genetics	18	Engineering Science	26	Geohydrology	34	Plant Pathology	42
Agricultural Economics	11	Biochemistry	19	Entomology	27	Geology	35	Quantity Surveying	43
Agrometeorology	12	Botany	20	Environmental Geology	28	Grassland Science	36	Soil Science	44
Agronomy	13	Chemistry	21	Food Science	29	Mathematical Statistics	37	Spatial Planning	45
Architecture	14	Computer Science and Informatics	22	Forensic Science	30	Mathematics	38	Statistics	46
Animal Science	15	Consumer Science	23	Genetics	31	Microbiology	39	Sustainable Agriculture	47
Applied Mathematics	16	Construction Management	24	Geochemistry	32	Physics	40	Urban and Regional Planning	48
Astrophysics / Astronomy	17	Disaster Management	25	Geography	33	Plant Breeding	41	Zoology	49

Table 4: Identification codes of specialisation fields

Alternative combination	00	Economics	58	Forensic Genetics	67	Limnology	76	Property Sciences	85
Program without two majors	1-9	Environmental Geography	59	Forensic Sciences Interdiciplinary	68	Microbiotechnology	77	Psychology	86
Agricultural Engineering	51	Environmental Management	60	Geographical Information Systems	69	Mineral Resource Management	78	Risk analysis	87
Agricultural Management	52	Environmental Rehabilitation	61	Human Molecular Biology	70	Nano Sciences	79	Soil Science Interdisciplinary	88
Agrometeorology Interdisciplinary	53	Environmental Science	62	Human Settlements	71	Physiology	80	Wildlife	89
Agronomy Interdisciplinary	54	Facilities Management	63	Irrigation Management	72	Plant Breeding Interdisciplinary	81	Wildlife Management	90
Business Management	55	Finance	64	Irrigation Sciences	73	Plant Health Ecology	82	Integrated Water Management	91
Computer Information Systems	56	Forensic Chemistry	65	Land and Property Development Management	74	Plant Pathology	83	Tourism	92
Ecology	57	Forensic Entomology	66	Life Sciences	75	Polymer Sciences	84		

The curriculum for the different learning programmes consists of three types of modules, namely compulsory, elective and foundational modules. Compulsory modules must be taken by all the students in the learning programme, elective modules provide students with the opportunity to select modules of interest, and required modules must be followed when a student does not comply with the requirements. The curriculum for the different learning programmes is available below, starting on p 47.

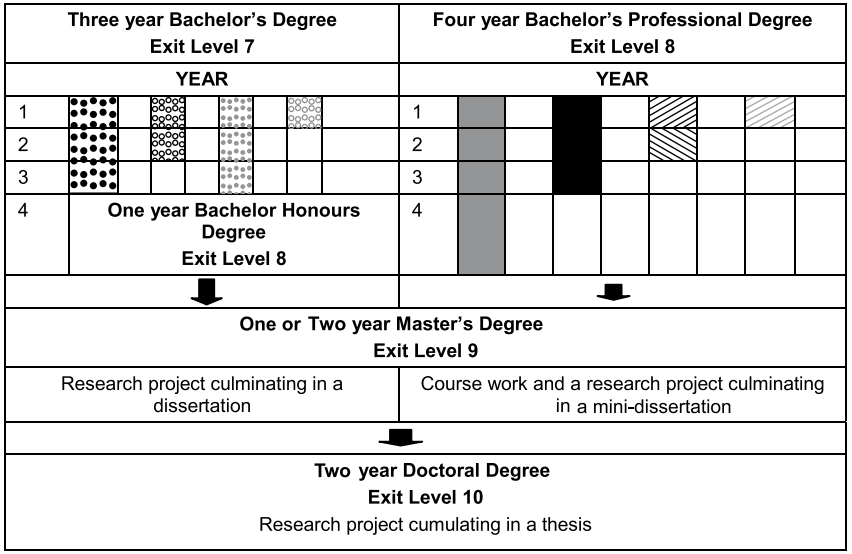
The curricula for the different learning programmes usually consist of three types of modules, namely compulsory, elective and required modules. Compulsory modules must be taken by all the students in the learning programme; elective modules provide students with the opportunity to select modules of interest; and required modules must be followed when a student does not comply with certain requirements. The curricula for the different learning programmes are set out below, starting on p.47.

Learning programme	First two or three digits represent type of degree (or part of the major)	Subsequent digits represent different disciplines or specialisation fields	Learning programme code
BAgric (Agricultural Economics)	401xx	xxx11	40111
B (Consumer Science)	401xx	xxx23	40123
BSc with Chemistry and Physics	42xxx (where 2 is part of 21, the code for Chemistry)	x2140	42140
BSc Hons (Chemistry)	450xx	xxx21	45021
MSc (Chemistry by dissertation)	471xx	xxx21	47121
PhD (Chemistry)	491xx	xxx21	49121

8. STRUCTURE OF QUALIFICATIONS

COMPOSITION OF THREE AND FOUR YEAR DEGREES

The different blocks represent different modules; if the blocks have the same colour they represent the same discipline.



MODULE CODES

Undergraduate and postgraduate modules may be presented as semester or year modules. The credits awarded to every module give an indication of the teaching and learning time and volume of work. One module credit equals 10 notional hours which include hours spent in the lecture room and on independent work and study.

A module is indicated with the code ABCDwxyz and this code represents the following:

ABCD	Indicates the discipline
w	A numeral stating the study year, for example first year = 1
x	Indicate NQF Level
y	An odd number indicates the first semester and an even number indicates the second semester. The numerals 0 indicates a year module
z	The number multiplied by four indicate the number of credits

For example, CROP3754 indicates that it is an Agronomy module (CROP), presented during the third academic year at NQF Exit Level 7 (3), that the module is presented during the first semester (odd number 5), and represents 4x4 = 16 teaching credits (4).

The numerical code for Bachelor Honours, Master's and Doctorate modules will start with a 6, 7 for structured or 8 research and 9. If the last number is 0 it indicate that the modules have either more than 36 credits or the credits are not a multiple of four.

9. CORE COMPETENCIES FOR GRADUATES

A Bachelor's or Bachelor of Science Graduate is:

Academically excellent	Adjusted to cultural diversity	An active global citizen
This entails that the student:		
• Attains a strong sense of academic integrity and scholarship. • Becomes self-motivated and self-regulated, with an ability to continuously direct his/her own learning. • Adapts to a changing environment and becomes committed to lifelong learning. • Accepts critical thinking and decision-making as part of the learning process. • Attains an appropriate level of achievement in language proficiency, reading and writing, problem solving, communication and broad research activities. • Becomes competent in information and communication technologies. • Develops cognitive and analytical skills that are flexible and transferable through various learning experiences.	• Acquires an understanding of the social and cultural diversity in our country. • Learns to value and respect different cultures.	• Acquires an appreciation of the global perspective on his/her chosen discipline(s). • Learns to accept social responsibilities. • Works effectively both as a team leader and a team member. • Takes cognisance of existing social, economic, political and environmental issues. • Encourages the improvement and sustainability of the environment. • Respects human rights, attaches importance to equity and values, ethics and ethical standards.

Knowledge	Skills	Values and attitudes
A B or BSc Graduate has the following:		
• Integrated, comprehensive knowledge of the main areas within the two major disciplines of choice. This includes an understanding of, and an ability to apply and evaluate, the key terms, concepts, facts, principles, rules and their theories. • Detailed knowledge of at least one area of specialisation and how that knowledge relates to other fields, disciplines or practices. • An understanding of contested knowledge and an ability to evaluate types of knowledge and explanations typical of the discipline.	• An understanding of a range of enquiry methods in a field, discipline or practice, and their suitability to specific investigations. • An ability to apply a range of methods to resolve problems or introduce change within a practice. • An ability to identify, analyse, critically reflect on and address complex problems, applying evidence-based solutions and theory-driven arguments. • An ability to make decisions and act ethically and professionally, and the ability to justify these decisions and actions drawing on appropriate ethical values and approaches within a supported environment. • An ability to manage processes in unfamiliar and variable contexts, recognising that problem solving is context- and system-bound, and does not occur in isolation.	• An ability to accurately identify, evaluate and address own learning needs in a self-directed manner, and facilitate collaborative learning processes. • An ability to take full responsibility for own work, decision making and use of resources and limited accountability for the decisions and actions of others in varied or ill-defined contexts. • An ability to develop appropriate processes of information gathering for a given context or use. • An ability to independently validate sources of information, and evaluate and manage it. • An ability to develop and communicate own ideas and opinions in well-structured arguments.

10. FACULTY RULES

NAS1 – General Rules

The **General Rules** of the UFS are set out in General Rules for Undergraduate Qualifications, Postgraduate Diplomas, Bachelor Honours Degrees, Master's Degrees, Doctoral Degrees, Higher Doctorates, Honorary Degrees and the Convocation for each year in the Rule Book of the University, and contains the following relevant information:

GENERAL RULES FOR UNDERGRADUATE (NQF Exit Level 7 or 8)			
A1 – General Rules	A2 – Applying for admission	A3 – Admission or re-admission to the University and to an academic qualification	A4 – Submission of documentation required to register as a student
A5 – Duration of study and compiling a curriculum	A6 – Student registration and re-registration	A7 – Switching qualifications and/or modules and/or instructional modes and/or migrating to another university campus/centre	A8 – Credit accumulation and credit transfer
A9 – Assessment rules	A10 – Qualification with distinction	A11 – Qualification certificates, Dean's Medals and Senate Medals	A12 – Results statements, academic records, study records, certified statements, certificates of conduct and certified examination timetables
A13 – Requests on the basis of exceptional circumstances	A14 – Discipline	A15 – Financial support	A16 – Module and venue timetable and examination timetable
A17 – Residence in campus accommodation	A18 – Fees payable	A19 – Information communication and information technology	

GENERAL RULES FOR POSTGRADUATE DIPLOMAS (NQF EXIT LEVEL 8)			
A20 – General Rules	A21 – Applying for admission	A22 – Admission or readmission to the university and to an academic qualification	A23 – Submission of documentation required to register as a student
A24 – Duration of study and compiling a curriculum	A25 – Student registration and re-registration	A26 – Switching qualifications and/or disciplines and/or modules and/or migrating to another university campus/centre	A27 – Credit accumulation and credit transfer
A28 – Assessment rules	A29 – Qualification with distinction	A30 – Qualification certificates	A31 – Intellectual property
A32 – Publication of a research essay	A33 – Results statements, academic records, study records, certified statements, certificates of conduct and certified examination timetables	A34 – Requests on the basis of exceptional circumstances	A35 – Discipline
A36 – Financial support	A37 – Module and venue timetable and examination timetable	A38 – Residence in campus accommodation	A39 – Fees payable
A40 – Information communication and information technology			

GENERAL RULES FOR BACHELOR HONOURS DEGREES (NQF Exit Level 8)			
A45 – General Rules	A46 – Applying for admission	A47 – Admission or readmission to the university and to a Bachelor Honours Degree	A48 – Submission of documentation required to register as a student
A49 – Duration of study and compiling a curriculum	A50 – Student registration and re-registration	A51 – Switching qualifications and/or disciplines and/or modules and/or migrating to another university campus/centre	A52 – Credit accumulation and credit transfer
A53 – Assessment rules	A54 – Qualification with distinction	A55 – Qualification certificates, Dean's Medals and Senate Medals	A56 - Intellectual property
A57 – Publication of a research report	A58 – Results statements, academic records, study records, certified statements, certificates of conduct and certified examination timetables	A59 – Requests on the basis of exceptional circumstances	A60 – Discipline
A61 – Financial support	A62 – Module and venue timetable and examination timetable	A63 – Residence in campus accommodation	A64 - Fees payable
A65 – Information communication and information technology			

GENERAL RULES FOR MASTER'S DEGREES (NQF Exit Level 9)			
A70 – General Rules	A71 – Applying for admission	A72 – Admission or readmission to the university and to a Master's degree	A73 – Submission of documentation required to register as a student
A74 – Mode of presentation	A75 – Requirements in respect of a Master's Degree research dissertation or publishable, interrelated manuscripts/published articles or a coursework Master's Degree mini-dissertation	A76 – Duration of study and compiling a curriculum	A77 – Student registration and re-registration
A78 – Registration of research titles and modifying a research title	A79 – Supervisor(s) and co-supervisor(s)	A80 – Examiners and moderators	A81 – Switching qualifications and/or disciplines and/or modules and/or migrating to another university campus/centre
A82 – Credit accumulation and credit transfer	A83 – Assessment rules	A84 – Qualification with distinction	A85 – Qualification certificates, Dean's Medals and Senate Medals
A86 – Intellectual property	A87 – Publication of a Master's degree research dissertation or a coursework Master's degree dissertation	A88 – Results statements, academic records, study records, certified statements, certificates of conduct and certified examination timetables	A89 – Requests on the basis of exceptional circumstances
A90 – Discipline	A91 – Financial support	A92 – Module and venue timetable and examination timetable	A93 – Residence in campus accommodation
A94 – Fees payable	A95 – Information communication and information technology		

GENERAL RULES FOR DOCTORAL DEGREES (NQF Exit Level 10)			
A100 – General Rules	A101 – Applying for admission	A102 – Admission or readmission to the university and to a Doctoral Degree	A103 – Submission of documentation required to register as a student
A104 – Mode of presentation	A105 – Requirements in respect of a thesis, publishable, interrelated manuscripts/published articles or mini-thesis	A106 – Duration of study and compiling a curriculum	A107 – Student registration and re-registration
A108 – Registration of research title and modifying a research title	A109 – Promoter and co-promoter(s)	A110 – Examiners	A111 – Switching qualifications and/or disciplines and/or modules and/or migrating to another university campus/centre
A112 – Credit accumulation and credit transfer	A113 – Assessment rules	A114 – Qualification with distinction	A115 – Qualification certificates
A116 – Intellectual property	A117 – Publication of a thesis	A118 – Results statements, academic records, study records, certified statements, certificates of conduct and certified examination timetables	A119 – Requests on the basis of exceptional circumstances
A120 – Discipline	A121 – Financial support	A122 – Residence in campus accommodation	A123 – Fees payable
A124 – Information communication and information technology			

GENERAL RULES FOR HIGHER DOCTORATES (NQF Exit Level 10)			
A130 – General Rules	A131 – Applying for admission	A132 – Admission to the Higher Doctorate Degree	A133 – Student registration and re-registration
A134 – Mentor	A135 – Examiners	A136 – Requirements to be met when submitting scientific publications	A137 – Assessment reports
A138 – Pass requirements and qualification with distinction	A139 – Plagiarism	A140 – Qualification certificates	A141 – Fees payable

GENERAL RULES FOR HONORARY DEGREES			
A145 – Honorary-degree proposals	R146 – Qualification certificates		

The General Rules of the UFS apply to this Faculty *mutatis mutandis* (A1 to A147). These **Rules of the UFS** are, with the necessary adjustments, applicable to all the qualifications that are awarded by the Faculty of Natural and Agricultural Sciences. Rules of the **Faculty of Natural and Agricultural Sciences (NAS),** which specifically apply to the degree and other programmes presented in the Faculty, are equally important and relevant. Students must consult the new Rule Book **every academic year before registration** to ensure alignment with updated curricula, as the Faculty updates the Rule Book to keep abreast of the latest scientific developments. It is the student's **responsibility** to be conversant with these rules and the following rules are important.

NAS2 and NAS3 – Entrance and progress requirements

Undergraduate programmes

The Faculty offers various undergraduate qualifications in different categories including Diplomas, Access and Extended Curriculum Programmes and Bachelor's Degrees. The following fields of study are covered in each of the categories at the Bloemfontein campus and on the Qwaqwa campus where indicated or where indicated on the Qwaqwa campus only:

- **Diplomas**: Advanced Diploma in Sustainable Agriculture in Rural Development, Advance Diploma in Actuarial Sciences
- **Access and Extended Curriculum Programmes:** University Preparation Programme: Agricultural Sciences for BAgric; University Preparation Programme: Natural and Agricultural Sciences(Mathematics and Chemistry) for BSc, Access: Natural and Agricultural Sciences (Mathematics and Chemistry) for BSc (Qwaqwa), Bachelor of Agriculture Extended Programme, Bachelor of Agricultural Sciences Extended Programme, Bachelor of Science Extended Programme (Mathematics and Chemistry) (Qwaqwa), Bachelor of Science Extended Programme (Mathematics and Finances).
- **Bachelor's Degrees:**
  - **Bachelor of:**
    - Architecture; Agriculture (Agricultural Management, Animal Production Management, Crop Production Management, Irrigation Management, Mixed Farming Management, Wildlife Management); Agricultural Economics, Computer Information Systems, Consumer Sciences(General and Food);
  - **Bachelor of Science majoring in:**
    - Actuarial Sciences, Agricultural Economics, Microbiology and Chemistry, Biochemistry and Chemistry
    - Biological Sciences: Behavioural Genetics, Biochemistry and Botany, Biochemistry and Entomology, Biochemistry and Food Science, Biochemistry and Genetics, Biochemistry and Microbiology, Biochemistry and Physiology, Biochemistry and Statistics, Biochemistry and Zoology, Botany and Entomology, Botany and Genetics, Botany and Life Sciences (Qwaqwa only), Botany and Microbiology, Botany and Plant Breeding, Botany and Plant Pathology, Botany and Zoology, Environmental Rehabilitation, Entomology and Genetics, Entomology and Life Sciences (Qwaqwa only), Entomology and Microbiology, Entomology and Zoology, Forensic Sciences, Genetics and Microbiology, Genetics and Zoology, Life Sciences (Qwaqwa only), Microbiology and Food Science, Microbiology and Statistics, Microbiology and Zoology, Plant Health Ecology, Zoology and Life Sciences (Qwaqwa only).
    - Building Sciences: Construction Management(residential), Quantity Surveying(residential), Construction Management (Distance learning), Quantity Surveying (Open learning)
    - Chemical and Physical Sciences: Chemistry and Biochemistry, Chemistry and Botany (Qwaqwa), Chemistry and Life Sciences (Qwaqwa only), Chemistry and Food Science, Chemistry and Microbiology, Chemistry and Physics (Qwaqwa), Physics and Agrometeorology, Physics and Astrophysics, Physics and Engineering Subjects.
    - Consumer Science
    - Geosciences: Environmental Geography (Qwaqwa only Geographical Information Systems, Geography and Agrometeorology, Geography and Environmental Sciences, Geography and Life Sciences (Qwaqwa only), Geography and Statistics, Geography and Tourism (Qwaqwa only), Environmental Geology Geochemistry, Geology and Chemistry, Geology and Geography, Geology and Physics, Geology specialisation.
    - Information Technology: Computer Science and Business Management. Computer Science and Chemistry (Qwaqwa), Computer Science and Management (Qwaqwa only), Computer Science and Mathematical Statistics, Computer Science and Mathematics, Computer Science and Physics (Qwaqwa).
    - Mathematical Sciences: Mathematical Statistics and Statistical Sciences: Climate Science, Econometrics, Investment Sciences, Psychometrics, Statistics and Accounting, Statistics and Economics, Statistics and Psychology Mathematics: Mathematics and Applied Mathematics, Mathematics and Chemistry, Mathematics and Finances, Mathematics and Mathematical Statistics, Mathematics and Physics.
  - **Bachelor of Science in Agriculture majoring in:**
    - Agrometeorology, Agronomy, Animal Sciences, Food Science, Grassland Sciences, Plant Breeding, Plant Pathology, Soil Sciences.

NAS2.1 – Faculty undergraduate admission requirements

In addition to the requirements contained in General Rules(2017) A1-A19, a student has to comply with the additional Faculty requirements:

a) Students should apply for admission to the programmes listed above on the prescribed form before the closing date.

b) The following Bachelor's and Bachelor of Science Degrees require selection: Architecture, Construction Management, Forensic Sciences, Geology, Physics and Engineering Sciences and Quantity Surveying.

c) Applications to these programmes, on the prescribed form, must reach Director: Student Academic Services on or before 31 July the year before intended registration for Architecture, Quantity Surveying and Construction Management, or 30 September for the rest, the year before the intended registration. Students will be notified of preliminarily selection before the end of November, but the final selection will only be confirmed after the National Senior Certificate (NSC) or National Certificate (Vocational) (NCV) examination results are available.

d) Admission depends on Admission Point (AP) or the M Scores (MS) as well as the performance in Mathematics (M), Physical Science (PS) and Life Sciences (LS). The AP or the MS are calculated as indicated in Table 3:

e) The admission requirements in Table 4 below are a broad indication for entrance to the Faculty of Natural and Agricultural Sciences and applicable to prospective students. It is important to note that some programmes have higher requirements or the requirements are adjusted as indicated in Table 5.

Table 3: Values to be used for all individual or all individual NSC or NCV subjects completed to calculate AP and M Scores

Calculation of the AP with regard to students who passed Grade 12 in 2008 onwards:

NSC or NCV Performance level for subjects	UFS Admission Point (AP)	NSC or NCV Performance level for subjects	UFS Admission Point (AP)
7 (90% – 100%)	8	4 (50% - 59%)	4
7 (80% – 89%)	7	3 (40% – 49%)	3
6 (70% – 79%)	6	2 (30% – 39%)	2
5 (60% – 69%)	5		

If the performance level in Life Orientation is 5 or above, it contribute 1 to the AP Score. If students include more than the required 7 subjects, select the best 6 to calculate the AP Score.

Calculation of the M Score with regard to students who passed Grade 12 prior to 2008:

M Scores are calculated using the symbols of the six (6) best matriculation subjects (regardless of whether they are higher or standard grade) passed in one examination.

Symbol	A	B	C	D	E	F
HG	8	7	6	5	4	3
SG	6	5	4	3	2	1

Table 4: Broad Admission requirements (These requirements must be read with Table 5)

The following is applicable to students who matriculated before or during 2007:	The following is applicable to students who completed the National Senior Certificate during or after 2008:
(i) Senior certificate with matriculation endorsement (matriculation exemption) or an equivalent qualification. (ii) A minimum MS of 30. (iii) HG = E or SG = C in an official tuition language. (iv) Mathematics HG = D or SG = B. Alternatively at least a pass mark of 60% in MATD1564 or MATD1534 or MATM1584. If STSM1614 or MATM1614 is included in the learning programme at least a level 6 (70%) and at least a level 7 (80%) is respectively required for Mathematics. (v) Both Biology and Physical Science will be required. **Take note that not all BSc programmes require both Life and Physical Sciences. See NAS 2.2 – table 5 for more detail.** (vi) Biology HG = D or SG = B and Physical Science HG = E or SG = C. (vii) Participation in the National Benchmark (NBT) tests for Language. (viii) Participation in the National Benchmark (NBT) tests for Mathematics.	(i) NSC or NCV with an endorsement that allows entrance to degree studies or an equivalent qualification. (ii) A minimum AP of 30, as calculated from Table 3 (iii) A performance level 4 (50%) in an official tuition language. (iv) Mathematics on level 5 (60%). Alternatively at least a pass mark in MATD1564 or MATD1534 or MATM1584 is required. If STSM1614 or MATM1614 is included in the learning programme a level 6 (70%) and a level 7 (80%) is respectively required for Mathematics. Alternatively a pass mark of at least 80% in MATD1564 or at least 70% in MATM1584 or a pass in MATM1534 is required and 60% in the Departmental Admission test. (v) Both Life Science and Physical Science must be included. **Take note that not all BSc programmes require both Life and Physical Sciences. See NAS 2.2 – table 5 for more detail.** (vi) Life Sciences level 5 (60%) and Physical Science level 4 (50%). Alternatively, at least 60% is required in the modules CHEM1552, CHEM1532, CHEM1622 and CHEM1642. (vii) Participation in the National Benchmark (NBT) tests for Language. (viii) Participation in the National Benchmark (NBT) tests for Mathematics.

f) If students wish to transfer from other higher education institutions or another UFS Faculty's programme before they have completed their undergraduate studies they must provide evidence of their academic progress, in the form of an academic record and module content discription. These records will be used to determine which modules could be recognised in the UFS prescribed curriculum and at which level the student will be placed.

NAS2.2 – Specific undergraduate programme requirements

Table 5: Specific admission requirements

(a) Advanced Diploma in Sustainable Agriculture in Rural Development

- A related Diploma or qualification at NQF Level 6.
- Applicants with different qualifications can be admitted if their qualifications are judged equivalent by a designated UFS panel through the Recognition of Prior Learning process. Applicants should have sound and proven experience relevant to the agricultural environment. Practical experience in agriculture and/or rural development, and appropriate prior learning are prerequisites for admission.
- This qualification is not envisaged for the individual passing directly on from the National Senior Certificate to subsequent NQF Exit Levels.

(b) University Preparation Programme (Natural Sciences and Mathematics)

- Requires a National Senior Certificate (NSC) or National Certificate (Vocational) (NCV) that allows entrance to diploma or higher certificate*.
- Minimum AP of 20.
- Official tuition language with a minimum achievement level 3 (40%).
- Mathematics with a minimum achievement level 3 (40%).
- Life Sciences with a minimum achievement level 3 (40%) AND Physical Science with a minimum achievement level 3 (40%).

(c) University Preparation Programme (Agricultural Sciences)

- National Senior Certificate (NSC) or National Certificate (Vocational) (NCV) that allows entrance to diploma or higher certificate* studies.
- Minimum AP of 20.
- Official tuition language with a minimum achievement level 3 (40%).
- Mathematical Literacy with a minimum achievement level 5 (60%) OR Mathematics with a minimum achievement level 2 (30%).

(d) BAgric extended four-year

- Requirement (i) in Table 4 above.
- A minimum AP of 25.
- Official tuition language with a minimum achievement level 4 (50%).
- Mathematics on performance level 2 (30%) or Mathematical Literacy at least at level 5 (60%) if the AP score is above 26.

(e) BSc extended four-year (Chemistry and Mathematics)

- Requirement (i) in table 4 above.
- A minimum AP of 25.
- Official tuition language with a minimum achievement level 4 (50%).
- Mathematics on performance level 3 (40%).
- Life Sciences at performance level 4 (50%) or Physical Science on performance level 3 (40%).

(f) BSc extended four-year (Mathematics and Finances)

- Requirement (i) in table 4 above.
- A minimum AP of 25.
- Official tuition language with a minimum achievement level 4 (50%).
- Mathematics at performance level 3 (40%).

BSc extended four-year (Computer Science and Mathematics) QWAQWA only

- Requirement (i) in table 4 above.
- A minimum AP of 25.
- Official tuition language with a minimum achievement level 4 (50%).
- Mathematics at performance level 3 (40%).

If students want to major in Physics or Chemistry together with Computer Science they need to Physical Science at performance level 3 (50%)

(g) BSc (Agriculture) extended five-year

- Requirement (i) in table 4 above.
- A minimum AP of 25 and a performance level 4 (50%) in an official tuition language.
- Mathematics at performance level 3 (40%).
- Life Sciences or Agricultural Science at performance level 4 (50%) or Physical Science at performance level 3 (40%).

(h) BAgric

- Requirements (i)-(iii) & (vii) in table 4 above.
- Mathematics at performance level 3 (40%) or Mathematical Literacy at least at level 7 (80%) if the AP is 31 or above.

(i) BSc majoring in Actuarial Science

- Requirements (i), (iii-(iv), (vii) & (viii) in table 4 above.
- A minimum AP of 34.
- Mathematics at performance level 7 (80%).
- If students transfer from foundational programmes or other degree programmes they must have an average of at least 70%, and at least 65% for each individual module.

(j) BSc (Agriculture)

- Requirements (i)-(iv), (vii) & (viii) in table 4 above.
- Either Life Sciences, Agricultural Sciences or Physical Science.
- Performance level 5 (60%) for Life Sciences or Agricultural Sciences and Performance level 4 (50%) for Physical Science.

(k) BSc majoring in Agricultural Economics

- Requirements (i)-(iv), (vii) & (viii) in table 4 above.
- Modules AGEC3714, AGEC3724, AGEC3734, AGEC3744, AGMA3714, AGMA3724, AGMA3734 and AGMA3744 might only be presented in English in which case translation services will be available from English to Afrikaans depending on student numbers and availability of resources.

(l) B (Consumer Sciences)

- Requirements (i)-(iii) & (vii) in table 4 above.

Table 5: Specific admission requirements

(m) BArch

- A selection process takes place before admission. Applications must reach the UFS before the 31 May the year before intended registration.
- A maximum number of 55 students are admitted.
- A student registered for a programme at the UFS and wishing to change to the BArch-programme, must contact the department on or before 31 May the year before intended registration.
- of the year before intended registration.
- Requirements (i)-(iii), (vii) & (viii) in table 4 above.
- Mathematics at performance level 4 (50%).
- All information pertaining to the selection process is available on the departmental website: www.ufs.ac.za/architecture; see 'Academic Information'.
- Applicants have to pass a preliminary selection process.
- Applicants who passed the preliminary selection will be invited to a selection interview at which a portfolio of creative work has to be presented.
- Qualifying applicants must write aptitude and NBT test and submit the results to the department before the selection interview.
- Students will be notified of the outcome not later than the end of November of the year before intended registration.

(n) BSc majoring in Biological Sciences with:

Biochemistry and Microbiology

- Modules MCBG3714, MCBP3714, MCBM3724, MCBC3724, BOCM3714, BOCE3714, BOCP3724, and BOCS3724 might only be presented in English in which case translation services will be available from English to Afrikaans depending on student numbers and availability of resources.
- Students wishing to continue with MCBP2616 must take note that a maximum of 160 students will be accepted due to laboratory constraints. Students will be admitted based on academic performance.
- Students wishing to continue with BOCB2616 must take note that a maximum of 210 students will be accepted due to laboratory and equipment constraints. Students will be admitted based on academic performance.

Genetics

- Please note a selection process is required for: GENE2616, GENE2626, GENE3714, GENE3724, GENE3734, GENE3744. Only 150 students will be accepted based on academic performance. Students wishing to continue with any of these modules must apply for selection (genetics@ufs.ac.za).
- Modules in the 3rd year GENE3714, FORS3714 and HMBG3714 might only be presented in English in which case translation services will be available from English to Afrikaans depending on student numbers and availability of resources

Botany

- For students in BTNY2616, they must have obtained at least 55% in BLGY1643.

Environmental Rehabilitation

- The same academic requirements set for students entering a BSc majoring in Geology will be applied for entering in the BSs majoring in Environmental Rehabilitation

(o) BSc majoring in Chemical and Physical Science

- Requirements (i)-(iv), (vii) & (viii) in table 4 above.
- Physical Science at performance level 4 (50%) or Physical Science HG = E or SG = C.
- If Biological modules is the second major Life Sciences at performance level 5 (60%) is required.
- Please note a selection process is required for: CHEM26XX and CHEM37XX. Only 80 second year students and a maximum of 60 third year students (Bloemfontein campus) and 70 second year students and a maximum of 45 third year students for the Qwaqwa campus will be admitted owing to laboratory constraints. These students will be admitted based on academic performance.
- Students intending to register for engineering modules must take note that limited space is available.

BSc majoring in Physics and Engineering Subjects:

- AP score of ≥34
- Cumulative AP ≥ 13 for Mathematics and Physical Science, at least performance level 6 (70%) for Mathematics.

(p) BSc majoring in Forensic Sciences

- A selection process takes place before admission. A maximum number of 80 students will be admitted. NBT tests results will also be used for selection purposes.
- Applications close on 30 September the year before intended registration.
- Requirements (i), (iii)-(iv), (vii) & (viii) in table 4 above.
- A minimum AP ≥ 34 (with cumulative AP ≥ 17 for Mathematics, Life Science and Physical Science).
- No person with a criminal record will be allowed into this programme.

Table 5: Specific admission requirements

(q) BSc majoring in Geography

- Requirements (i)-(iv) and (vii) & (viii) in Table 4 above.
- Physical Science at performance level 4 (50%) to register for the Geographical Information Systems programme.
- Life Sciences at performance level 5 (60%) is required for Environmental Sciences and Agrometeorology programmes.
- Life Science performance level 5 (60%) or Physical Science performance level 4 (50%) for the Statistics programme.

(r) BSc majoring in Geology

- A selection process takes place before admission. In the first year a maximum number of 80 students will be admitted to GLGY1614 owing to laboratory constraints. In the second and third year a maximum number of 60 students will be admitted due to laboratory constraints. These students will be admitted based on academic performance. Students who have not obtained an average of at least 55% for GLGY1614 or GLGY1624 or failing GLGY1614 or GLGY1624 or any other prescribed first year module will not be able to continue their studies in any of the Geology programmes.
- Applications to the BSc Geology programme, on the prescribed form, must reach the Registrar, Academic Student Services, UFS, Bloemfontein, on or before 30 September of the year before the intended registration. Students will be notified of the outcome as soon as examination results are available and no later than January.
- The selection process will be based on academic performance.
- Requirements (i)-(iv), (vii) & (viii) in table 4 above.
- Physical Science and Mathematics at performance level 5 (60%) or Physical Science HG = E or SG = C. Alternatively, at least 65% is required in the modules CHEM1552, CHEM1532, CHEM1622 and CHEM1642, and in MATD1564/MATD1534.
- An AP of 34 or higher is highly recommended.
- No occasional study students will be allowed.

(t) BSc majoring in Mathematical Sciences

- Requirements (i)-(iv), (vii) & (viii) in table 4 above.
- Mathematics at performance level 7 (80%). Alternatively (senior students) a mark of at least 70% in MATD1564/MATD1564 or at least 60% in MATM1584 or 50% in MATM1534 is required.
- If Agrometeorology or Chemistry or Physics is the second major Physical Science with a performance level of 4 (50%) is required.
- If enrolling for Applied Statistics degrees only level 5(60%) for Mathematics is required.

(s) BSc (Information Technology)

- Requirements (i)-(iii) and (vii) & (viii) in table 4 above.
- At least performance level 4 (50%) in Mathematics to register for BCIS or any BSc(IT) degree. A higher performance level might be required (see below).
- Mathematics at performance level 4 (50%) in order to register for MATM1574.
- Mathematics at performance level 5 (60%) to register for MATM1534.
- Mathematics at performance level 6 (70%) to register for STSM1614.
- Mathematics at performance level 7 (80%) in order to register for MATM1614. Alternatively (senior students) a pass mark of 80% for MATD1534/1564 or 70% for MATM1584 or 50% for MATM1534 and 60% for the Departmental Admission Test.
- If Chemistry or Physics is the second major, Physical Science at performance level 4 (50%) is required.

BSc (Information Technology) QWAQWA

- Requirements (i)-(iii) and (vii) & (viii) in table 4 above.
- At least performance level 4 (50%) in Mathematics to register for any BSc(IT) degree. A higher performance level might be required (see below).
- Mathematics at performance level 4 (50%) in order to register for IT and Management
- Mathematics at performance level 5 (60%) to register for MATM1534.
- Mathematics at performance level 7 (80%) in order to register for MATM1614. Alternatively (senior students) a pass mark of 80% for MATD1534/1564 or 70% for MATM1584 or 50% for MATM1534 and 60% for the Departmental Admission Test.
- If Chemistry or Physics is the second major, Physical Science at performance level 4 (50%) is required.

(u) BSc majoring in Quantity Surveying and BSc majoring in Construction Management

- NSC or NCV with an endorsement that allows entrance to degree studies or an equivalent qualification.
- A minimum AP of 35.
- A performance level 4 (50%) in an official tuition language.
- Mathematics on level 5 (60%).
- One of Economics, Business Studies, Accounting or Physical Science on level 4 (50%) is recommended.
- A maximum of 10 students of the extended programme who passes Mathematics development modules and mainstream modules of at least 70% average.
- BTech QS/CM degree with an average of 65% and an AP 31 and above, with maximum of 80 credits will be considered.
- National Diploma in QS with an average of 75% and an AP 31 and above, with no credit recognition will be considered.
- Other degrees: BCom with Economics III (60%) or Accounting II (60%), with a maximum of 80 credits will be considered; all other relevant degrees with an average of 60% in the exit year will be considered.
- A maximum number 80 students are selected.
- Application must be submitted before or on 31 July, the year before intended registration to the programme.
- Distance learning students must be 23 years or older and must be fulltime employed in the sector.

NAS2.3 – Other requirements: Note to students applying for any programme in this faculty

a) Students who score below 65% in the language NBT must register for the language module EALN1508 or AGAN1508.
b) First-time entering students with a performance level 5 in Mathematics or with a NBT mathematics score lower than 50% will have to attend compulsory extra Mathematics tutorial classes for three hours per week.
c) First-time entering students with a performance level of 4 for Physical Science will have to attend compulsory tutorials in Chemistry and Physics if those modules are included in their curriculum.
d) Registration for extra modules has financial implications, and the extra modules do not contribute to the total number of credits required to obtain a degree.
e) Students who have registered for the extra language module and more than one additional tutorial will not be able to register for the full curriculum and will only be allowed to register for three required modules per semester as prescribed in the learning programme.

Postgraduate programmes

The Faculty offers various postgraduate qualifications including Postgraduate Diplomas, Bachelor Honours, Master's, and Doctoral Degrees.

The following Postgraduate Diplomas are presented:

- Postgraduate Diploma in Disaster Management, Integrated Water Resource Management and Environmental Management

The Honours Degrees are divided into two categories namely, Bachelor Honours Degrees and Bachelor of Science Honours Degrees. The following fields of study are covered in each of the categories:

- Bachelor Honours is offered in Architecture, Agriculture (Agricultural Management, Irrigation Management, Wildlife Management), Consumer Sciences and Spatial Planning (specialising in Housing).
- Bachelor of Science Honours in Agriculture degree is awarded in the following fields of study: Agrometeorology, Agronomy, Animal Sciences, Food Science, Grassland Science, Plant Breeding, Plant Pathology, Soil Science. Actuarial Sciences, Agricultural Economics, Agrometeorology, Astrophysics, Behavioural Genetics, Biochemistry, Botany (Qwaqwa), Chemistry (Qwaqwa), Computer Science and Informatics, Consumer Science, Construction Management, Entomology, Environmental Geography (Qwaqwa), Environmental Geology, Environmental Rehabilitation, Food Science, Forensic Genetics, Genetics, Geochemistry, Geography, Geography and Ecology, Geography and Environmental Science, Geohydrology, Geology, Life Sciences, Limnology, Mathematics and Applied Mathematics, Mathematical Statistics, Microbiology, Physics (Qwaqwa), Plant Breeding, Plant Health Ecology, Plant Pathology, Polymer Science (only Qwaqwa) Soil Science, Statistics, Quantity Surveying, and Zoology (Qwaqwa).

The Master's Degrees are divided into three categories, namely; Master's Degrees, Master of Science Degrees, and Master of Science in Agriculture Degrees. The following fields of study are covered in each of the categories:

- Master's Degrees are offered in the following fields of study: Architecture, Architecture (Professional), Agricultural Management, Consumer Science, Disaster Management, Environmental Management, Human Settlements, Irrigation Management, Sustainable Agriculture, Land and Property Development Management, Urban and Regional Planning (Professional) and Urban and Regional Planning, Wildlife Management
- Master of Science is awarded in the following fields of study: Agricultural Economics, Actuarial Sciences, Agrometeorology, Applied Mathematics, Astrophysics, Behavioural Genetics, Geographical Information Systems, Biochemistry, Botany, Chemistry, Computer Science and Informatics, Construction Management, Consumer Science, Entomology, Environmental Geology, Environmental Management, Environmental Rehabilitation, Food Science, Forensic Genetics, Forensic Sciences, Forensic Sciences Interdisciplinary, Genetics, Geochemistry, Geography, Geography and Environmental Science, Geohydrology, Geology, Grassland Science, Limnology, Mathematics, Mathematical Statistics, Mathematical Statistics and Risk Analysis, Microbial Biotechnology, Microbiology, Mineral Resource Management, Nano Science Physics, Plant Breeding, Plant Breeding Interdisciplinary, Plant Health Ecology, Plant Pathology, Polymer Science, Soil Science, Property Science, Statistics, Quantity Surveying, Zoology.
- Master of Science in Agriculture are offered in the following fields of
- study: Agrometeorology, Agrometeorology Interdisciplinary, Agronomy, Agronomy Interdisciplinary, Animal Sciences, Food Science, Grassland Science, Plant Breeding, Plant Breeding Interdisciplinary, Plant Pathology, Plant Pathology Interdisciplinary, Soil Science Interdisciplinary, Wildlife.

Doctoral Degrees are offered in the following fields of study:

- Actuarial Sciences, Architecture, Agricultural Economics, Agricultural Management, Agrometeorology, Agrometeorology Interdisciplinary, Agronomy, Agronomy Interdisciplinary, Animal Sciences, Astrophysics, Applied Mathematics, Behavioural Genetics, Biochemistry, Botany, Chemistry, Computer Science and Informatics, Construction Management,

Consumer Science, Disaster Management, Environmental Management, Entomology, Environmental Geology, Environmental Rehabilitation, Food Science, Forensic Genetics, Forensic Sciences, Forensic Sciences Interdisciplinary, Forensic Sciences, Genetics, Geochemistry, Geographical Information Systems, Geography, Geography and Environmental Science, Geohydrology, Geology, Grassland Science, Housing, Irrigation Management, Land and Property Development Management, Limnology, Mathematics, Mathematical Statistics, Microbiology, Microbial Biotechnology, Mineral Resource Management, Nanoscience, Physics, Plant Breeding, Plant Breeding Interdisciplinary, Plant Health Ecology, Plant Pathology, Plant Pathology Interdisciplinary, Polymer Science, Property Science, Quantity Surveying, Risk Analysis, Spatial Planning (Specialising in Human Settlements), Soil Science, Soil Science Interdisciplinary, Statistics, Sustainable Agriculture, Urban and Regional Planning, Wildlife, Wildlife Management and Zoology.

Doctor of Science Degrees are offered in the following fields of study:

- Actuarial Sciences, Agricultural Economics, Agrometeorology, Agrometeorology Interdisciplinary Agronomy, Agronomy Interdisciplinary, Animal Sciences, Astrophysics, Applied Mathematics, Behavioural Genetics, Biochemistry, Botany, Chemistry, Computer Science and Informatics, Construction Management, Consumer Science, Environmental Management, Entomology, Environmental Geology, Environmental Rehabilitation, Food Science, Forensic Genetics, Forensic Sciences, Forensic Sciences Interdisciplinary, Forensic Sciences, Genetics, Geochemistry, Geographical Information Systems Geography, Geography and Environmental Science, Geohydrology, Geology, Grassland Science, Limnology, Mathematics, Mathematical Statistics, Microbiology, Microbial Biotechnology, Mineral Resource Management, Nanoscience, Physics, Plant Breeding, Plant Breeding Interdisciplinary, Plant Health Ecology, Plant Pathology, Plant Pathology Interdisciplinary, Polymer Science, Quantity Surveying, Risk Analysis, Soil Science, Soil Science Interdisciplinary, Statistics, Wildlife and Zoology.

NAS3.1 – Admission requirements for the Postgraduate Diploma

In addition to the requirements contained in General Rules A20-39, a student has to comply with the additional Faculty requirements:

(a) An applicant must have at least a minimum three-year degree (at NQF Exit Level 7) from any applicable field of study.
(b) A minimum average of 60% must be obtained in the final year of study.
(c) The student must prove to the Academic Departmental Head that he/she has adequate knowledge to justify admission to the programme.
(d) Applicants who do not have the formal minimum requirements must apply through Recognition of Prior Learning.
(e) Admission is subject to a selection process. Qualification and experience in the disaster management field will be an added advantage. It is a 1 year full-time and up to 2 years part-time programme.

1.	**Postgraduate Diploma in Disaster Management**	• Admission depends on previously acquired knowledge and experience in the disaster management field, as well as an appropriate NQF Exit Level 7 qualification

NAS3.2.1 – Admission requirements for Bachelor Honours Degrees

In addition to the requirements contained in General Rules A47, a student has to comply with the additional Faculty requirements:

(a) A Bachelor's Degree or equivalent NQF Exit Level 7 qualification including one of the following: BArch, BAgric, BConsumer Sciences, BComputer Information Systems, BSc (Information Technology), BSc majoring in Quantity Surveying or Construction Management and the following additional requirements per discipline.
(b) A deserving applicant in possession of a BSc degree with the required major modules may be permitted by the Academic Departmental Head and with the approval of the Dean to receive postgraduate training in Agriculture. Such a student registers for BScHons (Agriculture), during which prescribed honours modules as well as certain additional undergraduate Agriculture modules may be taken in consultation with the departmental chair.
(c) All Honours Degrees are selection courses and admission to these degrees is subject to approval of the departmental chair/Programme Director.
(d) Applicants should apply for admission to the Honours Degrees on the prescribed form. These forms should be completed and handed to the relevant Programme Director at the beginning of the second semester. Selection will take place when results are available. The honours programmes start on a date as determined by the relevant department. All modules in the learning programme must be successfully completed.

NAS3.2.2 – Admission requirements for a Postgraduate Diploma

In addition to the requirements contained in General Rules A47, a student has to comply with the additional Faculty requirements:

(a) A Bachelor's Degree or equivalent NQF Exit Level 7 qualification
(b) Appropriate work experience

NAS3.3 – Specific programme requirements for Honours Degrees

2.	**Architecture**	• Application must reach the UFS before 31 May the year before intended registration. • A selection process takes place before admission. A maximum of 45 students will be admitted. • All information pertaining to the selection process is available on the departmental website: www.ufs.ac.za/architecture; see 'Academic Information'. • To be eligible for BArchHons selection, a student must have obtained a BArch degree or equivalent qualification from any other Architectural Learning Site with a collective average mark in his/her final year of 55% for the following modules or their equivalent, CONS3706, HARC3704 and TARC3704, as well as a subminimum of 60% for DESN3700 or its equivalent. • Students who do not comply with the above prerequisite must either repeat (only once) selected module(s) or work on the recommendation of the Academic Departmental Head, in an architect's office for a year in order to be eligible for BArchHons selection the following year. • Students may be required to attend a personal interview, present a portfolio and provide verified academic records. The final discretion on whether the student can enrol for the programme will rest with the selection panel. • Language proficiency, in the medium of instruction that students want to do the programme (English or Afrikaans) will be part of selection.
3.	**Actuarial Science**	• A student must have a BSc or BCom degree in Actuarial Science, as well as being qualified for at least four exemptions in the modules of the Faculty / Institute of Actuaries, of which at least one exemption has to be for CT1, CT4, CT6 or CT8.
4.	**Agricultural Economics**	**BScHons (Agricultural Economics)** • Admission to the study is subject to the discretion and approval of the Academic Departmental Head. The following criteria are required: o BSc degree in Agricultural Economics o An average mark of 65% for all undergraduate Agricultural Economics modules over the full period of the BSc degree. • Additional modules /modules may be required before admission to the BScHons study. **BAgricHons (Agricultural Economics)** • Admission to the study is subject to the discretion and approval of the Academic Departmental Head. The following criteria are required: o BAgric degree in Agricultural Economics o An average mark of 65% for all undergraduate Agricultural Economics modules over the full period of the BAgric degree. • Additional modules /modules may be required before admission to the BAgricHons study.
5.	**Agriculture**	**Agricultural Management** • Admission to the study is subject to the discretion and approval of the Academic Departmental Head. The following criteria are required: o BAgric degree in Agricultural Management o An average mark of 65% for all undergraduate Agricultural Economics and Agricultural Management modules over the full period of the BAgric degree. • Additional modules /modules may be required before admission to the BAgricHons study. **Wildlife Management** • • A minimum of 60% in Agricultural Management and/or Agricultural economics or equivalent modules at NQF 7 level. • economics or equivalent modules at NQF 7 level. **Irrigation Management** • A minimum of 60% in Agricultural Engineering or equivalent at NQF 7 level. • Apart from the above mentioned requirements, the Academic Departmental Head may expect a student to complete certain additional modules.
6.	**Agrometeorology**	• Agrometeorology at third-year (NQF 7) level.
7.	**Behavioural Genetics (Human Genetics)**	• Admission into BScHons majoring in Behavioural Genetics for students who majored in Genetics and Psychology or Zoology is subject to selection. A minimum of 60% in Genetics at third-year (NQF 7) level is required. Selection will take place during August each year.
8.	**Biochemistry**	• At least 64 credits in Biochemistry at third-year level. An average of 65% in undergraduate Biochemistry modules.
9.	**Botany**	• A minimum of 60% in Botany at third-year (NQF 7) level and in consultation with the Academic Departmental Head.

10. Chemistry	• To be considered for BScHons in Chemistry, a student must have a BSc degree. Other prerequisites include MATM1614 or MATM1534, plus MATM1624 or MATM1544. An average mark of 60% in CHEM3713+CHEM3711, CHEM3733+ CHEM3731, CHEM3723+ CHEM3721 and CHEM3743+ CHEM3741or equivalent NQF Exit Level 7 modules. Note also that the programme starts annually on 15 January.
11. Computer Science and Informatics	• A minimum average of 60% for the relevant Computer Science modules at third-year (NQF 7) level. In exceptional cases students may be allowed in consultation with the Programme Director or Academic Departmental Head.
12. Consumer Sciences	• Consumer Science or relevant NQF at Level 7 at third-year (NQF 7) level with at least 60%.
13. Construction Management	• A selection process takes place before admission. A maximum number of 30 students are admitted owing to classroom constraints. • Application must be submitted before or on 31 August, the year before intended registration to the Bachelor Honours programme. • Bachelor's/BSc degree in Construction Management at NQF Exit Level 7 at an accredited institution with an average of 60% in exit year, excluding BTech.
14. Entomology	• A minimum of 60% in Entomology & Zoology at third-year (NQF 7) level and in consultation with the Programme Director.
15. Environmental Rehabilitation	• A minimum of 60% in relevant modules at third-year (NQF 7) level and in consultation with the Academic Departmental Head. • Students entering from a BSc decree in Geology will do the degree over 18 months and must take BTNY2616, BTNY3702 amd BTNY3734 as bridging courses.
16. Food Science	• Food Science at third-year (NQF 7) level. An average of 65% in undergraduate Food Science modules.
17. Forensic Sciences	• Admission into BScHons in Forensic Sciences is subject to selection. A minimum of 60% in relevant modules at third-year (NQF 7) level or equivalent modules are required. Selection will take place at the end of August each year.
18. Genetics	• Admission into BScHons majoring in Genetics is subject to selection. A minimum of 60% in Genetics at third-year (NQF 7) level or equivalent modules are required. Selection will take place during August of each year.
19. Geography	• A student must achieve an average pass mark of 60% for all Geography modules (64 credits) at third-year (NQF 7) level to be admitted to the Bachelor Honours Degree. In exceptional cases the department may grant admission by virtue of an oral or written assessment in which the student displays relevant knowledge of the theory and principles of the subject. Depending on a student's academic background, additional modules may be prescribed by the department. Proof of computer literacy is a prerequisite. A student's skills in English will be assessed (Proficient performance in the TALPS Test) and if the required standard is not met, additional modules will be prescribed.
20. Geology, Geochemistry and Environmental Geology	• Students who did not receive their BSc Geology Degree at the University of the Free State, need to have achieved a combined average pass mark of 65% for at least 64 credits in their final year Geology modules • For admission to the Bachelor Honours Degree in Geology, Geochemistry or Environmental Geology a student must achieve a combined average pass mark of 60% in four Geology modules (64 credits) at third-year (NQF 7) level (two modules in the first semester and two in the second semester, including GLGY3714 and GLGY3724 or equivalent modules). Students must complete all required NQF Exit Level 7 Geology modules in a maximum of two years. Students who have completed their Geology modules in the first attempt will be given preference. Thirty students will be admitted to the Geology Bachelor Honours programme. However the Geochemistry and the Environmental Geology programme can only accommodate a maximum of five students each. Proficient performance in the TALPS Test is required.
21. Geographical Information Systems	• Geography at third-year (NQF 7) level or equivalent Geography at NQF 7 at another university with at least 64 credits in total in this subject area. Minimum average of 60% in the third-year. BSc in Geography with an average of 60% of 3 year modules.
22. Geohydrology	• A BSc, BScAgriculture, BEng degree or BTech(Geology) degree. An average of 60% in the final year of a BSc degree calculated from the major subject, as well as Geology, Chemistry, and Mathematics or Statistics on first-year level is required for admission to the degree. A selection process takes place before admission. A maximum of 40 students can be admitted. Application close 30 September the year before intended registration. Proficient performance in the TALPS Test is required.
23. Grassland Science	• Grassland Science at third-year (NQF 7) level.
24. Consumer Science	• BSc Consumer Science, B Consumer Science or an equivalent qualification.
25. Life Sciences	• A person must pass with an average of 60% for all third-year and second-year Life Science modules.

26. Limnology	• A BSc or BScAgriculture degree with at least one of the following as major: Biochemistry, Botany, Chemistry, Entomology, Mathematics, Microbiology, Physics, Soil Science, Zoology. • A mimimum of 60% in relevant modules at third year (NQF 7) level and in consultation with the Academic Departmental Head. • A selection process takes place before admission.
27. Mathematics and Applied Mathematics	• At least four Mathematics and Applied Mathematics or equivalent modules, at third-year (NQF 7) level, completed with an average mark of 60%. In addition, all applicants will have to write and pass an admission examination to verify sufficient background and foundational mathematics knowledge. If necessary, students may be required to take additional undergraduate modules as supplementary prerequisites for certain Bachelor Honours modules. Proficient performance in the TALPS Test is also required before enrolment. The Academic Departmental Head grants admission and consults on the compilation of the curriculum. Students will do an oral presentation for their final selection.
28. Mathematical Statistics	• A minimum average pass mark of 60% in STSM3714, STSM3724, STSM3734 and STSM3744 or equivalent NQF 7 level modules
29. Microbiology	• At least 64 credits in Microbiology at third-year (NQF 7) level. An average of 65% in undergraduate Microbiology modules.
30. Physics	• An average mark of 60% in PHYS3714, PHYS3732, PHYS3752, PHYS3724, PHYS3742 and PHYS3762. The Academic Departmental Head may grant permission for admission to the Bachelor Honours Degree in exceptional cases. The programme commences in middle January and students must apply for admission to the Academic Departmental Head before that date.
31. Plant Breeding	• A minimum of 60% average for all the Plant Breeding modules on third-year (NQF 7) level is required.
32. Plant Health Ecology	• Plant Health or equivalent modules at third-year (NQF 7) level.
33. Plant Pathology	• An average of 60% for the third-year in a BSc or BScAgriculture Degree with the following as major: Plant Pathology or equivalent NQF Level 7 modules. Students may be required to take additional undergraduate courses based on their academic background.
34. Polymer Science	• A minimum of 60% average for all the Chemistry modules on third-year (NQF 7) level is required.
35. Soil Science	• Soil Science at third-year (NQF 7) level.
36. Statistics	• MATM1614 and MATM1624, as well as a minimum average mark of 65% in STSA2616, STSA2626, STSA3716 and STSA3726.
37. Spatial Planning and BSPHons (specializing in Housing)	• Closing date for applications is 31 July prior to intended year of registration. • An appropriate qualification at NQF Level 7 (SAQA certificate must accompany the qualification when requested), as approved by the academic departmental head and an average of at least 60% in previous qualifications. • Applicants have to write selection tests if they are considered suitable for selection. These tests will be conducted online at a pre-arranged time and date. • If a student does not entirely meet the admission requirements, the academic departmental head and the Recognition of Prior Learning office, in consultation with the dean may, in meritorious cases, recommend that some concessions be made in respect of the requirements. The final decision shall rest with the dean. Supplementary courses, as determined by the head of the department, may be required.
38. Quantity Surveying	• A selection process takes place before admission. A maximum number of 30 students are admitted owing to classroom constraints. • Application must be submitted before or on 31 August, the year before intended registration to the Bachelor Honours programme. • Bachelor's/BSc degree in Quantity Surveying on NQF Exit Level 7 at an accredited institution with an average of 60% in exit year, excluding BTech.
39. Wildlife	• Grassland Science at third-year (NQF 7) level or equivalent modules and in consultation with the Academic Departmental Head.
40. Zoology	• A minimum of 60% in Entomology & Zoology at third-year (NQF 7) level and in consultation with the Programme Director.

NAS3.4 – Admission requirements for Master's Degrees

In addition to the requirements contained in General Rules A72, a student has to comply with the additional Faculty requirements:

(a) All Master's Degrees are selection programmes and admission to these degrees is subject to approval of the Academic Departmental Head.

(b) Applicants must apply for admission to the Master's Degree on the prescribed form. These forms are completed and submitted to the Programme Director at the beginning of the second semester. Selection will take place when the results are ready. The Master's programmes start on a date as determined by the relevant department. Each module in the learning programmes must be successfully completed.

(c) Applicants must have an applicable Bachelor Honours Degree or equivalent NQF Exit Level 8 qualification and the additional requirements per discipline (see Reg. NAS3.5).

(d) If a student does not entirely meet the admission requirements, the Dean may, in consultation with the Academic Departmental Head, in meritorious cases, recommend that some concessions be made in respect of the requirements.

(e) Bachelor of Science Honours or relevant Honours Degree on NQF Exit Level 8 with an average of 60% in the exit year of the relevant degree may be recognized as meeting the minimum entry requirements for a Master's Degree programme.

NAS3.5 – Specific programme requirements for Master's Degrees

1.	**Master of Architecture** *(for Professional registration)*	• Application must reach the UFS before 31 May the year before intended registration. • A selection process takes place before admission. A maximum number of 45 students will be admitted. • All information pertaining to the selection process is available on the departmental website: www.ufs.ac.za/architecture; see 'Academic Information'. • To be eligible for MArch selection a student must have obtained a BArchHons degree or equivalent qualification from any other Architectural learning site with a joint average mark in his/her final year of 55% for the following modules or their equivalent: CONS6808, HURB6804 and RARC6808, as well as a subminimum of 60% for DESN6800 or its equivalent. • Students who do not comply with the above prerequisite must either repeat (only once) selected module(s) or work in an architect's office for a year in order to be eligible for MArch selection the following year. • Students may be required to attend a personal interview, present a portfolio and provide verified academic records. • Qualifying students must submit a research proposal as determined and communicated by the Academic Departmental Head. The final discretion whether the student is regarded as ready for the programme will rest with the selection panel.
2.	**Master of Architecture** *(for extended research)*	• Apart from the General Rules the following is applicable: • Students must have obtained either the postgraduate professional qualification, BArch or an equivalent thereof OR the BArchHons or its equivalent. • Students who are in possession of the BArchHons must prove that a Design Dissertation formed part of the requirements for the conferment of such degree. • Students who are in possession of the BArchHons must have obtained a minimum of 60% in THREE of the following modules or their equivalent: DESN6800, CONS6808, HURB6804 and RARC6808. • Qualifying students must submit a dissertation proposal as determined and communicated by the Academic Departmental Head. The final discretion whether the student can enrol for the programme will be the selection panel's.

3.	**Master of Agriculture**	Apart from the General Rules, the following apply: • Students must convince the specific Academic Departmental Head that he/she has sufficient knowledge of the subject to be admitted to the programme. **MAgric (Agricultural Management)** • Admission to the study is subject to the discretion and approval of the Academic Departmental Head and a postgraduate selection committee. The following criteria are required: • Bachelor Honours majoring in Agricultural Management • Proof of successful completion of: o AGMA6808 OR o equivalent module for the above mentioned module. • Registration is only allowed after the research proposal was presented and approved by the postgraduate selection committee. • Additional modules /modules may be required before admission to the MAgric study. • It may be required that some modules be successfully completed by the end of the first year of study for the M Agric degree as a prerequisite for registration of the second year of study for the MAgric degree. • It is required from the student to submit one (1) publishable scientific article when submitting the final dissertation for examination.
4.	**Master of Disaster Management**	Apart from the General Rules the following is applicable:: • A student must in order to be admitted to this Master's programme have: o Appropriate NQF Exit Level 8 Qualification • A student must prove to the Academic Departmental Head that he/she has: o adequate knowledge to justify admission to this study. o practical and/or preparatory experience which will be an added advantage. **NB: An Executive Committee of the UFS will assess, nature and suitability of experience or preparatory studies mentioned above.**
5.	**Master of Environmental Management**	Apart from the General Rules the following is applicable: • A four-year degree (on NQF Exit Level 8) or an equivalent qualification with appropriate experience in the environmental science field will be considered by the University for admission. Depending on the academic background of the student, additional modules may be prescribed. • Where a student with merit does not comply fully with the admission requirements, the Dean, in conjunction with the Selection committee at the Centre for Environmental Management, may recommend that the requirements be partially waived. • As only a limited number of students can be accepted, an application form available from the Centre for Environmental Management (cem@ufs.ac.za) must be submitted by the end of September of the preceding year, after which selection will take place. Proficient performance in the TALPS Test is also required before enrolment.
6.	**Master of Land and Property Development in Housing**	Apart from the General Rules the following is applicable: • A student who wishes to enrol for the degree must have a 60% average in one of the following: - an applicable four-year degree plus applicable practical experience and/or applicable preparatory studies, OR - an applicable Bachelor Honours Degree, or an Bachelor Honours Degree plus applicable studies, and/or practical experience.
7.	**Master of Land and Property Development Management**	In addition to the requirements contained in General Rules A3.1-3.6, a student has to comply with the additional Faculty requirements: • Students should apply for admission to the programme listed above on the prescribed form before the closing date, 31 August the year before intended registration. • Bachelor of Science Honours or relevant Bachelor Honours Degree on NQF Exit Level 8 with an average of 60% in the exit year of the relevant degree and included at least 30 credits of research may be recognised as meeting the minimum entry requirements to this Master's Degree programme. • A selection process takes place before admission. A maximum number of 25 students are admitted owing to classroom constraints.
8.	**Master of Sustainable Agriculture**	Apart from the General Rules the following is applicable: • A student who wishes to enrol for the degree must have one of the following: - an applicable four-year degree plus applicable practical experience and/or applicable preparatory studies, OR - an applicable Honours Degree, or an Honours Degree and applicable studies, and/or practical experience. **NB: The scope, nature and applicability of practical experience and preparatory study in Reg. NAS3.4 (a) and (b) above will be determined by the Director of the Centre for Sustainable Agriculture**

9.	**Master of Urban and Regional Planning** *(for extended research)*	Apart from the General Rules the following is applicable: • A student who wishes to enrol for the degree, must have a 60% average in one of the following: - an applicable four-year degree plus applicable practical experience and/or applicable preparatory studies OR - an applicable Honours Degree, or an Bachelor Honours Degree and applicable studies, and/or practical experience.
10.	**Master of Urban and Regional Planning** *(for Professional registration)*	Apart from the General Rules the following is applicable: • A person may be admitted to the programme in Urban and Regional Planning if he/she is in possession of one of the following qualifications with an average pass mark of at least 60% and has the necessary academic background: • Bachelor Honours in Urban and Regional Planning. • A degree similar to a Bachelor Honours in Urban and Regional Planning (missing modules for the Bachelor Honours in Spatial Planning must be completed). • Applicants may have to write selection tests if they are considered to be suitable for selection. These tests, and possible interviews, may be conducted on the Bloemfontein Campus, at a pre-arranged time and date. • Supplementary courses, as determined by the Academic Departmental Head, after consultation with the Dean and/or the Recoginition of prior Learning Office, may be required; or a student may be expected to undergo an extra year of study in order to complete the programme if a he/she does not entirely meet the admission requirements.

11. Master of Science

Apart from the General Rules the following is applicable to the different fields of study:

Agricultural Economics

- Admission to the study is subject to the discretion and approval of the Academic Departmental Head and a postgraduate selection committee. The following criteria are required:
  - Bachelor Honours Degree in Agricultural Economics
  - Proof of successful completion of:
    – AGEC6814, AGEC6834, AGEC6854, AGEC6874, AGEC6808 OR
    – equivalent modules for the above mentioned modules.
  - Registration is only allowed after the research proposal was presented and approved by the postgraduate selection committee.
  - Additional modules may be required before admission to the MSc study.
  - It may be required that some modules be successfully completed by the end of the first year of study for the MSc degree as a prerequisite for registration of the second year of study.
  - It is required from the student to submit one (1) publishable scientific article when submitting the final dissertation for examination

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Computer Science and Informatics

- An applicable Honours Degree with a minimum average pass mark of 60% is required.

Construction Management

In addition to the requirements contained in General Rules A3.1-3.6, a student has to comply with the additional Faculty requirements:

- Bachelor of Science Honours or relevant Bachelor Honours Degree on NQF Exit Level 8 with an average of 60% in the exit year of the relevant degree and included at least 30 credits of research, may be recognised as meeting the minimum entry requirements to the Master's Degree programme.
- In addition to these requirements the General Institutional Rules, Rules for Master's Degree of the UFS as well as the additional Natural and Agricultural Sciences Faculty requirements per discipline (see Reg. NAS3.5).

Environmental Management

- An applicable Bachelor Honours Degree
- A candidate must submit a research proposal together with the application.
- Proficient performance in the TALPS Test is required.

Geohydrology

- An applicable Bachelor Honours Degree with a minimum average pass mark of 60% is required. Additional coursework may be prescribed where students do not have the required background in Geohydrology. In special cases admission may be allowed in consultation with the Director of Institute for Groundwater Studies.
- Proficient performance in the TALPS Test is required.

Geology, Geochemistry and Environmental Geology

- An applicable BScHons degree with a minimum average pass mark of 60% is required
- Proficient performance in the TALPS Test is required.

Limnology

- Students in possession of a BScHons degree in Limnology are admitted to this course for which a dissertation (LIMG8900 – 180 credits) is required, based on an approved research project. For persons in possession of a BScHons or BScAgricultureHons degree in a related field of study additional coursework may be prescribed where students do not have the required background in Limnology. In special cases admission may be allowed in consultation with the Director of the Centre for Environmental Management.
- Proficient performance in the TALPS Test is required.

Mathematics or Applied Mathematics

- For admission to a Master's Degree in Mathematics or Applied Mathematics, the student needs Mathematics or Applied Mathematics, or the equivalent at Bachelor Honours level. In addition, all applicants will have to write and pass an admission examination to verify sufficient background and foundational mathematics knowledge. If necessary, students may be required to take additional undergraduate modules as supplementary prerequisites for certain Masters' modules. Proficient performance in the TALPS Test is required before enrolment.

Mathematical Statistics

- An appropriate Bachelor Honours Degree and mathematical background is required. Admission is subject to the approval of the Academic Departmental Head.

Mineral Resource Management

- An applicable BScHons degree with a minimum average pass mark of 60% is required
- Proficient performance in the TALPS Test is required.

Quantity Surveying

In addition to the requirements contained in General Rules A3.1-3.6, a student has to comply with the additional Faculty requirements:

- Bachelor of Science Honours or relevant Bachelor Honours Degree on NQF Exit Level 8 with an average of 60% in the exit year of the relevant degree and included at least 30 credits of research may be recognised as meeting the minimum entry requirements to the Master's Degree programme.
- In addition to these requirements the General Institutional Rules, Rules for Master's Studies of the UFS as well as the additional Natural and Agricultural Sciences Faculty requirements per discipline (see Reg. NAS3.5).

12. Master of Science in Agriculture	Apart from the General Rules the following is applicable: • The students must convince the Academic Departmental Head/centre concerned that he/she has adequate knowledge of the subject to justify admission to the study. • In the case of Animal, Grassland Sciences and Food Science admission to the study is subject to the approval of a postgraduate selection committee and Academic Departmental Head. Approval will be based on a satisfactory study record and appropriate qualification, or experience obtained. Additional modules may be required before admission to the MScAgric study is granted.

NAS3.7 – Admission requirements for a Doctoral Degree

In addition to the admission requirements contained in General Rules A106, a student has to comply with the following additional Faculty requirements apply:

(a) All PhD degrees are selection programmes and admission to these degrees is subject to approval by the Academic Departmental Head.

(b) The PhD student must show that he/she has sufficient knowledge of the subject prior to admission. Students should apply for admittance to the Doctoral Degree on the prescribed form. These forms should be completed and submitted to the Academic Departmental Head.

(c) The PhD student must have a Master's Degree or equivalent NQF Exit Level 9 qualification. Master's Degrees include: MArch, MArch, MLPM (M.Prop), MSc, MAgric, MSc (Agriculture), MEM, MSA, MSc (Construction Management), MSc (Quantity Surveying), MURP, or MDM. The following additional requirements for specifics disciplines apply:

NAS3.8 – Specific programme requirements for Doctoral Degrees:

(a) Agricultural Economics	Admission to the study is subject to the discretion and approval of the Academic Departmental Head and a postgraduate selection committee. The following criteria are required: • Master's Degree majoring in Agricultural Economics registration is only allowed after the research proposal was presented and approved by the postgraduate selection committee. • Additional modules may be required before admission to the PhD study. • It may be required that some modules be successfully completed by the end of the first year of study for the PhD degree as a prerequisite for registration of the second year of study for the PhD degree.
(b) Agricultural Management	Admission to the study is subject to the discretion and approval of the Academic Departmental Head and a postgraduate selection committee. The following criteria are required: • Master's Degree majoring in Agricultural Management • Registration is only allowed after the research proposal was presented and approved by the postgraduate selection committee. • Additional modules may be required before admission to the PhD study. • It may be required that some modules be successfully completed by the end of the first year of study for the PhD degree as a prerequisite for registration of the second year of study for the PhD degree.
(c) Disaster Management	• In order to be admitted to the PhD, a student must be in possession of an relevant Master's Degree and specific/relevant modules in the Postgraduate Diploma in Disaster Management. Depending on the background and knowledge that the applicant has, some core disaster management modules may be required in order to equip the student with adequate disaster management knowledge.
(d) Environmental Management	• In order to comply with the admission requirements, a student must possess a Master's of Environmental Management Degree before registering for the PhD degree. Individuals holding another Master's Degree may be considered for admission.
(e) Limnology	• In order to be admitted to the PhD, a student must be in possession of an MSc (Limnology). The Limnology Committee will appoint supervisors and decide in which department a student should register.
(f) Microbial Biotechnology	• A student must be in possession of a Master's Degree in Microbiology, Biochemistry, Food Science, Microbial Biotechnology or related disciplines. Students in possession of a Master's Degree in related modules (e.g. Botany, Zoology, Chemistry, Chemical Engineering) can be requested by the Microbial Biotechnology Committee to complete additional theoretical work, work assignments, and/or modules before the thesis is submitted for examination.
(g) Geology	• Proficient performance in the TALPS Test or the IELTS is required

NAS4 – Progress requirements

Rules A5(a) indicates that a student must complete his/her studies in the minimum prescribed study period plus two years. This is known as the residential period. Most of the undergraduate programmes in this Faculty thus have a residential period of five years, except BScAgriculture and BSc Extended Curriculum Programmes which have a six year residential period.

a) Students must successfully complete a minimum of 64 mainstream credits per year to be allowed to register the following year. Students who do not obtain a minimum of 64 credits per year will automatically be **BLOCKED FOR REGISTRATION** in the Faculty. They will be expected to re-apply in order to be re-admitted to this Faculty.
   Students must therefore pass a minimum of 32 credits per semester to be allowed to register the following semester. Students who fail to obtain 32 credits after the first semester will automatically be blocked for registration. They can appeal to the Faculty Admissions Committee for re-admission. The appeal form must be completed and submitted to the Office of the Dean two days after the results of the supplementary examination are available.

b) Students will only be allowed to repeat a module once if they meet the minimum requirements for repetition.
   If a student only requires 32 credits to obtain a qualification and has not exceeded the residential period, special permission may be granted to repeat a module for the **SECOND** time. No first-year module can be repeated more than once.

c) In order to repeat a module, a student must have completed that module and obtained a semester mark of at least 30 %. Students can follow the appeal process and the Appeal Committee could consider the matter on the basis of merit.

d) Students in the Faculty of Natural and Agricultural Sciences will only be allowed to repeat 9 modules in their three-year study programme or repeat 12 modules in their four-year study programme.

e) Class attendance is required for students who have to register for the same module a second time. In the event of timetable clashes between repeated and new modules, preference must be given to the module being repeated. In such cases, students may not register for the new module.

f) Students who do not pass all their required first-year modules (at least 120 main stream credits) in three years, and have at least obtained 48 second-year credits, will not be allowed to re-register to the Faculty of Natural and Agricultural Sciences.

g) Students must pass a minimum of 80 credits to be able to register for modules in a subsequent study year of a learning programme.

h) Students cannot register for third-year modules if any first-year modules are outstanding.

i) Students must complete their degrees within the residential period. If it becomes evident that the student will not be able to comply with this rule, the student can be deregistered even if the residential period has not been reached.

j) Students who do not comply with i), but have a maximum of 4 modules outstanding, will only be allowed to conditionally register for one more semester. The student must then pass all the modules that they are registered for in that semester. Approval by the Faculty Admissions Committee is needed. Applications for conditional registration close on 31 August of their fifth study year for outstanding first semester modules and 31 January after completion of their fifth year for outstanding second semester modules.

k) Students repeating modules can only register for a maximum of 64 credits per semester. Special permission may be granted for adding one 16-credit module.

l) Students may only register for one additional 16-credit module per semester, over and above the number of prescribed modules required in the learning programme. Approval will depend on the academic record of the student.

m) Opportunity exists in the Faculty of Natural and Agricultural Sciences to appeal against the decision made by the Programme Director and/or delegated representative. A student may submit an appeal to a decision, which must contain supporting documentation that substantiates the situation, to the Appeals Committee of the Faculty. The Appeals Committee consists of the Teaching and Learning Manager and at least two other senior academics within the faculty. The Appeals Committee deliberates the cases before the semester starts. Appeal applications must be submitted to the Office of the Dean five working days before the semester starts. Results of the appeal will be available before the semester starts.

n) Students must obtain at least 45% for a semester mark to participate in the examination.

NAS5 – Module requirements

(a) Students must comply with the requirements of the specific programme and specific modules. All prerequisites for modules presented in the learning programmes in the Faculty are provided in the study guides.

(b) Some modules require selection and students will only be allowed to register for that specific module after approval of the Programme Director.

(c) Students who passed Grade 12 Information Technology at performance level 5 or Computer Application Technology (CAT) at performance level 6 are exempted from CSIQ1531/CSIL1551/CSIL1511 and CSIQ1541/CSIL1561/CSIL1521.
(d) For some modules a minimum prerequisite applies. The requirement is a semester/year mark or an examination mark of 40% in the relevant module. It is indicated as, for example, Min. (MATM1614), if MATM1614 is the relevant module.
(e) If a co-requisite is required and the modules are taken for the first time, the module prescribed as co-requisite must be taken simultaneously with the relevant module. For example, to take GLGY2642, the prerequisites are 55% average for GLGY1614 and GLGY1624 and the co-requisite with GLGY2644.

NAS6 – Students from other faculties

(a) Students from other faculties who register for modules in the Faculty of Natural and Agricultural Sciences must comply with the minimum regulation requirements, as set out in NAS2.1 and NAS2.2.

NAS7 – Learning programme

Students have to:
- Select a learning programme.
- Follow the specific prescribed curriculum.
- Select one of the Biological Sciences, Mathematical Sciences, Chemical and Physical Science, Geosciences, Computer Science and Informatics, Computer Information Systems and Consumer Sciences fields of study for BSc degrees; or Soil Crop and Climate, Animal Wildlife and Grassland, Agricultural Economics, or Food Science for one of BScAgriculture degrees; or Crop Production, or Animal Production fields of study for the BAgric degrees.
- Verify that all the selected modules are included in the **class and examination timetable**.
- Verify that the **prerequisites** prescribed for every module are met.
- Be aware that elective modules can be exchanged with each other, but all compulsory modules must be successfully completed.

NAS7.1 – The selection of a learning programme

a) Students are only allowed to change to different fields of study or degrees within the Faculty at the end of their first year of study. If a student changes from one field of study to another, the total degree residential period must not exceed a maximum of five or six years, depending on the field of study.
b) Students can change within fields of study only up to the second year of study; this does not grant them permission to extend the duration of study beyond five years.
c) Students who change from one major within a complementary learning programme could have an extension on their study duration.

NAS7.2 – Minimum credit allocation

A degree cannot be conferred if the minimum credit requirements are not met and the prescribed curriculum are not fully completed:
(a) **All three-year Degrees:**
If a student wants endorsement with **two majors,** at least 60 credits per major discipline at NQF Exit Level 7 is required.
(b) **BArch, BAgric, BConsumer Sciences, BCompInfoSys, BSc, BSc (Information Technology), BSc in Quantity Surveying or BSc in Construction Management:**
A total of at least 360 credits, with a maximum of 120 credits at NQF Level 5 and 120 credits on Level 6 and Level 7 respectively, must be obtained over three years. At least 60 credits must be from one discipline and at NQF Exit Level 7. For BSc (Quantity Surveying) and BSc (Construction Management) the 60 credits at NQF Exit Level 7 will not be from one discipline.
(c) **BSc Extended Curriculum Programme (four years):**
A total of at least 474 credits, of which at least 112 credits must be developmental modules, a maximum of 208 credits at NQF Level 5 and at least 120 credits at NQF Exit Level 7 must be obtained over four study years.
(d) **BSc (Agriculture), BSc (Consumer Science) (four years):**
A total of at least 480 credits, with a maximum of 96 credits at NQF Level 5 and at least 120 credits at NQF Exit Level 8 for the degree must be obtained over four years. At least 60 credits must be from the minor discipline at NQF Exit Level 7.
(e) **BSc (Agriculture) Extended Curriculum Programme (five years):**
A total of at least 592 credits, of which at least 108 credits must be developmental modules, a maximum of 208 credits at NQF Level 5 and at least 120 credits at NQF Exit Level 8 must be obtained over five study years.

NAS8 – Assessment examination and promotion
NAS8.1 – Examination and promotion system

In addition to the requirements contained in General Rule A28, a student has to comply with the additional Faculty requirements:
(a) The guidelines as set out in the study guide for assessment method and calculation of semester and final marks apply.

(b) The promotion system only applies to specific modules as indicated in the study guides. Students who obtain a semester mark of 70% or higher in a specific module can be promoted if the promotion system applies to the module. The module mark becomes the final mark for the module.
(c) The degree is awarded with distinction to a student who obtained a weighted average of 75% in the prescribed final year modules and if the programme was completed in the prescribed minimum study years.

NAS8.2 – Assessment for Departments of Architecture, Quantity Surveying and Construction Management, and Urban and Regional Planning

(a) For most of the modules presented by the Department of Architecture, Urban and Regional Planning, Quantity Surveying and Construction Management assessment of the student's academic progress will take place on a continuous basis by means of assignments, tests and/or design tasks as specified in the module guide. The acknowledgment of a year/semester mark obtained will be subject to satisfactory attendance at lectures, studio periods and seminars. A final mark which will be taken as the student's examination mark will be compiled from the marks obtained in the assessments mentioned above.
(b) Modules presented by departments other than Architecture or Quantity Surveying/Construction Management will be subject to the assessment procedure of those departments.
(c) Students in the Department of Architecture must meet the prescribed sub-minimum of 30% for all assignments and design tasks as specified in the module guides to pass a module.

NAS8.3

In addition to the requirements contained in General Rule: A9, A28, A53, A83, A113 a student has to comply with the additional Faculty requirements:
(a) To gain admission to the examination in a module in the Faculty of Natural and Agricultural Sciences, a module mark of at least 45% is required.

11. QUALIFICATIONS IN THE FACULTY AT THE QWAQWA CAMPUS

11.1 BACHELOR DEGREES AND DIPLOMAS		MINIMUM PERIOD OF STUDY	NQF LEVEL	ABBREVIATION
	ACCESS PROGRAMMES AND EXTENDED PROGRAMMES			
1	University Preparation Programme: Natural and Agricultural Sciences for BSc	1 year	5	UPP Mathematics & Chemistry
2	Bachelor of Science Extended Programme (Mathematics and Chemistry and Biology)	4 years	7	BSc
3	Bachelor of Science Extended Programme (Biology and Geography)	4 years	7	BSc
4	Bachelor of Science Extended Programme (Computer Science and Mathematics)	4 years	7	BSc
	BACHELOR'S DEGREES			
1	Bachelor of Science	3 years	7	BSc

11.2 POSTGRADUATE DIPLOMAS, BACHELOR, HONOURS, MASTER'S AND DOCTORAL DEGREES		MINIMUM PERIOD OF STUDY	NQF LEVEL	ABBREVIATION
	POSTGRADUATE DIPLOMA			
	BACHELOR HONOURS DEGREES			
1	Bachelor of Science Honours	1 year	8	BScHon
	MASTER'S DEGREES			
1	Master of Science	2 years	9	MSc
	DOCTORAL DEGREES			
1	Philosophiae Doctor	3 years	10	PhD
2	Doctor of Science	3 years	10	DSc

12. LEARNING PROGRAMMES & MODULES REQUIRED

12.1 LEARNING PROGRAMMES FOR ACCESS AND EXTENDED PROGRAMMES

Candidates who do not comply with the Faculty of Natural and Agricultural Sciences entry requirements for main stream BSc studies can gain admission to the university through the University Preparation Programme (UPP) or the BSc Extended programmes. The programmes provide students with an opportunity to improve their skills and competencies with aim of gaining access to mainstream studies after successful completion of the first year. These Programmes also address, through a course in Skills and Competencies in Lifelong Learning, the student's wider needs with regards to quality of personal life, study and reading skills, self-assertiveness, problem solving, and other generic competencies. These students also attend an academic language course in English to improve their reading and writing skills for higher education purposes.

12.1.1 UPP NATURAL SCIENCES 40001(4006) (CHEMISTRY, MATHEMATICS AND BIOLOGY)

YEAR			Semester 1	Semester 2
1	**Academic Modules**	Mathematics Chemistry Biology	MATD1554 CHEM1552 +CHEM1551 BIOL1504	MATD1564 CHEM1642
	Development Modules	Academic language course Computer Literacy Life-long Learning – Natural Sciences	EALN1508 CSIQ1531 SCNS1508	
	After successful completion of ALL THE MODULES in the first year of the BSc Four-year Curriculum (Extended Programme) with an average of 60 % for Academic modules, the student changes to the first year main fields of interest modules of the learning programme of his/her choice as set out in the Faculty's Yearbook. Students must take note of the following requirements: • Students must pass all academic modules in the June examination to continue their studies in the second semester • To register for CHEM1622 students must have passed CHEM1522 and CHEM1532 • To register for CHEM1642 students must have passed CHEM1522 and MATD1554 or level 4 for NCS Mathematics. • To register for MATD1564 students must have passed MATD1554. To register for BIOL1624 and BIOL1644students must have passed BIOL1504. Students who could not complete the first two years of study in three years will not be allowed for re-registration to the Faculty of Natural and Agricultural Sciences.		
2	In their second year of study students have to register for CHEM1551, CHEM1661, and CSIQ1541 as well as all the first year main fields of interest modules in the learning programme of choice as set out in the Faculty Yearbook. Students must take note of the following requirements: • To register for CHEM1551 students must have passed CHEM1622 + CHEM1642 as well as MATD1564 . • To register for CHEM1661, students must have passed CHEM1551. • The modules CHEM1522, CHEM1622, CHEM1532, CHEM1642, CHEM1551 and CHEM1661 must be passed to get recognition for CHEM1513+ CHEM1551 and CHEM1624/CHEM1644 (See BSc main fields of interest learning programmes).		
3	**Follow <u>second year</u> learning programme of choice in the Faculty Yearbook.** Students must take note of the following requirement: • Students must have passed CHEM1551, CHEM1661 and CSIQ1541 to be allowed to change to the programme code of current study.		
4	**Follow the <u>third year</u> learning programme of choice as set out in the Faculty Yearbook.**		

12.1.2 BSc FOUR-YEAR EXTENDED PROGRAMME 40990 (CHEMISTRY, MATHEMATICS AND BIOLOGY)

		Semester 1	Semester 2
1	Mathematics Chemistry Biology	MATD1554 CHEM1552+ CHEM1532 BIOL1504	MATD1564 CHEM1622 + CHEM1642
	Academic language course Computer Literacy Life-long Learning – Natural Sciences	EALN1508 CSIQ1531 SCNS1508	
	After successful completion of ALL THE MODULES in the first year of the BSc Four-year Curriculum (Extended Programme) with an average of 60 % for Academic modules, the student changes to the first year main fields of interest modules of the learning programme of his/her choice as set out in the Faculty's Yearbook. Students must take note of the following requirements: • Students must pass at least two academic modules in the June examination to continue their studies in the second semester • To register for CHEM1622 students must have passed CHEM1522 and CHEM1532 • To register for CHEM1642 students must have passed CHEM1522 and MATD1554 or level 4 for NCS Mathematics. • To register for MATD1564 students must have passed MATD1554. To register for BIO 1644 and BIOL1624 students must have passed BIOL1504. Students who could not complete the first two years of study in three years will not be allowed for re-registration to the Faculty of Natural and Agricultural Sciences.		
2	**In their second year of study students have to register for CHEM1551, CHEM1661, and CSIQ1541 as well as all the first year main fields of interest modules in the learning programme of choice as set out in the Faculty Yearbook. Students must take note of the following requirements:** • To register for CHEM1551 students must have passed CHEM1622 + CHEM1642 as well as MATD1564 . • To register for CHEM1661, students must have passed CHEM1551. • The modules CHEM1522, CHEM1622, CHEM1532, CHEM1642, CHEM1551 and CHEM1661 must be passed to get recognition for CHEM1513+ CHEM1551 and CHEM1624/CHEM1644. (See BSc main fields of interest learning programmes).		
3	**Follow <u>second year</u> learning programme of choice in the Faculty Yearbook.** Students must take note of the following requirement: • Students must have passed CHEM1551, CHEM1661 and CSIQ1541 to be allowed to change to the programme code of current study.		
4	**Follow the <u>third year</u> Learning Programme of choice as set out in the Faculty Yearbook.**		

12.1.3 BSc FOUR-YEAR EXTENDED PROGRAMME 40992 (COMPUTER SCIENCE AND MATHEMATICS)

YEAR			Semester 1	Semester 2
1	**Academic Modules**	Mathematics Information Technology	MATD1554 CSIQ1533+CSIQ1553	MATD1564 CSIQ1623+ CSIQ1681 EBCS1524
	Development Modules	Academic language course Computer Literacy Life-long Learning – Natural Sciences	EALN1508 CSIQ1512 SCNS1508	
	After successful completion of ALL THE MODULES in the first year of the BSc Four-year Curriculum (Extended Programme) with an average of 60 % for Academic modules, the student changes to the first year main fields of interest modules of the learning programme of his/her choice as set out in the Faculty's Yearbook. Students must take note of the following requirements: • Students must pass at least two academic modules in the June examination to continue their studies in the second semester • To register for CSIQ1623 students must have passed CSIQ1553 and MATD1554 or level 4 for NCS Mathematics. • To register for MATD1564 students must have passed MATD1554. Students who could not complete the first two years of study in three years will not be allowed for reregistration to the Faculty of Natural and Agricultural Sciences.			
2	**In their second year of study students have to register for CSIQ1624 and CSIQ1541 as well as all the first year main fields of interest modules in the learning programme of choice as set out in the Faculty Yearbook. Students must take note of the following requirements:** • To register for CSIQ1624 students must have passed CSIQ1512, CSIQ1533 as well as MATD1564. • To get recognition for CSIQ1531 + CSIQ1541 students must have passed CSIQ1512			
3	**Follow <u>second year</u> learning programme of choice in the Faculty Yearbook.** Students must take note of the following requirement: • Students must have passed CSIQ1623, CSIQ1624 and CSIQ1512 to be allowed to change to the programme code of current study.			
4	**Follow the <u>third year</u> learning programme of choice as set out in the Faculty Yearbook.**			

12.1.4 BSc FOUR-YEAR EXTENDED PROGRAMME 40993 (BIOLOGY AND GEOGRAPHY)

		Semester 1	Semester 2
1	Mathematics Geography Biology	MATD1554 GEOE1514 BIOL1504	MATD1564 GEOE1624
	Academic language course Computer Literacy Life-long Learning – Natural Sciences	EALN1508 CSIQ1531 SCNS1508	
	After successful completion of ALL THE MODULES in the first year of the BSc Four-year Curriculum (Extended Programme) with an average of 60 % for Academic modules, the student changes to the first year main fields of interest modules of the learning programme of his/her choice as set out in the Faculty's Yearbook. Students must take note of the following requirements: • Students must pass at least two academic modules in the June examination to continue their studies in the second semester • To register for GEOE1624 students must have passed GEOE1514 • To register for MATD1564 students must have passed MATD1554.To register for BIOL1624 students must have passed BIOL1504. Students who could not complete the first two years of study in three years will not be allowed for re-registration to the Faculty of Natural and Agricultural Sciences.		
2	**In their second year of study students have to register for CSIQ1541 as well as all the first year main fields of interest modules in the learning programme of choice as set out in the Faculty Yearbook.**		
3	**Follow <u>second year</u> learning programme of choice in the Faculty Yearbook.**		
4	**Follow the <u>third year</u> Learning Programme of choice as set out in the Faculty Yearbook.**		

12.2 LEARNING PROGRAMMES FOR BACHELOR DEGREES

12.2.1 BACHELOR OF SCIENCE IN THE BIOLOGICAL SCIENCES

LEARNING PROGRAMMES BIOLOGICAL SCIENCES FIELDS OF INTEREST 1

Learning programmes in the BIOLOGICAL FIELD OF INTEREST offer FOUR OPTIONS. Learning programmes consist of the combination of modules from the following disciplines: Botany, Zoology and Life Sciences. A combination of Life Sciences and all third year modules from either Botany, Entomology or Zoology as the other major. Students include all the compulsory modules in row (C1, C2, C3) of each of the selected disciplines for all three study years. Students need to SELECT enough elective modules per semester to obtain at least a total of 120 credits for

DISCIPLINE	**BOTANY**	**ZOOLOGY**	**LIFE SCIENCES**	**BOTANY**	**ZOOLOGY**	**LIFE SCIENCES**
	QC432065	**Q**C434965	**Q**C436565	**Q**C432065	**Q**C434965	**Q**C432765
YEAR	**FIRST**			**FIRST**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C1	BIOL1514 CHEM1551+CHEM1513 **ONE OF:** MATM1614 MATM1534	BIOL1514 CHEM1551+CHEM1513 **ONE OF:** MATM1614 MATM1534	BIOL1514 CHEM1551+CHEM1513 **ONE OF:** MATM1614 MATM1534	BIOL1624 BIOL1644 CHEM1623+CHEM1661	BIOL1624 BIOL1644 CHEM1623+CHEM1661	BIOL1624 BIOL1644 CHEM1623+CHEM1661
ELECTIVES E1	PHYS1534 GEOG1514 EBCS1514	PHYS1534 GEOG1514 EBCS1514	PHYS1534 GEOG1514 EBCS1514	PHYS1644 GEOG1624 MATM1544 EBCS1524	PHYS1644 GEOG1624 MATM1544 EBCS1524	PHYS1644 GEOG1624 MATM1544 EBCS1524
REQUIRED *if NBT < 65%	CSIQ1531 UFS101 *EALN1508	CSIQ1531 UFS101 *EALN1508	CSIQ1531 UFS101 *EALN1508	CSIQ1541	CSIQ1541	CSIQ1541
YEAR	**SECOND**			**SECOND**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C2	BIOL2614 BOTA2654 BIOL2674	BIOL2614 ZOOL2634 BIOL2674 ZOOL2614	ZOOL2614 BIOL2614 BIOL2674	BOTA2684 BIOL2644	BIOL2644 ZOOL2664 ZOOL2684	BIOL2644 BOTA2684
ELECTIVES E2	**ONE OF:** ZOOL2634 ZOOL2614 GISS2614		**ONE OF:** ZOOL2634 BOTA2654 GISS2614	**TWO OF:** ZOOL2664 GISS2624 ZOOL2684	**ONE OF:** BOTA2684 GISS2624	**TWO OF:** ZOOL2664 GISS2624 ZOOL2684
YEAR	**THIRD**			**THIRD**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C3	BIOL3714 BOTA3734 BOTA3754	BIOL3714 ZOOL3714 BOTA3754 ZOOL3734	BIOL3714 ZOOL3734 ZOOL3714 BOTA3754	BIOL3724 BOTA3724 BOTA3744	ZOOL3744 ZOOL3724 BIOL3724 ZOOL3764	BIOL3724 ZOOL3764 BOTA3744
ELECTIVES E3	**ONE OF:** ZOOL3714 ZOOL3734			**ONE OF:** GISS3724 ZOOL3744 ZOOL3724 ZOOL3764		**ONE OF:** GISS3724 BOTA3724 ZOOL3744 ZOOL3724

12.2.2 BACHELOR OF SCIENCE IN THE CHEMICAL AND PHYSICAL SCIENCES

LEARNING PROGRAMMES PHYSICAL AND CHEMICAL SCIENCES FIELDS OF INTEREST 1

Learning programmes in Chemical and Physical sciences offer TWO main options with either

- Physic and Chemistry as the two majors or
- Chemistry in combination Biological Subjects as the other majors.

Each student Includes all the compulsory modules (row C) for all three study years enough electives modules (row E) per semester to obtain at least 120 credits per year in the first year and the second year.

DISCIPLINE	**PHYSICS & CHEMISTRY**	**CHEMISTRY & BOTANY**	**PHYSICS & CHEMISTRY**	**CHEMISTRY & BOTANY**
	QC432140	**QC432120**	**QC432140**	**QC432120**
YEAR	**FIRST**		**FIRST**	**FIRST**
SEMESTER	**FIRST**		**SECOND**	**SECOND**
COMPULSORY C1	PHYS1514 CHEM1551+CHEM1513	CHEM1551+CHEM1513 BIOL1514	PHYS1624 CHEM1623 + CHEM1661	CHEM1623 + CHEM1661 BOTA1644 BOTA1624
	MATM1614 **OR** MATM1534	MATM1614 **OR** MATM1534	MATM1624 **OR** MATM1544	MATM1624 **OR** MATM1544
ELECTIVES E1	GEOG1514 CSIQ1614 CSIQ1614 CSIQ1512	PHYS1514 GEOG1514 CSIQ1614 CSIQ1512	CSIQ1623 CSIQ1624	
REQUIRED ***if NBT < 65%**	CSIQ1531 UFS101 *EALN1508		CSIQ1541	
YEAR	**SECOND**		**SECOND**	
SEMESTER	**FIRST**		**SECOND**	
COMPULSORY C2	PHYS2614 PHYS2632 CHEM2633+CHEM2631 CHEM2613+CHEM2611 MASC2611	CHEM2633+CHEM2631 CHEM2613+CHEM2611 BOTA2654	PHYS2624 PHYS2642 CHEM2643+CHEM2641 CHEM2623+ CHEM2621	CHEM2643+CHEM2641 CHEM2623+CHEM2621 BIOL2644 BOTA2684
ELECTIVES E2	BIOL1514 BIOL1524 MATM2614	MATM2614 **ONE OF:** BIOL2614 BIOL2674	MATA2644	MATM2624 MATM2664
YEAR	**THIRD**		**THIRD**	
SEMESTER	**FIRST**		**SECOND**	
COMPULSORY C3	PHYS3714 PHYS3732 PHYS3752 CHEM3713+CHEM3711 CHEM3733+CHEM3731	CHEM3713+CHEM3711 CHEM3733+CHEM3731 BOTA3734+BOTA3754	PHYS3724 PHYS3742 PHYS3762 CHEM3723+CHEM3721 CHEM3744	CHEM3723+CHEM3721 CHEM3744 BOTA3744+BOTA3724
ELECTIVES E3				

12.2.3 LEARNING PROGRAMMES IN THE INFORMATION TECHNOLOGY STREAM

LEARNING PROGRAMMES IN INFORMATION TECHNOLOGY BSc(IT)

Learning programmes in Information Technology offer THREE main options with either

- Information Technology and Chemistry as the majors
- Information Technology and Physics as the majors
- Information Technology and Business subjects as the majors

Students include all the compulsory modules in row C1 and C2 of each discipline for all three study years. They need to SELECT enough elective modules per semester to obtain at least 120 credits per year in the first year and the second year.

DISCIPLINE	INFORMATION TECHNOLOGY & CHEMISTRY	INFORMATION TECHNOLOGY & PHYSICS	INFORMATION TECHNOLOGY & MANAGEMENT	INFORMATION TECHNOLOGY & CHEMISTRY	INFORMATION TECHNOLOGY & PHYSICS	INFORMATION TECHNOLOGY & MANAGEMENT
EXT CODE	QC432221	QC432240	QC432202	QC432221	QC432240	QC432202
YEAR	**FIRST**			**FIRST**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C1	CSIQ1614 CSIQ1553 CHEM1551+CHEM1513	CSIQ1614 CSIQ1553 PHYS1514	CSIQ1614 CSIQ1553 EBUS1514	CSIQ1623 CSIQ1624 CHEM1623 + CHEM1661	CSIQ1623 CSIQ1624 PHYS1624	CSIQ1623 CSIQ1624 **ONE OF:** EIOP1524 EBUS1624
COMPULSORY C2	**ONE OF:** MATM1534 MATM1614	**ONE OF:** MATM1534 MATM1614	**ONE OF:** EBCS1514 MATM1534 MATM1614	**ONE OF:** MATM1624 MATM1544	**ONE OF:** MATM1624 MATM1544	**ONE OF:** EBCS1524 MATM1544 MATM1624
ELECTIVES	EBCS1514	EBCS1514		EBCS1524	EBCS1524	
REQUIRED ***if NBT < 65%**	UFS101 EALN1508 CSIQ1531	UFS101 EALN1508 CSIQ1531	UFS101 EALN1508 CSIQ1531	CSIQ1541	CSIQ1541	CSIQ1541
YEAR	**SECOND**			**SECOND**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C1	CSIQ2634 CSIQ2614 CSIQ2654 CHEM2613+CHEM2611 CHEM2633+CHEM2631 MASC2611	CSIQ2634 CSIQ2654 CSIQ2614 PHYS2614 PHYS2632	CSIQ2634 CSIQ2654 CSIQ2614 EBUS1614	CSIQ2644 CSIQ2624 CHEM2623+ CHEM2621 CHEM2643+CHEM2641	CSIQ2644 CSIQ2624 PHYS2624 PHYS2642	CSIQ2644 CSIQ2624 EBUS2724
C2			**ONE OF:** ECAP2614 EECF1614			**ONE OF:** ELRM2624 EECF1624
ELECTIVE				CSIQ2642	CSIQ2642	CSIQ2642
YEAR	**THIRD**			**THIRD**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C1	CSIQ3734 CSIQ3714 CHEM3713+CHEM3711 CHEM3733+CHEM3731	CSIQ3734 CSIQ3714 PHYS3714 PHYS3732 PHYS3752	CSIQ3734 CSIQ3714 EBUS2714 EORG3715	CSIQ3724 CSIQ3784 CHEM3723+CHEM3721 CHEM3743+CHEM3741	CSIQ3724 CSIQ3784 PHYS3724 PHYS3742 PHYS3762	CSIQ3724 CSIQ3784 ESBM2724 EPFM3724

12.2.4 BACHELOR OF SCIENCE IN GEOSCIENCES

The learning programmes in **GEOGRAPHICAL FIELD OF INTEREST** offer **THREE OPTIONS**, Environmental Geography, Geography and Life Science and Tourism Geography. This programme include the studiy of the properties and processes in the earth and on the surface and encompass a holistic study of the human environment and accompanying interactions and relationships. The programme is aimed at students who are interested in various aspects of the environment and can lead to specialisation as environmentalists. Careers in these sciences are divergent because all institutions that are involved with resource utilisation are legally obliged to examine the impact of their activities on the environment. The connection of geographical information and computer technology simplifies the storage, processing, modelling and presentation of information and expedites decision making.

Each student includes all the compulsory modules (rows C) for all three study years and choose modules as supportive electives (E) per semester to obtain at least 120 credits for each year of study.

DISCIPLINE	**ENVIRONMENTAL GEOGRAPHY**	**GEOGRAPHY AND LIFE SCIENCES**	**GEOGRAPHY AND TOURISM**	**ENVIRONMENTAL GEOGRAPHY**	**GEOGRAPHY AND LIFE SCIENCES**	**GEOGRAPHY AND TOURISM**
CODE	**QC433359**	**QC433365**	**QC433392**	**QC433359**	**QC433365**	**QC433392**
YEAR	**FIRST**			**FIRST**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C1	GEOG1514 BIOL1514 MATM1534 **OR** MATM1614	GEOG1514 BIOL1514 MATM1534 OR MATM1614	GEOG1514 BIOL1514 EBCS1514 EBUS1514	GEOG1624 BIOL1624 BIOL1644	GEOG1624 BIOL1644 BIOL1624	GEOG1624 GEOT1624 EBCS1524 EBUS1624
ELECTIVES	EBCS1514 CHEM1552 CHEM1532 CHEM1551 PHYS1534	CHEM1552 CHEM1532 CHEM1551 EBCS1514 EBUS1514		CHEM1642 CHEM1622 CHEM1661 MATM1544 EBCS1524 PHYS1644	CHEM1642 CHEM1622 CHEM1661 EBCS1524 EBUS1624 MATM1544	
REQUIRED ***if NBT < 65%**	CSIQ1531 UFS101 *EALN1508	CSIQ1531 UFS101 *EALN1508	CSIQ1531 UFS101 *EALN1508	CSIQ1541	CSIQ1541	CSIQ1541
YEAR	**SECOND**			**SECOND**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C2	GEOG2614 GISS2614 BIOL2674 GEOG2634	GEOG2614 BIOL2674	GEOG2614 GEOG2634 GEOT2614 SOCD2614	BIOL2644 GEOG2624 GEOG2644 GISS2624	GEOG2644 BIOL2644 GISS2624	GEOT2624 GEOG2624 GEOG2644 SOCP2624
ELECTIVES		**TWO OF:** GEOG2634 GISS2614 BOTA2654 ZOOL2614 ZOOL2634			**ONE OF:** GEOG2624 BIOL2644 BOTA2684 ZOOL2664	
YEAR	**THIRD**			**THIRD**		
SEMESTER	**FIRST**			**SECOND**		
COMPULSORY C3	GEOG3714 GEOG3734 GEOG3754 BIOL3714	BIOL3714 GEOG3714	GEOT3714 GEOT3734 GEOG3754 EBUS2714	GEOG3724 GEOG3744 GEOG3764 GISS3724	GISS3724	GEOT3724 GEOT3744 GEOG3764 GEOG3724
ELECTIVES		**TWO OF:** BOTA3734 ZOOL3734 ZOOL3714			**THREE OF:** BOTA3724 GEOG3744 GEOG3724 ZOOL3764 ZOOL3724	

12.3 BACHELOR OF SCIENCE HONOURS
HONOURS LEARNING PROGRAMMES

Students register for all compulsory modules plus enough other to obtain at least 120 credits

DISCIPLINE	BOTANY	ZOOLOGY	PHYSICS	CHEMISTRY	GEOGRAPHY	COMPUTER SCIENCE
NEW CODE	QC460065	QC460020	QC460027	QC460049	QC460033	QC460021
			FIRST & SECOND SEMESTER			
COMPULSORY	BOTA6808 BIOL6814 BIOL6834 BIOL6824	ZOOL6808 BIOL6814 BIOL6834 BIOL6824	PHYS6808 PHYS6808 PHYS6808 PHYS6814 PHYS6834 PHYS6854 PHYE6824 PHYE6844 PHYS6844 PHYI6834 PHYI6874 PHYI6864	CMPR6808 CMPO6814 CMPP6814 CMPR6814 CMPA6814 CMPA6824 CMPB6824 CMPC6824 CMPA6824 CMPC6824 CMPB6824	GEOG6808 GEOG6816 GEOG6824 GEOG6846 GEOG6826 GEOG6814	This programme will be presented over two years and students need toregister for two module as UNISA. **Year 1** BIOL6814 CSIQ6833 CSIQ6824 **Year 2** CSIQ6809 CSIQ6843 CSIQ6863 **UNISA MODULES** INF4831 INF4883
ELECTIVES	**THREE OF:** BOTA6814 BOTA6824 BOTA6844 BOTA6864 Any other 16 credit Honours module approved by the Programme Director	**THREE OF:** ZOOL6814 ZOOL6854 ZOOL6824 ZOOL6834 ZOOL6844 Any other 16 credit Honours module approved by the Programme Director	PHYS6814 PHYS6834 PHYS6854 PHYS6874 PHYE6824 PHYE6844 PHYS6844 PHYI6834 PHYI6874		GISS6826 GEO6836	

12.4 MASTER OF SCIENCES

These learning programmes aims at:

(a) providing the candidate with the opportunity to present evidence of advanced study and research characterised by intellectual independence and advanced knowledge of a specialisation area in the subject, as well as accurate evaluation of his/her own results and that of others by production of a thesis which places his/her research in broader context and which is capable of withstanding international intellectual scrutiny.

(b) developing the candidate in order to demonstrate knowledge and understanding of supervised planning and execution of a research project in the discipline. This project includes hypothesis formulation, collecting appropriate experimental materials, optimising techniques and procedures, data acquisition, analysis and interpretation of results, and writing of a dissertation according to a structured format and related literature.

The minimum term of this study is 2 years and a total of 180 credits are allocated for this degree. The candidate may do a research Masters programme with a full dissertation or a structured Masters programme depending on the discipline in which they want to register. In cases where an MSc degree consists only of a dissertation the programme code will start with 471 and in the case where the MSc degree consists of both course work and research the programme code will start with 472.

- If the full dissertation option is followed the candidate must do research on an approved topic for at least two semesters, in consultation with the Departmental Chairperson, in preparation for a dissertation that shall be submitted as the only requirement for the degree. Candidates may be required to present at least one seminar/research report in each year in accordance with departmental rules.

- If the structured Master programme is all prescribed modules, a compulsory research essay must be completed. The topic for the research must be determined in consultation with the Departmental Chairperson. Candidates may be required to present at least one seminar/research report.

RESEARCH MASTERS								
YEAR 1 + 2								
Botany	QC480020	BOTA8900	**Physics**	QC480040	PHYS8900	**Environmental Geography**	QC480059	GEOG8900
Chemistry	QC480021	CHEM8900	**Polymer Sciences**	QC480084	CHEM8900	**Zoology**	QC480049	ZOOL8900
Computer Science	QC480022	CSIQ8900	**Geography**	QC480033	GEOG8900			

12.5 DOCTOR OF SCIENCES DEGREES (NQF LEVEL 10)

12.5.1 PHILOSOPHIAE DOCTOR (PhD) 49119, 49140, 49149

These learning programmes aims at:
(a) providing the candidate with the opportunity to prove her/his ability to plan and do research independently and to report the results;
(b) enabling the candidate to make an original contribution to the discipline.
The minimum term of this study is 3 years and a total of 360 credits are allocated for this degree. The candidate must do research for at least four semesters on an approved topic selected in consultation with the Departmental Chairperson in preparation to complete the thesis (360 credits). The degree study therefore lasts three years. The candidate will present at least one seminar/research report in each year of study in accordance with departmental regulations.

Candidates can register for a PhD with specialisation in one of the following area:

Botany	QC490020	BOTA9100	**Physics**	QC490040	PHYS9100	**Environmental Geography**	QC490059	GEOG9100
Chemistry	QC490021	CHEM9100	**Polymer Sciences**	QC490084	CHEM9100	**Zoology**	QC490049	ZOOL9100
Computer Science	QC490022	CSIQ9100	**Geography**	QC490033	GEOG9100			

13. MODULE CONTENT FOR UNDERGRADUATE MODULES ALPHABETICALLY PER INTEREST FIELD AND DEPARTMENT

ABBREVIATION AND NUMBERING SYSTEM

Each module of the subject is represented by a three-digit module code, in which the year of study and semester of presentation (unless otherwise stated) are combined. In addition, the credit value, NQF level, CESM code, prerequisite pass and/or prerequisite and co-requisite modules for each, modular name, contact sessions, content and assessment for each module are given.

This is a promotion module: if a candidate participates in all assessments and obtains an average semester mark above 75%, this candidate need not write the final exam – their semester mark will become their final mark.

Key:

Subject						
Module code	**Credit value**	**NQF-level**	**CESM code**	**Prerequisite pass and/or prerequisite and co-requisite modules for each**	**Module name**	**Contact sessions**
Content					**Assessment**	

Example:

BOCB2616	**24**	**6**	**CESM: 130201**	**Two of the following: BLG114, BLGY1623, BLG144 and (CHEM1624 OR 60% pass in CHEM1644 or CHEM1532+CHEM1622+CHEM1661)**	**Biochemistry of biological compounds**	**3L, 4P**
An introduction to the most important principles governing biochemistry. The module is designed to expand on the foundation that the student has acquired in chemistry and biology modules and to provide a biochemical framework that allows understanding of new phenomena.					Semester tests and class tests. One examination paper of three hours.	

Explanation
Subject: Biochemistry: Module BOCB2616:
Module code

- First digit: 2 – refers to the year of study in which the module is presented.
- Second digit: is a number that discriminates between modules of the same subject in the same year of study and refers to the semester (unless stated otherwise), according to the following pattern explained earlier (p. XXXX), (Uneven numbers: modules offered in the first semester; Even numbers: modules offered in the second semester; 0,9: modules offered over two semesters, i.e. a year module).
- Third digit: multiply by 4 to indicate the credits.

Contact sessions

- The number of contact sessions of each module is indicated in the square following the module subject.
- The following abbreviations are used:
- L – lectures lasting 50 minutes each (e.g. 1L, 2L)
- P – practical periods lasting 50 minutes each (e.g. 1P, 2P, 3P)
- S – seminars lasting 50 minutes (e.g. 1S)
- T – tutorials lasting 50 minutes each (e.g. 1T, 2T)
- D – discussion lasting 55 minutes each (e.g.3D)
- B – block sessions over one week (e.g. 3B)

- BOCB2616 is therefore offered as a module during the first semester of the second year and a student will acquire 24 credits on completion at NQF Level 6.
- Before a student can register for this module the following prerequisites need to be met: two of the following BLG114, BLGY1623, BLG144 and (CHEM1624 OR 60% pass in CHEM1644 or CHEM1532+CHEM1622+CHEM1661)
- The contact sessions of BOCB2616 amount to three lectures plus four practicals per week for the duration of the module, i.e. one semester.
- The content of the module as well as the assessment mode is indicated in the next two blocks.

NATURAL SCIENCES

BIOLOGICAL SCIENCES

13.1. DEPARTMENT OF BOTANY

BOTA2654	**16**	**6**	**130301**	**BIOL1624**	**Introduction to plant anatomy and morphology**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including anatomy, structure and organisation of the cell wall, ergastic substances, structure and development of the ovule and embryo sac, structure, organisation and characteristics of tissues (parenchyma, collenchyma, sclerenchyma, epidermis, periderm, phloem, xylem) and secretory structures.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.	
BOTA2684	**16**	**6**	**131002**	**BIOL1624**	**Plant physiology and biotechnology**	**3L,3P**
Physiological processes in plants, such as water uptake by plants, translocation, and transpiration, carbon partitioning, nutrient uptake, mineral nutrition, growth regulators, plant movement, photomorphogenesis, biological clock, photoperiodism and adaptation to extreme environments. Plant biotechnology course will look at alternative cultivation techniques of plants: plant nutrient cycles, organic and hydroponic cultivation of plants. The course will also focus on secondary products in plants, i.e. their economic and medicinal value.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 3 hours.	
BOTA3724	**16**	**7**	**130399**	**BOTA2684**	**Plant metabolism and the environment**	**3L,3P**
Plant respiration: cytosolic and mitochondria reactions, measurement of plant respirations, fermentation, regulation of plant glycolysis with special reference to key enzymes, the physiological role of the alternative oxidative pentose phosphate pathway (OPP Pathway), and the effects of environmental factors on respiration. Photosynthesis: the chloroplast and associated pigments, photochemical and non-photochemical reaction of photosynthesis, photophosphoryylation (cyclic and non-cyclic), C3-reduction cycle, photorespiration, C4- and CAM-photosynthesis. The methodology in determining photosynthetic rate through fluorescent techniques, and effects of environmental factors on photosynthesis. Nitrogen metabolism: the stages of the nitrogen cycle such as fixation, assimilation and transamination.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 3 hours.	
BOTA3734	**16**	**7**	**130399**	**BOTA2654**	**Introduction to Plant Systematics**	**3L,3P**
This module describes the plant kingdom and the position of angiosperms within it. Plant fossils and evolutionary history of all plant groups will be discussed, as well as the evolution of flowers, pollination, breeding systems, reproductive isolation and hybridization. Students will learn about the taxonomic system and main subdivisions within the angiosperms. They will learn to apply evolutionary theory, speciation and cladistics as a method for deriving phylogenetic trees, and they will learn to apply the rules of nomenclature. Students will learn to assess taxonomic evidence and various types of characters used in plant identification. They will be able to use molecular data in deriving phylogenetic trees. Finally, students will gain an overview of basic biogeography and the concept of biodiversity hotspots.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 3 hours.	
BOTA3744	**16**	**7**	**130399**	**BOTA2684**	**Ethnobotany and Plant Defence**	**3L,3P**
Basotho ethnology, ethnogeography and ethnobotany, basic traditional medicines preparations. Defence mechanisms of plants against biotic and abiotic stress factors on physiological-biochemical level. Constitutive and induced defence, structural and biochemical defence, hypersensitive reactions, systemic acquired resistance, signal mechanism and manipulation of resistance. Biotechnological application of plants: e g. Propagations techniques, chemical reactions to produce desired products of industrial and pharmaceutical importance. Principles, applications and economic potential of Basotho medicinal plants, algal biotechnology. Design of bioreactors, candidate species for plant and algal biotechnology, practical experience in micropropagation techniques and field trials.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
BOTA3754	**16**	**7**	**130399**	**BIOL2644**	**Vegetation Ecology**	**3L,3P**
Ecosystems and vegetation processes. Primary productivity and biomass production. Global Biomes and South African Biomes and their relation with climate. Plants and soils, water holding capacity of soils, soil formation and classification of horizons. Plant population ecology. Dispersal, recruitment and clonal growth. Plant functional types and life histories, theories of competition and other plant interactions. Responses to stresses and disturbances. The Braun-Blanquet method of vegetation sampling, plot size, cover-abundance scale. Classification and ordination. Direct and indirect gradient analysis and various multivariate techniques. Vegetation dynamics, in terms of gap dynamics, fire and grazing. Vegetation mapping. Species diversity and ecosystem processes.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
BOTA6808	**32**	**8**	**130601**	**Selection to Honours degree**	**Research Project**	**6D**
The student will conduct a research project depending on the speciality of the supervisor. The research project will be in plant sciences as deemed necessary by the supervisor. The student will be expected to submit a research proposal and after its approval research will be conducted and then presented orally and finally a written research report (dissertation, which may be in article format)					Continous assessment of mini-dissertation or article)	

BOTA6814	**16**	**8**	**130601**	**Selection to Honours degree**	**Restoration Ecology**	**1L,1P**
Principles of green economics: valuation of natural resources and ecosystem services. Restoration planning, indicator species and restoration targets. Restoration targets as based on species, on ecosystem processes or on ecosystem services. Soil enhancement techniques and bio-engineering. Formation of erosion gullies. Hydrology and water balance in river catchments. Revegetation, ecological assembly and population viability analysis. Spatial scale and landscape context. Island biogeography in landscape management. Monitoring and ecological management, fire, herbivory, aftercare of restoration work.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
BOTA6824	**16**	**8**	**130601**	**Selection to Honours degree**	**Plant Ecophysiology**	**1L**
Plant ecophysiology is the study of how plants function in diverse environments and their physiological responses to environmental and climate change. The processes occurring in plants during instantaneous stress response, acclimation and adaptation to stress are investigated. The course will focus on how plant growth is affected by certain environmental stress factors including nutrient availability and deficiency, alluminium in the soil, ecohydrology, light stress, water deficit and air pollution on plants. The course will also focus on how physiological activities are affected by pathogens and availability of light, water, nutrients and atmospheric CO2. How respiration in roots is affected by flooding, salinity and water stress.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
BOTA6844	**16**	**8**	**130601**	**Selection to Honours degree**	**Plant Biotechnology**	**3L,3P**
This module introduces students to principles, techniques and applications of plant biotechnology. The students will learn about the techniques in plant tissue culture, an introduction on recombinant DNA technology, the application of genomics and proteomics technologies in studying genes and traits of interest for transgenic plants, the different ways in which transgenic plants are produced and analysed. The regulation and biosafety of plant biotechnology will be discussed as well as why transgenic plants are controversial.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
BOTA 6864	**16**	**8**	**130301**	**Selection to Honours degree**	**Phytomedicine**	**3L,3P**
Principles of Basotho ethnography, indigenous knowledge of medicinal plants, collection and identification of plants, using the herbarium, resources utilization and implications (Underutilization and over exploitation), methods preparation of herbal remedies and scientific validation of implicated plants in terms of validation of folkloric claims.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	

13.2 DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

ZOOLOGY

ZOOL2614	**16**	**6**	**CESM: 130602**	**BIOL1644**	**Basic entomology**	**3L,3P**
This module consists of both theoretical and practical units, giving students a broad introduction to the study of insects. Topics covered include insect physiology, evolution, and taxonomy. Students will be given practical tools to start in the field of entomology, within a sound scientific, hypothesis-based framework. Upon completion of this module, students will have acquired skills in insect taxonomy that will enable them to identify insects to order and family level. Students will also understand the composition of the diverse variation in form and structure of the insect body. Students will learn how insects are able to survive under diverse conditions. Students will also have insight into where insects fit into the animal kingdom and be able to describe the unique entomological fauna of southern Africa.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
ZOOL2634	**16**	**6**		**BIOL1644**	**Invertebrate biodiversity**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including an overview of upper classification through all invertebrate phyla. This will include the general taxonomy, anatomy, morphology, physiology, ecology, evolution and benefits to humans. In practical sessions the students will be introduced to all phyla and taught how to identify invertebrates from phylum to order level. Phyla included in course are: Porifera, Placozoa, Cnidaria, Ctenophora, Mesozoa, Plathelminthes, Nemertea, Rotifera, Acanthocephala, Gnathostomulida, Micrognathozoa, Nematoda, Nematomorpha, Priapulida, Kinorhyncha, Loricifera, Annelida, Mollusca, Arthropoda, Tardigrada, Onychophora, Gastrotricha, Chatognatha, Cycliophora, Phoronida, Brachiopoda, Bryozoa, Entoprocta, Echionodermata, Hemichordata, Xenoturbellida, Chordata (the non vertebrate specimens).					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.	
ZOOL2664	**16**	**6**	**130601**	**BIOL1644**	**African vertebrates**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Zoology, including several aspects and principles of the study of African vertebrates, including the principles of vertebrate systematics, physiology, morphology, anatomy, ecology and ethology, as well as key terms, concepts, facts, principles, rules and theories associated with vertebrates. Students will undergo both theoretical and practical training, acquiring a grasp of laboratory and field-based research techniques. After successful completion of this course a student will be able to identify African vertebrates and be well informed on the basic concepts of vertebrate ecology in the southern African sub-region.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.	

ZOOL2684	**16**	**6**	**130601**	**BIOL1644**	**Introduction to Parasitology**	**3L,3P**
This module introduces students to the practical and theoretical aspects of studying parasites. Topics include taxonomic classification of parasites, host spectrum, geographical distribution, morphology, life cycles, epidemiology, parthenogenesis, control measures and public significance and vectors of medical and veterinary importance.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 3 hours.	
ZOOL3714	**16**	**7**	**130604**	**BIOL2644**	**Introduction to Animal Behaviour**	**3L,3P**
This course introduces students to the scientific study of animal behaviour through an evolutionary lens, including aspects of human behavioural ecology. Tinbergen's four questions will be applied to the study of animal behaviour, i.e., the functional, phylogenetic, mechanistic and developmental aspects of behaviour. This course will also introduce principles of optimal foraging theory, predator-prey interactions, social behaviour, decision-making theory, learning, communication, cognition, and the physiological control of behaviour. Successful students will be prepared for the advanced course in Behavioural Ecology (ZOOL6814) and will be able to apply their knowledge of behavioural ecology to biodiversity conservation, wildlife management, animal husbandry, and the more theoretical field of biological psychology.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
ZOOL3724	**16**	**7**	**130399**	**BIOL2334**	**Introduction to Ecotoxicology**	**3L,3P**
This course is aimed at undergraduate students who have completed basic chemistry and biology courses. It provides a general introduction to the field of ecotoxicology and covers topics such as environmental contamination, major classes of contaminants and acute/chronic effects of contaminants on individuals, populations, communities and ecosystems. Through an accompanying practical program, emphasis is also given on the assessment of the toxicity of potential environmental contaminants in the laboratory.					A mini-research project and report, a scientific literature based assignment, two formal semester tests and a final examination of at least 3 hours.	
ZOOL3734	**16**	**7**	**CESM: 130602**	**ZOOL2614**	**Insect ecology**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Entomology, including class discussions based around insect ecology and various ecological concepts from the interaction between insects and their abiotic environment, insects and other individuals within the same species as well as between specimens of different species. Students will investigate symbiotic relationships, as well as their evolutionary development. The course is designed around the creation of hypotheses and experimental design to test these ecological theories. Students are expected to find South African examples for various ecological concepts, and be able to design experiments around South African conditions. Furthermore, students are taught to argue various statements, as well as formulate their own opinions around various ecological topics. Students are also expected to find additional literature in the form of articles to justify their arguments. Students will be taught various ecological statistical analyses and calculations used during environmental evaluation and related ecological studies.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
ZOOL3744	**16**	**7**	**130504**	**ZOOL2684**	**Molecular parasitology**	**3L,3P**
This module introduces students to parasite genomics whereby the identity and functions of important genes and proteins of selected parasites will be studied. Practical techniques of parasite diagnostics, such as PCR and LAMP, will be demonstrated and practiced. These techniques are used for diagnosis of parasite infections targeting specifically expressed genes or unique sequences on non-specific genes. Further techniques will also be practiced, such as ELISA, in which recombinant proteins are used as antigens in serological assays. Students will understand the basic functions of the immune system and different types of the immune system (innate and adaptive). This study will include in-depth coverage of molecules used by immune system to combat parasite infections. Lastly, the course details antigenic variation, a common strategy used by parasites to evade immune systems.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
ZOOL3764	**16**	**7**	**CESM: 130602**	**ZOOL2614**	**Applied entomology**	**3L,3P**
This module will teach students to apply their knowledge of entomology to manage pest species or to use insects beneficially. The theoretical aspect will be divided into four main modules: chemical control of pests, biological control of pests, additional methods of controlling pests, and beneficial uses of insects. The practical side of the course will look at the major pests of fruit, vegetable, wood and livestock practices. Students will identify major pests, calculate thresholds, and recommend treatment plans. Topics will include: basic entomological practices in the agricultural environment, insects as pests, intergraded pest management, thresholds, insecticides, insecticide toxicity and environmental fate, host plant resistance, transgenic crops, storage and transport pest management, vectors and vector control, biological control, nematology, forest, tree, and garden pest management, bee keeping, decomposers, biomonitoring, insect conservation and trade markets, urban and public health entomology, the role of insects in aesthetics, art, culture and leisure practices.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	

ZOOL6814	**16**	**8**	**130601**	**Selection to Honours degree**	**Applied behavioural ecology**	**3L**
Students will use both the primary literature and hands-on research experience to gain a holistic understanding of the latest advances in the wide-ranging field of animal behaviour – ranging from invertebrates to humans. This course will enable students to apply principles of behavioural ecology to animals in the wild, under laboratory conditions, within captive situations (e.g., zoos and breeding centres), as well as human behaviour on both a small and large scale. Students will know how to manage and improve animal welfare and also assess patterns within human society that can be applied to political science, epidemiology, economics and psychology. A sound knowledge of behavioural studies prepares students for various careers in nature conservation, agriculture, academic institutions and consultation.					This is a formative, continuous assessment course in which students write four capstone assignments throughout the semester to combine into an electronic portfolio. These assignments will cover topics including conservation behaviour in SA, pop psychology, animal enrichment, and book evaluation.	
ZOOL6824	**16**	**8**	**130601**	**Selection to Honours degree**	**Veterinary parasitology**	**3L,3P**
Students will learn about the different habitats of vectors, their adaptations to habitats, feeding behaviour and host preferences. They will acquire advanced knowledge on the life cycle stages of endoparasites in and outside the host. Factors conducive to propagation of parasites including temperature, vegetation, soil, rainfall will also be covered in this module.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
ZOOL6844	**16**	**8**	**130601**	**Selection to Honours degree**	**Biosystematics**	**3L,3P**
Each student will choose an invertebrate taxonomic group whose taxonomy they will re-evaluate according to recent academic literature. They are required to write a scientific review of this taxonomic group with basic descriptions of classification within this taxon, general information available on the biology, ecology, physiology, biochemistry and conservation status of the chosen taxon. Additionally each student have to create a dichotomous key for the species within a given area (South Africa, Free State, or Qwaqwa region) that have been described, as well as design a poster around the taxonomy of the chosen group. This course will give students interested in other taxa not dealt with in detail within the department the opportunity to study them for academic credits. Additionally students must make a reference collection of the chosen taxon for the region. It will be recommended for students to take a taxon relative to their main honours research project.					Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
ZOOL6854	**16**	**8**	**130601**	**Selection to Honours degree**	**Immunology**	**3L, 3P**
The objective of this course is to learn about the structural features of the components of the immune system as well as their functions and to attain a working knowledge of current immunological principles as they relate to the cells and molecules of the immune system, how they interact in defending the body against invading microorganisms, how they develop and acquire the ability to recognize antigens, and finally how they malfunction in autoimmune diseases and how they become inadequate in immune deficiency states. Furthermore, students will extend and solidify their understanding of the presented principles through critical readings from the primary research literature. Reading of research papers will help introduce students to research techniques and also help them appreciate the value of scientific research.						
ZOOL6808	**32**	**8**	**0**	**Selection to Honours degree**	**Research Project**	**3L, 3P**
The student will conduct a research project depending on the speciality of the supervisor. The research project will either be in zoology field or entomology field related to life sciences as deemed necessary by the supervisor. The student will be expected to submit a research proposal and after its approval research will be conducted and then presented orally and finally a written research report (dissertation, which may be in article format)					Continous assessment and mini-dissertation or article	
ZOOL6898 (2018)	**32**	**8**	**0**	**BSc degree**	**Science for Society**	**3L, 3P**
This is a year long module in which students have to combine skills from both natural and social sciences to address real problems in the community. Students will work in small groups to find creative yet practical ways to start addressing problems in the community (that can be solved through science), or to develop ways of using science to improve conditions in the local community. Stakeholders from the local community will be involved from the start of the year, to give their views on issues they feel scientists may address; and at the end of the year, their feedback on the success of the intervention(s) will be obtained. Through a process of iterative action research, students will develop and assess new interventions and learn about the process of socially responsible science. This module is seen as a vehicle for students to gain interdisciplinary research abilities, group-work and project-management skills.					Continuous evaluation	
ZOOL6834	**16**	**8**	**CESM: 130602**	**Honours degree**	**Science for Society**	**3L, 3P**
The students will choose a main zoology or entomology field and plan a short course around this topic. They will have to gather topics and background information from textbooks and relative literature, and logically arrange a course layout. Furthermore, the student has to create classes and teaching aids on this topic. Each student also has to design a project for an additional practical class as well as evaluation criteria, test and memorandum. Each student will have to choose an addition science important book to read and write a report on. Students will additionally have to read scientific articles for weekly discussion classes.					Continuous evaluation	

BIOLOGY

BIOL1514/ BIOL1504	**16**	**5**	**130601**	**NCS level 5 Life Sciences or Physical Sciences NCS level3 Life Sciences or Physical Sciences**	**Lower life and molecular biology**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including conditions on early earth, chemical evolution, appearance of cells, origin of metabolism, self-replicating systems, origin of pro and eukaryotic cells, origin of membranes and organelles, cell division, energy harvesting pathways: photosynthesis. The Flow of genetic information: mitosis and meiosis, DNA replication and patterns of inheritance and the application are included. The following are also covered: bacteria and viruses, protists, single celled algae and fungi.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 3 hours.
BIOL1624	**16**	**6**	**130301**	**BIOL1514 or BIOL1504**	**Introductory plant biology**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including Development and reproduction of flowering plants, plant multiplication, plant taxonomic principles, biodiversity, ecology, economic importance of plants.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.
BIOL1644	**16**	**6**	**130601**	**BIOL1514 or BIOI1504**	**Animal biology**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including higher levels of the kingdom Animalia, a thorough briefing on Invertebrata and an introduction to Vertebrata. Topics covered include an introduction to invertebrate classification and bio-ecology, insect morphology, anatomy and metamorphosis, basic entomology and its application, including insect plant relationships, medical, veterinary and forensic entomology, insect physiology and pest control. Finally, students will learn about mammalian zoogeography, evolution and etho-ecology.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.
BIOL2614	**16**	**6**	**130601**	**BIOL1624 & BIOL1644**	**Evolution, genetics and diversity**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including Students will be introduced to the principles of evolutionary theory, including the following key concepts: species concepts, scientific names, binomial and sub-specific ranks, Darwin's theory of evolution, Mendelian genetics, the modern synthesis, variability in populations: population genetics and Hardy-Weinberg equilibrium, natural selection and genetic drift, molecular genetics, the genetic code, distribution ranges, dispersal, biogeography and reproductive isolation. Students will receive a practical introduction to methods such as Polymerase Chain Reaction, gene sequencing, deriving phylogenetic trees, phenetics and phylogenetics.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.
BIOL2644	**16**	**6**	**130601**	**BOTH BIOL1644 + BIOL1624**	**Introduction to ecology**	**3L,3P**
This module contains fundamental knowledge, theories, principles and practices of Biology, including an introduction to the discipline of systems ecology, including ecosystem modeling and compartment models. Biogeochemical cycles, primary production and flow of energy and matter through ecosystems. Food chains and food pyramids. Importance of water and the various aquatic habitats. Carbon cycle and global warming. Role of biodiversity in ecosystems, competition for resources, predation and parasitism. Stress and disturbance, K and r strategists, basic population biology. Dispersal and reproduction of organisms. Human dependence on ecosystems, use of natural resources and the principle of sustainability. The link between ecology and economy and ecosystem degradation.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.
BIOL2674	**16**	**6**	**131002**	**NCS MATH LEVEL 5 OR MATD1564**	**Biostatistics**	**3L,3P**
This module will give students a thorough, applied grounding in the basic statistics used in the life sciences, including descriptive statistics, creation and testing of hypotheses, t-tests, chi-squared test, basic non-parametric and parametric analyses up to the one-way ANOVA. Successful students will be able to assess and interpret univariate statistics and become confident in judging which statistical tests to apply to specific datasets. Students will have a solid grounding in the analysis of data using pocket calculators and simple statistical packages. This course will also introduce students to the basics of multivariate statistics.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.
BIOL3714	**16**	**7**	**131201**	**BIOL2644**	**Human ecological footprint**	**3L,3P**
The influence of human activities on ecosystems is critically reviewed, which includes man's ecological footprint, biodiversity, speciation, extinction and Africa's natural history. Several conservation issues are analysed, including an evaluation of the state of our natural resources, translocation and introduction of organisms, threats to biodiversity with a focus on southern African species, an introduction to conservational areas in southern Africa, environmental management, climate change and an exploration of alternative, sustainable sources of energy. After successfully completing this module, the student will be able to critically evaluate human impact on the environment and will be able to provide practical solutions for environmental problems.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.
BIOL3724	**16**	**7**		**BIOL2614**	**Macroevolution and speciation**	**3L,3P**
This module describes the history of life, focusing on the phenomena of natural selection and adaptation, as originally postulated by Darwin. A broad perspective will be taken, encompassing evidence from plate tectonics, fossil records, evolutionary genomics, homologies, embryology and modern-day biodiversity. Important concepts such as inheritance of characteristics, stochastic mutations, and the various processes that drive speciation will be addressed. Students will gain an invaluable, scientific perspective on the abundance and origins of life on Earth.						Formative practical experiment , assignments and two formal semester tests a final summative assessment, examination of at least 2 hours.

BIOL6814	**16**	**8**	**130601**	**Qualifying for BSc Hons**	**Scientific methodology and communication**	**1L, 3P**
Description of five principles of science. Description of hypothesis. Description of theory with discussions on world's popular theories. Definition of research, its significance and discussions on practical products of research available in our daily life. A breakdown on how to write a research proposal including literature review, justification, objectives, materials and methods, milestones/time frames, budget, data analysis and references. What is plagiarism, why do people plagiarize and how to avoid plagiarism. Step by step protocols of searching and downloading articles, genes, amino acids, alignment of sequences on online databases with practical at the library. Different laboratory techniques depending on students research specialty such as microscopy and molecular techniques. Field research techniques, application for permits, animal ethics, sample collection (animal and plant).					Continous assessment of mini-dissertation or article	
BIOL6824	**16**	**8**	**130601**	**Qualifying for BSc Hons**	**Current events in Science**	**2L + 2T**
Each student will choose a topic relevant to events from the previous year on a global scale. Regular topic fall into the main categories of: natural disasters, accidents due to human error, exploitation of natural resources; disease outbreaks; new ground braking findings within biology and relative fields; conservation practices & malpractices; and governmental policies. Each student must then gather information around the event, history that lead up to the event, the consequences of the event, the management of the event, and future plans for restoration. Furthermore, they have to bring it into perspective and find out how the event affected our country, and how our government and relative associated management would have dealt with a similar event. Each student will also report on interesting media stories, or statements of famous people and their opinions of the event as well as providing their own opinion and solution to the problem or how they would have dealt with the problem differently. The student would have a better understanding of the impact of humanity on the environment as well as being able to debate various relative environmental issues taking inconsideration the view points of all parties involved.					Continous assessment	
BIOL6834	**16**	**8**	**130601**	**Qualifying for BSc Hons**	**Advanced Biostatistics**	**1L,2T**
Exploratory data analysis. Basic statistical programming in R. Multiple regression and Multi-factor ANOVA. Principal Components Analysis, Factor analysis. Cluster analysis. Correspondence Analysis, Canonical Correspondence Analysis, Multidimensional Scaling. PerMANOVA. Discriminant analysis. Presentation of data and interpretation of results. Relevance for community ecology.					Continous assessment	

13.3 DEPARTMENT OF CHEMISTRY

Take note: *CHEM1552 + CHEM1622 + CHEM1532 + CHEM1642 + CHEM1551 + CHEM1661 is equivalent to CHEM1513+ CHEM1551 + CHEM1624.*
Admission to second and third-year chemistry is subject to a selection process as only the 70 best students can be accommodated.

CHEM1552	**8**	**4**	**CESM: 140401**		**Introduction to Chemistry-Development module**	**2L,1T**
Mathematical skills (Significant numbers, mathematical calculations, handling of logarithms to the base 10 and natural logarithms, the drawing of graphs on scale on graph paper), Classification of matter, The Periodic table, Chemical formulas and nomenclature, Basic structure of the atom, fundamental principles, ions and formation of molecules, relative atomic mass, molar mass, The mole concept, molar concentration, parts per million and percentage concentration, Introduction to acids and bases, relevant acid-base theories and pH-calculation, Introduction to gases – laws of Boyle, Charles and the combined gas laws as well as the Kelvin temperature.					Continuous: A minimum of 4 assignments. Formal: Two written assessments and a final assessment of at least 1½ hours.	
CHEM1532	**8**	**6**	**CESM: 140404**		**Organic Chemistry**	**2L,1T**
Hybridization of the carbon atom; properties, preparation and reaction of hydrocarbons, alkyl halides, alcohols, ketones, aldehydes, carboxylic acids, derivatives of carboxylic acids; introduction to stereoisomerism and reaction mechanisms.					Continuous: A minimum of4 assignments. Formal: Two written assessments and a final assessment of at least 1½ hours.	
CHEM1622	**8**	**6**	**CESM: 140405**	**CHEM1552**	**Physical Chemistry**	**2L,1T**
Phases and Solutions: Description of the phases of matter and the influence of solutes on the phase characteristics of the gas phase (atmospheric pressure, pressure of a column {barometer, manometer}; Gas laws {Boyle, Charles, Avogadro, Ideal gas law, Dalton, Henry}), Colligative properties (boiling point elevation and freezing point depression), Thermodynamics: elementary calculation on heat transfer, the First Law of thermodynamics, thermochemical processes and introduction to reaction entropy and free energy. Reaction kinetics: Reaction orders and calculation of reaction rates, reaction times and half-lives. Electrochemistry (Voltaïc cell, cell notation, cell potential, spontaneity).					Continuous: A minimum of 4 assignments. Formal: Two written assessments and a final assessment of at least 1½ hours.	

CHEM1531+ CHEM1551	**12+4**	**5**	**CESM: 140403**	**CHEM1552 AND MATHS NCS LEVEL 4 OR MATM1554**	**Inorganic and Analytical Chemistry**	**2L,1T**
Mathematical skills (Significant numbers, mathematical calculations, handling of logarithms to the base 10 and natural logarithms, the drawing of graphs on scale on graph paper), Classification of matter, The Periodic table, Chemical formulas and nomenclature, Basic structure of the atom, fundamental principles, ions and formation of molecules, relative atomic mass, molar mass, The mole concept, molar concentration, parts per million and percentage concentration, Introduction to acids and bases, relevant acid-base theories and pH-calculation, Introduction to gases – laws of Boyle, Charles and the combined gas laws as well as the Kelvin temperature. Empirical and molecular formulas as well as stoichiometry, Quantitative analyses (Gravimetry en Volumetry), Oxidation, reduction, oxidation number and balancing of redox reaction equations ; Quantum mechanical atomic theory, Electron distribution, polarity and periodicity, Bonds, Lewis structures and molecular geometry; Chemical equilibrium and solubility products, Acids, bases, pH and buffers.Experience critical (generic) outcomes with respect to literacy skills (oral and written reasoning), mathematical skills, problem solving skills and experimental skills.						Continuous: A minimum of 4 assignments. Formal: Two written assessments and a final assessment of at least 1½ hours.
CHEM1623+ CHEM1621	**12+4**	**6**	**CESM: 140405**	**CHEM1552**	**Organic & Physical Chemistry**	**3L,3P**
Phases and Solutions: Description of the phases of matter and the influence of solutes on the phase characteristics of the gas phase (atmospheric pressure, pressure of a column {barometer, manometer}; Gas laws {Boyle, Charles, Avogadro, Ideal gas law, Dalton, Henry}), Colligative properties (boiling point elevation and freezing point depression). Thermodynamics: elementary calculation on heat transfer, the First Law of thermodynamics, thermochemical processes and introduction to reaction entropy and free energy. Reaction kinetics: Reaction orders and calculation of reaction rates, reaction times and half-lives. Electrochemistry (Voltaïc cell, cell notation, cell potential, spontaneity). Hybridization of the carbon atom; properties, preparation and reaction of hydrocarbons, alkyl halides, alcohols, ketones, aldehydes, carboxylic acids, derivatives of carboxylic acids; introduction to stereoisomerism and reaction mechanisms. Experience critical (generic) outcomes with respect to literacy skills (oral and written reasoning), mathematical skills, problem solving skills and experimental skills.						Continuous: A minimum of 4 assignments. Formal: Two written assessments and a final assessment of at least 1½ hours.
CHEM1642	**8**	**5**	**CESM: 140403**	**CHEM1552 AND MATHS NCS LEVEL 4 OR MATM1554**	**Inorganic and Analytical Chemistry**	**2L,1T**
Empirical and molecular formulas as well as stoichiometry, Quantitative analyses (Gravimetry en Volumetry), Oxidation, reduction, oxidation number and balancing of redox reaction equations ; Quantum mechanical atomic theory, Electron distribution, polarity and periodicity, Bonds, Lewis structures and molecular geometry; Chemical equilibrium and solubility products, Acids, bases, pH and buffers.						Continuous: A minimum of 4 assignments. Formal: Two written assessments and a final assessment of at least 1½ hours.
CHEM1551	**4**	**5**	**CESM: 140401**	**NSC PS LEVEL 4 OR CHEM1552(CHEM1412)+CHEM1642**	**Inorganic and Analytical Chemistry (Practical)**	**3P**
Experience critical (generic) outcomes with respect to literacy skills (oral and written reasoning), mathematical skills, problem solving skills and experimental skills.						Continuous: a minimum of 7 practical experiments. A 70% attendance is compulsory for practicals. Formal: A final assessment of at least 1½ hours.
CHEM1661	**4**	**6**	**CESM: 140401**	**NSC PS LEVEL 4 OR CHEM1632+CHEM1622**	**Analytical, Physical and Organic Chemistry (Practical)**	**3P**
Experience critical (generic) outcomes with respect to literacy skills (oral and written reasoning), mathematical skills, problem solving skills and experimental skills.						Continuous: a minimum of 7 practical experiments. A 70% attendance is compulsory for practicals. Formal: A final assessment of at least 1½ hours.
CHEM2613+ CHEM2611	**16**	**6**	**CESM: 140405**	**CHEM1513+ CHEM1551, CHEM1624/1664, MATM1614/1534**	**Physical Chemistry**	**2L, 12P**
Dynamics: Properties of gases and the kinetic molecular theory. Thermodynamics: Advanced application of the first, second and third laws of thermodynamics to chemical systems as well as thermochemical calculations. Phase studies: Properties of liquids and solutions. Phase equilibria: Quantify real gas-, liquid- and solid mixtures. Electrolytic solutions: To quantify electrolytic conductivity and transport. Quantum chemistry: Atomic structure through the Schrodinger equation as well as own functions, own values and amplitudes of selected examples. Quantum mechanics: Application of concepts in practice.						Continuous: A minimum van 10 practical experiments and 7 assignments. Formal: Two written assessments and a final assessment of 2 hours each.

CHEM2623+ CHEM2621	**16**	**6**	**CESM: 140404**	**CHEM1624/1664, MATM1614/1534**	**Organic Chemistry**	**2L, 12 P**
Extension of the chemistry of carbonyl compounds, carboxylic acids and carboxylic acid derivatives. The chemistry of aromatic compounds: structure of benzene, aromaticity, electrophilic substitution, the influence of substituents on electrophilic substitution, aromatic halides and hydrocarbons, carbonyl and nitro compounds, phenols and hydroxycarbonyl compounds. Stereochemistry and conformation: synthesis and reactions of stereo-isomers.					Continuous: A minimum van 9 practical experiments and 7 assignments. Formal: Two written assessments and a final assessment of 2 hours each.	
CHEM2633+ CHEM2631	**8**	**6**	**CESM: 140402**	**CHEM1513+ CHEM1551, CHEM1624/144, MATM1614/134**	**Analytical Chemistry**	**1L, 8P**
Basic principles of error of observation and analysis thereof, buffer systems, analytical techniques of gravimetry, oxidimetry and spectrophotometry.					Continuous: A minimum van 6 practical experiments and 4 assignments. Formal: Two written assessments and a final assessment of 1 hour each.	
CHEM2643+ CHEM2641	**8**	**6**	**CESM: 140403**	**CHEM1513+ CHEM1551, CHEM1624 MATM1614/134**	**Inorganic Chemistry**	**1L, 8P**
Properties of covalent bonding (localized and delocalized) employing the Molecular Orbital theory, calculations on electronegativity, effective nuclear charge and magnetism, molecular geometry, chemical properties of the 3d transition metal ions, chemistry of π-acid ligands and their complexes such as carbonyls, isocyanide, dinitrogen, phosphines and cyano complexes, nomenclature of complex compounds.					Continuous: A minimum van 6 practical experiments and 4 assignments. Formal: Two written assessments and a final assessment of 1 hour each.	
CHEM3713+ CHEM3711	**16**	**7**	**CESM: 140402**	**CHEM2613+CHEM2611, CHEM2633+CHEM2631, CHEM2643+CHEM2641, min.MATM1624/1644**	**Analytical Chemistry**	**2L, 10P**
Modern analytical techniques such as nuclear magnetic resonance, spectrometry, electroanalytical methods and classical analytical techniques such as potentiometry, voltammetry and amperometry.Gas chromatography, complexometry and UV/visible spectrometry.					Continuous: A minimum van 8 practical experiments and 4 assignments. Formal: Two written assessments and a final assessment of 2 hours each.	
CHEM3723+ CHEM3721	**16**	**7**	**CESM: 140403**	**CHEM3713+CHEM3711**	**Inorganic Chemistry**	**2L, 10P**
Bonding theories and the chemistry of organometallic complexes, solution behaviour of metal complexes, introductory theory of X-ray crystallography (powder and single-crystal X-ray crystallography) in structure analysis in the solid state, Solid state analyse of ionic compounds in centric cubic space groups. Advanced knowledge on coordination chemistry, specifically aimed at the crystal field and molecular orbital theories (as reflected in simple electronic spectra and magnetic properties), organometallic chemistry, substitution mechanisms in square-planar and octahedral complexes and general industrial and catalytic applications of organometallic catalysts.					Continuous: A minimum van 8 practical experiments and 4 assignments. Formal: Two written assessments and a final assessment of 2 hours each.	
CHEM3733+ CHEM3731	**16**	**7**	**CESM: 140405**	**CHEM2613+CHEM2611, CHEM2633+CHEM2631, min. MATM1624/1644**	**Physical Chemistry**	**2L, 10P**
Dynamics: chemical kinetics and surface chemistry. Thermodynamics: advanced chemical thermodynamics, free energy, chemical equilibrium, multicomponent systems and electrochemistry. Macromolecular chemistry: the syntheses, characterization and molecular mass determination of polymers. Basic principles of nuclear and radiochemistry.					Continuous: A minimum van 8 practical experiments and 4 assignments. Formal: Two written assessments and a final assessment of 2 hours each.	
CHEM3744	**16**	**7**	**CESM: 140404**	**CHEM2623+ CHEM2621**	**Organic Chemistry**	**2L, 10P**
The principles and applications of physical techniques (e.g. NMR).Introduction to dynamic stereochemistry. Advanced reactions, mechanisms and their stereochemistry including reactions of carbohydrates, the Diels-Alder reaction, the addition of alkenes (e.g. oxymercuration, hydroboration, analyse addition), nucleophilic addition of aldehydes and ketones (e.g. Wittig reaction, Cannizzarro reaction), alpha substitution of carbonyl compounds (e.g. alpha-halogenation, alkylation of enolate ions) and carbonyl condensation reactions (e.g. Claisen condensations).					Continuous: A minimum van 8 practical experiments and 4 assignments. Formal: Two written assessments and a final assessment of 2 hours each.	

CMPO6814	**16**	**8**	**CESM: 140406**	**Selection for BSc Honours**	**Polymers and Polymerization**	**1L, 2P**
• Concepts and nomenclature • Step polymerization • Radical polymerization • Ionic polymerization • Stereochemistry and coordination polymerization • Copolymerization				After successful completion of the module the student should: 1. Know and understand the basic principles underlying polymer science, and the properties that distinguish polymers from other substances 2. Develop a kinetic/mechanistic understanding of step polymerization 3. Develop a kinetic/mechanistic understanding of free-radical polymerization		One examination paper of 2 hours.
CMPA6824	**16**	**8**	**CESM: 140406**	**Selection for BSc Honours**	**Applied Polymer Science**	**1L, 2P**
• Polymer processing • Additives in polymers • Biomedical applications of synthetic polymers • Polymers for the electronics industry • Speciality polymer applications • Introduction to paints and adhesives				After successful completion of the module the student should: 1. Know and understand the different polymer processing techniques 2. Understand and be able to discuss the purpose of different types of additives in polymers, as well as the influence these additives have on the polymer properties 3. Know, understand and be able to discuss the use of polymers in biomedical applications, the electronics industry, paints and adhesives, as well as other speciality polymer applications		One examination paper of 2 hours.
CMPP6814	**16**	**8**	**CESM: 140406**	**Selection for BSc Honours**	**Physical Polymer Science**	**1L, 2P**
• The amorphous state • The crystalline state • Elastic deformation • Viscoelasticity • Elastomers • Yield and crazing • Fracture and toughening				After successful completion of the module the student should: 1. Understand the chain-like structure of polymers, and be able to describe and explain polymer features like crystalline structure, amorphous structure, glass transitions and melting, models used to explain the morphology in semi-crystalline polymers, and orientation 2. Know and understand the relationships between polymer structure/ morphology and the different physical properties 3. Understand and be able to apply the different principles and models related to the mechanical properties of solid polymers.		One examination paper of 2 hours.
CMPR6814	**16**	**8**	**CESM: 140406**	**Selection for BSc Honours**	**Polymers and Polymer Reactions**	**1L, 2P**
• Inorganic, organometallic and inorganic-organic polymers • Reactions involving polymers • Properties of commercial polymers • Polymer structure-property relationships After successful completion of the module the student should: 1. Know, understand and be able to discuss a number of examples of inorganic, organometallic and inorganic-organic polymers				2. Know and understand the reactions that polymers can undergo, and the structural and morphological factors that have an influence on these reactions 3. Know, understand and be able to discuss the properties of a number of commercially important polymers 4. Be able to relate polymer structures with their thermal and mechanical properties		One examination paper of 2 hours.

CMPB6824	16	8	CESM: 140406	Selection for BSc Honours	Polymer Blends, Composites and Nanocomposites	1L, 2P

- General introduction to polymer blends
- Compatibilization methods in polymer blends
- Characterization of polymer blends
- Properties of polymer blends
- General overview of composites science
- Polymer composite and nanocomposite research: Case studies

After successful completion of the module the student should:

1. Know and understand the concept of polymer blending
2. Understand and be able to explain the morphology of polymer blends, and its relation to the properties of these blends
3. Understand and be able to discuss the different methods used to characterize polymer blends, and be able to interpret and explain the results obtained from these methods
4. Understand and be able to discuss the different compatibility methods used in polymer blending
5. Understand and be able to explain the relation between blend morphology and properties
6. Understand and be able to discuss a number of aspects related to polymer composites and nanocomposites
7. Understand and be able to explain the results presented and discussed in some research-based case studies

One examination paper of 2 hours.

CMPA6814	16	8	CESM: 140406	Selection for BSc Honours	Polymer Testing and Characterization I	1L, 2P

- Theoretical description of polymers in solution
- Number-average molar mass
- Scattering methods
- Frictional properties of polymers in solution
- Chromatographic and polymer separation techniques
- Molar mass distribution
- Chemical composition and molecular microstructure

After successful completion of the module the student should:

1. Understand and be able to explain the principles behind a number of techniques used in polymer analysis and characterization, as well as the instrumental setups and experimental designs of these techniques.
2. Be able to interpret and explain typical results obtained from the different techniques.

One examination paper of 2 hours.

CMPR6808	16	8	CESM: 140406	Selection for BSc Honours	Research Project	1L, 2P

- Mini research project with mini-dissertation

After successful completion of the module the student should be able to:

1. Plan and execute a research project in the field of polymer science
2. Search for relevant literature, read the contents, and critically and comparatively summarise the information obtained from the literature
3. Correctly present and interpret the research results
4. Neatly write a dissertation in the correct format

One examination paper of 2 hours.

13.4 DEPARTMENT OF PHYSICS

PHYS1514	16	5	CESM: 140101	With MATM1614/1534	Mechanics, optics and electricity	3 L, 1 T/P

Logical exposition of fundamental principles and the development of problem solving skills are addressed.
Mechanics: Revision of the elementary concepts: displacement, velocity, acceleration, force, work, energy, power, projectile motion and rotation.
In the above vector quantities and simple calculus is used wherever needed.
Geometrical optics: The electromagnetic spectrum, plane mirrors, spherical mirrors, image formation, thin lenses, optical instruments.
Electricity: Electrical charge, electrical field, electrical potential, current, resistance, circuits.

One examination paper of two hours.

PHYS1624	16	6	CESM: 140101	Min.PHYS1514/1534, min.MATM1614/1534	Mechanics, thermodynamics, electricity and magnetism	3l, 1T/P

Logical exposition of fundamental principles and the development of problem solving skills are addressed.
Mechanics: Momentum, collisions, rotation, gravitation, oscillations, waves.
Thermodynamics: Temperature, heat, first law of thermodynamics, kinetic theory of gases, entropy, second law of thermodynamics.
Electricity and magnetism: Gauss's law, capacitance, magnetic field, Ampere's law, induction and inductance, simple alternating current circuits.

One examination paper of two hours.

PHYS1534	16	5	CESM: 140101	NSC PS at least level 4 or successful completion of BSc Extended first year	Mechanics, optics, electricity, biologically and medically relevant topics	3L

Applications of physics in biology and medicine are discussed in this module.
Mechanics: Revision of the elementary concepts: displacement, velocity, acceleration, force, work, energy, power. Treatment of the above without calculus.
Geometrical optics: The electromagnetic spectrum, plane mirrors, spherical mirrors, image formation, thin lenses, optical instruments.
Electricity: Electrical charge, electrical field, electrical potential, current, resistance, circuits.
Biologically and medically relevant topics: Physical principles of apparatus used in biology and medicine, some applications of physics in these fields.

One examination paper of two hours.

PHYS1644	**16**	**5**	**CESM: 140101**		**Mechanics, thermodynamics, electricity, magnetism, biologically and medically relevant topics**	**3L,1T/P**
Applications of physics in biology and medicine are discussed in this module. Mechanics: Momentum, collisions, rotation, gravitation, oscillations, waves. Thermodynamics: Temperature, heat, first law of thermodynamics, kinetic theory of gases, entropy, second law of thermodynamics. Electricity and magnetism: Gauss's law, capacitance, magnetic field, Amperé's law, induction and inductance, simple alternating current circuits. Biologically and medically relevant topics: Physical principles of apparatus used in biology and medicine, some applications of physics in these fields.						One examination paper of two hours.
PHYS2614	**16**	**6**	**CESM: 140101**	**PHYS1514/1534, PHYS1624/1644, MATM1614/1534, MATM1624/1544**	**Mechanics, waves and optics**	**3L**
Much of physics and engineering demands a thorough knowledge of vibrating systems and wave behaviour. After a review of Newtonian dynamics, it is applied to systems experiencing a restoring force, leading to simple harmonic motion. This theory is generalized to the cases of damped and driven oscillators. The wave equation is derived, and standing waves, as well as the reflection and transmission of waves are explained. Polarization, interference and diffraction of light, illustrating its wave nature, are then discussed.						One examination paper of three hours.
PHYS2624	**16**	**6**	**CESM: 140101**	**PHYS1514/1534, PHYS1624/1644, MATM1614/1534, MATM1624/1544**	**Electronics**	**2L, 1P**
Electronics: Properties of semiconductors, diodes, rectifier circuits, zener diodes, power supplies, transistors, transistor amplifiers, operational amplifiers, operational amplifiers in feedback circuits, timer circuits, digital circuits and, computers ports. Practical work in electronics: Diodes, power supplies, transistors, operational amplifiers in feedback circuits, timer circuits, digital circuits and computers control. A project and seminar.						One examination paper of three hours.
PHYS2632	**16**	**6**	**CESM: 140101**	**PHYS2612**	**Practical work: Physics**	**2L, 1P**
Practical work on oscillations, waves and optics: experiments with mechanical oscillators, light interference, and computer simulations of waves and Fourier analysis.						One practical session of 5 hours per week during the first semester.
PHYS2642	**8**	**6**	**CESM: 140101**	**MATM2614 OR MASC2611**	**Electromagnetism**	**2L**
The electromagnetic force is one of the four fundamental forces in nature. It dominates the interaction of matter on the atomic scale and governs the behaviour of the full spectrum of electromagnetic waves.						One practical session of 5 hours per week during the first semester.
PHYS3714	**16**	**7**	**CESM: 140101**	**PHYS1624**	**Modern Physics**	**3L**
Special relativity: Galilean and Lorentz transformations, length contraction, time dilation, relativistic Doppler shift and aspects of relativistic mechanics. Particle properties of waves: Black-body radiation, photo-electric effect, Compton effect, gravitational red and blue shift, Mössbauer effect and applications. Wave properties of particles: Electron diffraction, de Broglie waves, probability waves, Heisenberg's uncertainty principle. Introductory quantum physics: Schrödinger's equation, one dimensional potential well, quantum mechanical tunnelling and its applications, hydrogen atom, orbital angular momentum and electron spin, Zeeman effect and applications. Nuclear Physics: The atomic nucleus, radioactivity, quantum mechanical treatment of alpha-decay, nuclear fission and fusion reactions, reaction rate, neutron transport in reactors.						One examination paper of three hours.
PHYS3724	**16**	**7**	**CESM: 140101**	**PHYS3714**	**Solid-state Physics**	**3L**
Structure of solids: Crystallography: crystal planes, crystal lattice, reciprocal lattice, Defects: point defects, dislocations, X-ray diffraction. Lattice dynamics: Lattice vibrations: Einstein and Debye models, normal modes and density of states, thermal properties, Brillouin zones. Free electron model: Electrical and thermal conduction, Fermi level, Hall effect. Periodic Potential: Band theory: nearly free electron and tight binding approach.						One examination paper of three hours.
PHYS3732	**8**	**7**	**CESM: 140101**	**PHYS1624**	**Statistical Physics I**	**1L**
Phase space, distribution function, the most probable distribution, Lagrange multipliers, Boltzmann distribution, degeneracy of energy levels, the Maxwell-Boltzmann velocity distribution, the Maxwell-Boltzmann speed and energy distributions, the derivation of the equation of state of an ideal gas using the Maxwell-Boltzmann distribution, paramagnetism. Applications in terms of transport processes like effusion and diffusion, derivation of the hydrodynamic equations of motion of gases and fluids, heat conduction, propagation of sound waves, and viscosity.						One examination paper of two hours.

PHYS3742	**8**	**7**	**CESM: 140101**	**PHYS3732**	**Statistical Physics II**	**1L**
Quantum statistics, the Fermi-Dirac and Bose-Einstein statistics and distributions, the equation of state of a quantum gas, Fermi temperature, low-temperature properties of a degenerate gas, the degenerate electron gas, valence and conduction bands in semiconductors, degenerate gases in astrophysics: white dwarfs and neutron stars, Blackbody radiation, the photon gas, stimulated emission, Debye specific heat, electron specific heat.					One examination paper of two hours.	
PHYS3752	**8**	**7**	**CESM: 140101**	**PHYS2632 (with PHYS3714 and PHYS3732)**	**Practical work: Physics**	**1P**
Practical work on phenomena that are explained by modern physics, as well as a few experiments in statistical physics and thermodynamics.						
PHYS3762	**8**	**7**	**CESM: 140101**	**PHYS2632 (with PHYS3724 and PHYS3742)**	**Practical work: Physics**	**1P**
Practical work on phenomena that are explained by solid state theory as well as a few experiments in statistical physics and thermodynamics.						

13.5 DEPARTMENT OF COMPUTER SCIENCES AND INFORMATICS

- Computer Literacy: CSIQ1531and CSIQ1541 are compulsory if the programme prescribes it and the student did not pass the promotion test at the beginning of the semester. If the student passes the promotion test, he/she will receive a mark which will appear on his/her study record. Students, who passed grade 12 Information Technology (IT) on performance level 5(60%), or Computer Application Technology (CAT) on performance level 6 (70%), are exempted from CSIQ1531.
- It will be expected from BSc (IT) students to do at least one student assistantship in the Department of Computer Science and Informatics in the second or third year of study.
- The contents of CSIL1521 and CSIQ1541 are the same.
- **Modules in () indicate equivalent modules on main campus**

CSIQ1531 (CSIL1511)	**4**	**5**	**CESM: 060599**	**None**	**Computer Literacy: Part 1**	**1L, 3P**
A basic knowledge of the principles of microcomputers and microcomputer hardware, the basic commands of the operating system, a general word processing program, a spreadsheet program, presentation program and the internet. The student must also be able to apply the knowledge.					Continuous evaluation; no special examinations will be granted.	
CSIQ1541	**4**	**5**	**CESM: 060599**	**CSIQ1531**	**Computer Literacy: Part 2**	**1L, 3P**
Basic commands of a database program, as well as advanced commands of a general word processing program, a spreadsheet program and a presentation program. The student must also be able to apply the knowledge.					Continuous evaluation; no special examinations will be granted.	
CSIQ1512	**8**	**5**	**CESM: 060599**	**With CSIQ1533**	**Computer Literacy for Computer Science**	**2L, 3P**
This module introduces the learner to the world of computers. The course is aimed at computer science students who have little or no background of computers and their functionality. The course covers basic computer literacy including programmes commonly used on a day to day basis in industry such as Microsoft Windows and Office. Learners also get the opportunity to explore common communication environments. The course prepares the learners to search for information and stay abreast with current trends in the computing arena.					This is not a promotion module. One examination paper (written and/or practical) of three hours.	
CSIQ1553	**12**	**5**	**CESM: 060103**	**None**	**Introduction to Computer Hardware**	**3L, 3P**
This module introduces the learner to computer hardware components. The course is aimed at computer science students who have little or no background of computers and their functionality. The course covers computer hardware from the basic terms, assembly, configuring through to troubleshooting and computer hardware's integration with software.					This is a promotion module. One examination paper (written and/or practical) of three hours.	
CSIQ1614	**16**	**6**	**CESM: 060201**	**With CSIQ1512**	**Introduction to Software Development Concepts**	**3L, 3P**
This module deals with the professional implementation of computerised solutions in an object-oriented, high-level programming environment. The module provides an introduction to problem solving, algorithms, classes, objects, properties and methods. Control structures, e.g. selection and iteration, and input and output are also covered.					This is a promotion module. One examination paper (written and/or practical) of three hours.	
CSIQ1623	**12**	**6**	**CESM: 060801**	**CSIQ1512 + CSIQ1553**	**Introduction to Computer Networks**	**3L, 3P**
This module introduces the learner to the theory and practical aspects of computer networks. The course is aimed at computer science students who have a background with computers and their functionality. The course covers computer networks topics which include computer networks concepts, organisation, topologies, hardware, media, OSI Model, TCP/IP suite, addressing and basic troubleshooting.					This is a promotion module. One examination paper (written and/or practical) of three hours.	

CSIQ1624	**16**	**6**	**CESM: 060201**	**CSIQ1534 + CSIQ1531**	**Programming and Problem Solving: Part 2**	**3L, 3P**
This module deals with information systems and problem solving in business and scientific environments. Advanced object oriented concepts, debugging, storing data in files and access to simple databases.					One examination paper (written and/or practical) of three hours.	
CSIQ2614	**16**	**6**	**CESM**	**CSIQ1644**	**Data Structures and Advanced Programming**	**3L, 3P**
This module deals with advanced programming that requires an understanding of data structures and the professional implementation thereof.					One examination paper (written and/or practical) of three hours.	
CSIQ2624	**16**	**6**	**CESM : 060302**	**CSIQ1624**	**Human-Computer Interaction**	**2L,3P**
If the potential computer user is not accommodated throughout the design process of a computer system, the system will not be used and money and energy will be wasted. This module provides the user with an introduction to Human-Computer Interaction (HCI). Aspects that are covered include usability, human factors, models of interaction, data collection, the design of user interfaces, visual interfaces and the evaluation of interfaces; types of interfaces, mobile HCI.					This is a promotion module. One examination paper (written and/or practical) of three hours	
CSIQ2642	**8**	**6**	**CESM : 060501**	**CSIQ1531+ CSIQ1541**	**Information Technology Service Learning**	**E/A**
This module enables the students to serve the community by ploughing back the IT knowledge gained during their studies. While serving the community the students will learn how to work with people with varying computer literacy skills or levels. By teaching or helping others, their own knowledge will be expanded.					Continuous assessment is applied in this module and no special examinations are allowed.	
CSIQ2634	**16**	**6**	**CESM: 060702**	**CSIQ1624**	**Databases and Database Management Systems 1**	**2L, 3P**
This module deals with database concepts, design and implementation concepts, transaction management and concurrency control, distributed database management systems, object-oriented databases and database programming. There will be operations on databases such as SQL queries, ER diagrams and ADO.NET.					This is a promotion module. One examination paper (written and/or practical)	
CSIQ2654	**16**	**6**	**CESM: 060904**	**CSIQ1624**	**Introduction to Websites Development**	**2L, 3P**
This module introduces the learner to developing web sites. The development of good web pages requires that the programmer has knowledge of various web aspects and technologies. This includes the working of the Internet, graphical interfaces, Internet protocols, web page development with XHTML, HTML5, and CSS. JavaScript will also be introduced.					This is a promotion module. One examination paper (written and/or practical)	
CSIQ2624	**16**	**6**	**CESM: 060302**	**CSIQ1624**	**Human Computer Interaction**	**2L, 3P**
This module provides the student with an introduction to Human-Computer Interaction (HCI). Aspects that are covered include usability, human factors, interaction models, data collection, designing user interfaces, visual interfaces and the evaluation of interfaces, types of interfaces and HCI for mobile devices.					This is a promotion module. One examination paper (written and/or practical) of three hours.	
CSIQ2644 (2016)	**16**	**7**	**CESM : 060299**	**CSIQ2634**	**Mobile Development**	**2L,3P**
Theory and practical applications of new mobile technologies, which will be adapted on a yearly basis. Principles of mobile applications programming, mobile programming, publishable applications.					This is not a promotion module. One examination paper (written and/or practical)	
CSIQ3734	**16**	**7**	**CESM : 060904**	**CSIQ2614 and CSIQ2634**	**Internet Programming**	**2L,3P**
Students will learn essential web development skills related to current Internet technologies and protocols, web graphics and multimedia, web authoring and design, and web programming. Appropriate programming languages will be used for server-side programming.					This is not a promotion module. One practical examination (written and/or practical).	

13.6 DEPARTMENT OF GEOGRAPHY

GEOE1514	**16**	**6**	**140501**	**NSC MATHEMATICS LEVEL 3 FOR BSc Geography NSC MATHEMATICS LEVEL 5**	**INTRODUCTION TO PHYSICAL GEOGRAPHY**	**3L, 3P**
Universe, Solar System, Earth, Climatology, Hydrogeography, soil geography, weathering and erosion, geomorphology, environmental geography. Practicals: Elementary cartography and the representation, interpretation of Environmental Data.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	

GEOE1624	**16**	**6**	**140501**	**GEOE1514**	**INTRODUCTION TO HUMAN GEOGRAPHY**	**3L, 3P**
The Module is concerned specifically with human Settlement. It deals with Population dynamics, Development of rural and Urban Settlements, Urbanization, Agriculture, flows and networks and economic Geography						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GEOG1514	**16**	**6**	**140501**	**NSC MATHEMATICS LEVEL 3 FOR BSc Geography NSC MATHEMATICS LEVEL 5**	**INTRODUCTION TO PHYSICAL GEOGRAPHY**	**3L, 3P**
Universe, Solar System, Earth, Climatology, Hydrogeography, soil geography, weathering and erosion, geomorphology, environmental geography. Practicals: Elementary cartography and the representation, interpretation of Environmental Data.						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GEOG 1624	**16**	**6**	**140501**	**GEOG1514**	**INTRODUCTION TO HUMAN GEOGRAPHY**	**3L, 3P**
The Module is concerned specifically with human Settlement. It deals with Population dynamics, Development of rural and Urban Settlements, Urbanization, Agriculture, flows and networks and economic Geography						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GEOT1624	**16**	**6**	**140504**	**NSC**	**TOURISM GEOGRAPHY**	**3L,1T**
The aim of the module tourism geography is to introduce students to the geographical distribution of tourism, travel patterns, and the impact of tourism on the natural environment, economics and social behaviour of local communities and destinations.						Formative & summative, Tests & assignments & projects.
GEOG2614	**16**	**6**	**140501**	**GEOG1514 or GEOE1514**	**PROCESS GEOMORPHOLOGY AND GEOMORPHOLOGICAL HAZARDS**	**3L, 3P**
The module focus on earth surface process and hazards, Introduction to Geomorphological and geological phenomena, waves and ocean phenomenon as important geomorphic agent of erosion in the coastal zone. Fluvial Geomorphology and its application to the environment, Aeolian geomorphology and its application to the environment.						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GEOG2634	**16**	**6**	**140501**	**GEOG 1624 or GEOE1624**	**URBAN DEVELOPMENT STUDIES**	**3L, 3P**
The module focus on central Theme of Society and Space including components of development, theoretical framework and criteria of measuring development, spatial models, intra-urban structures, urbanization and its impacts on physical and social environment, problems and challenges of first and third world, housing and services. Practicals: collection and preparation of data, statistical principles of application in in spatial analyses, interpretation of results						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GISS2614	**16**	**6**	**140501**	**CSIQ 1531 & GEOG 1514 or GEOE151**	**INTRODUCTION TO REMOTE SENSING**	**3L, 3P**
A brief History of Remote Sensing for Earth observation (Photogrammetry and aerial photography), Physical laws of Remote Sensing and Energy Interactions (Electromagnetic Radiation), Evolution of Platforms and Characteristics of Remote Sensing Sensors (Resolutions), Remote sensing Data collection and Process, Satellite based sensors, Multispectral Remote Sensing (Visible and Infrared Remote sensing), Hyperspectral Remote Sensing, Active Sensor Remote Sensing, Lidar Remote Sensing, Radar Remote Sensing, GIS integration, Remote Sensing Applications						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GEOT2614	**16**	**6**	**140504**	**GEOT1624 or GEOE1624**	**GLOBAL TOURISM STUDIES**	**3L,1T**
The aim of this module is to introduce students to the basic concepts and systems underlying scientific tourism studies. It also defines the concept tourist, different types of tourists, the reasons why visitors travel and the different experiences that enhance the tourism industry.						Formative & summative, Tests & assignments & projects.
GEOG2624	**16**	**6**	**140501**	**GEOG1514 or GEOE1514**	**ENVIRONMENT AND CLIMATE STUDIES**	**3L, 3P**
The module gives the background of environmental sciences starting from the basics of science, it looks at different materials that are found in different ecosystems including biodiversity and natural process. Other studies include, Economy and the environment, water sources, pollution and solid waste, human benefit and impacts as a result of resource extraction.						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.

GEOG2644	**16**	**6**	**140501**	**GEOG 1514 or GEOE1514**	**BIOGEOGRAPHY AND CLIMATE OF SOUTHERN AFRICAN**	**3L, 3P**
Introduction to biogeography of Southern Africa, Historical pattern of Vegetation distribution in Southern Africa, Southern Africa Biomes, Biodiversity and Conservation in Southern Africa, Environmental Impacts on Vegetation of Southern Africa, Basic concept and general climate of Southern Africa, Weather Producing Systems of Southern Africa, Severe weather events of Southern Africa, Climate Variability, Change and its impact.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GISS2624	**16**	**6**	**140501**	**CSIQ 1531 & GEOG 1514& MATHS NSC LEVEL 5 or MATD1564 or GEOE1514**	**INTRODUCTION TO GEOGRAPHICAL INFORMATION SYSTEM**	**3L, 3P**
Theoretical framework of GIS, data structure and databases, collection and verification of data with spatial analysis. Presentation of information with the aid of GIS. Identification of features and measurement on GIS platform.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOT2624	**16**	**5**	**140504**	**GEOT1624**	**PRIMARY AND SECONDARY ASPECTS OF TOURISM STUDIES**	**3L,1T**
The aim of this module is to build on and improve the knowledge on basic concepts and systems underlying the development of the tourism industry. The content also emphasises the role of the following industrial sectors in the promotion tourism at national and international level; the transport industry, accommodation and catering sector, natural and cultural attractions.					Formative & summative, Tests & assignments & projects.	
GEOG3714	**16**	**7**	**140501**	**GEOG2614**	**ENVIRONMENTAL GEOMORPHOLOGY**	**3L, 3P**
The module aims to familiarize students with the role of geomorphology as a significant branch of earth sciences. Students are familiarized with the development of nineteenth, twentieth and twenty first century geomorphology, the move towards process-oriented studies and new methodologies (micro-geomorphology), Southern African Geomorphology and the Quaternary of Southern Africa, Geomorphology of semi-arid and arid southern Africa, Including free state.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOG3734	**16**	**7**	**140501**	**GEOG2634**	**APPLIED URBAN DEVELOPMENT AND SPATIAL TRANSFORMATION**	**3L, 3P**
Geography of apartheid, inequality and post-apartheid, spatial transformation of urban areas, changing urbanization process and patterns, spatial integration of the former homelands, geography of inequality on national, regional and local level. Spatial transformation of urban areas, its future challenges and solution. Urbanization and urban growth as spatial processes, challenges associated with fast growing cities.					Formative assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOT3714	**16**	**7**	**140504**	**GEOT1624**	**TOURISM DEVELOPMENT AND POLICY**	**3L**
This module aims to introduce the student to different theories of development and to emphasise the relationship between tourism and development. The study includes concepts of pro-poor tourism and responsible tourism.					Formative & summative, Tests & assignments & projects	
GEOG3724	**16**	**7**	**140501**	**GEOG2634**	**RURAL GEOGRAPHY**	**3L,2P**
This module aims to provide an introduction to rural development issues globally, it investigates the sustainable development of rural areas, the impact of migration on the development of rural areas, poverty as it manifest itself in different forms of rural areas, how poverty can be reduced in rural areas and rural – urban linkage.					Formative assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOG3744	**16**	**7**	**140501**	**GEOG2624**	**ENVIRONMENTAL MANAGEMENT AND ANALYSIS**	**3L,3P**
The South African Environment and Processes, Systems in the Environment, Environmental Management Plans, Integrated Environmental Management procedures, environmental impact analyses					Formative assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOT3744	**16**	**7**	**140504**	**GEOT2624**	**TOURISM AND LOCAL DEVELOPMENT IN SOUTH AFRICA**	**3L,1T**
The aim of the module is to assist students to recognise and understand the important role of tourism in Local Economic Development in South Africa. The emphasis is on the presence and or absence of pro-poor tourism development programmes, plans and projects in the South African context.					Formative & summative, Tests & assignments & projects	

GISS3724	**16**	**7**	**140501**	**GISS2624**	**GEOGRAPHICAL INFORMATION SCIENCE**	**3L, 3P**
Geographical data and the computer, data collection and data acquirement, data verification, quality control, raster data models, vector data models, interpolation, spatial analysis and spatial modelling, errors, the management of a GIS. Application programmes, data digitising, topology, data processing, removing of errors, digital image processing as data source, representation of information, report writing.						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.

GEOG3754	**16**	**7**	**Not Sure**	**GEOH 2614**	**ECONOMIC GEOGRAPHY**	**3L, 1P**
Concept of Economic Geography, Key approaches in economic geography, Key concepts and theories: wealth, value and circuits of capital; factors of production; agriculture, manufacturing and services; neo-classical equilibrium; core-periphery theories of economic change, Geographies of economic globalisation in agriculture, manufacturing and services. Governing globalisation. Trans-national and multi-national corporations Global finance. Urban and Regional Economic growth and decline with emphasis on environmental quality, Geographic Perspectives on Sustainable Economic growth and development.						Assignments, Essay and two formal semester tests a final summative assessment, examination of at least 2 hours.
GEOG3764	**16**	**7**	**Not sure**	**GEOG1624**	**ETHICAL DEBATES IN GEOGRAPHY**	**3L, 3P**
A review of major environmental issues and the role of various actors in addressing environmental problems, Framing environmental debates. Identifying major themes in environmental discourse, Anthropocentrism vs. Biocentrism, Sovereignty vs. Global Commons, Resource use/ Development vs. Conservation, Sustainable development and Natural Resource Management,Fracking in South Africa; Good or Bad The Climate Debate, Pros and cons of Carbon trading, Alternate Energy: proponents and opponents						Assignments, Essay and two formal semester tests a final summative assessment, examination of at least 2 hours.

GEOG6808	**32**	**8**	**14501**	**Selection for honours**	**RESEARCH IN GEOGRAPHY**	**2B**
This course advances a framework for designing a research study in Geography. This process includes deciding on a paradigm; using literature; writing an introduction; stating a purpose for the study; identifying research questions and hypotheses; using theory; defining, delimiting and stating the significance of the study and advancing methods and procedures for data collection and analysis. The objective of this course is to guide the research student through this process in a structured manner. The course is divided into a number of seminars that will entail a presentation by a number of staff members. These theory presentations are followed by a discussion of the practical considerations the student will need to think through to successfully complete the final year-end project. In addition, there are four report back sessions during which students will make a 10-minute presentation to both staff and fellow research students on the progress he/she has made in the chosen field of investigation. This presentation also provides the opportunity for both staff and fellow students to ask questions, as well as make suggestions, relating to the research. The course culminates in the presentation of a research report that is a compulsory element of the Honours degree in Geography						4 seminars presentation with continuous assessment and feedback and a final research report
GEOG6816	**16**	**8**	**14501**	**Selection for honours**	**THEORETICAL FOUNDATIONS OF GEOGRAPHY**	**3L, 1P**
The module aims to familiarise students with philosophy in general, and the philosophy of geography in particular. It starts with a brief introduction to philosophy in general, the universe around us, and the general ethics behind scientific enquiry and research. It proceeds to examine the development of geographical thought and the evolution of the discipline. Conceptions in geography from the late seventeenth century, through positivism and into post modernism are assessed and evaluated.						Mini Project and two formal semester tests a final summative assessment, examination of at least 2 hours.
GISS6824	**16**	**8**	**140501**	**Selection for honours**	**ADVANCE REMOTE SENSING**	**3L, 3P**
Remote Sensing data Acquisitions, Digital image processing systems and image display and visualization, Image preprocessing: Radiometric and Geometric corrections, Image Enhancements, Pattern Recognition, Accuracy Assessments and Change Detection, Special Topics in Remote Sensing: Lidar Remote Sensing and Hyperspectral Remote Sensing, Applications of Remote Sensing: Agriculture, Global Vegetation, Forestry, Biodiversity, Water Resources						Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.
GEOG6836	**16**	**8**	**140501**	**Selection for honours**	**APPLIED GEOMORPHOLOGY**	**3L, 2P**
Applied geomorphology in the context of land management in the Free State, in particular aeolian processes, and wind erosion and its impacts on the Free State's landforms and agricultural base.						Formative assignments and two formal semester tests a final summative assessment, examination of 3 hours.

GEOG6824	**16**	**8**	**140501**	**Selection for honours**	**SUSTAINABLE NATURAL RESOURCE MANAGEMENT**	**3L, 1P**
Overview of the principles of interdisciplinary natural resource management, Resource and Environmental Management Policy (Energy, Soil, Water, Forest, Biodiversity, Mineral). Sustainable development and Natural Resource Management,Sustainability, Economics, and Natural Resources, Natural Resources Administration and Law, The Role of Information Management in Sustainable Resource Use, Human Dimensions of Natural Resources and Environmental Management, Ecological Dimensions of Resource and Environmental Management, Exploring Natural Resource Case studies: Examples					Mini Project and two formal semester tests a final summative assessment, examination of at least 2 hours.	
GEOG6814	**16**	**8**	**140501**	**Selection for honours**	**INTERMEDIATE GEOGRAPHIC INFORMATION SYSTEMS**	**3L 3P**
At an intermediate level, the module aims to provide a working knowledge of GIS to students with little or no previous experience of the science After successful completion of the module, the student should have a thorough knowledge of the basic principles of Geographic Information Systems and be able to do simple data import, processing, analyses and presentation on a computer. The student will have basic cartographic and surveying skills; be able to identify features on photographs; and have basic knowledge of satellite images and image processing.					Formative practical experiment, assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOG6846	**16**	**8**	**140501**	**Selection for honours**	**INTEGRATED ENVIRONMENTAL MANAGEMENT**	**3L P**
Integrated environmental management (history, issues and challenges). Water and wastewater management issues. Land contamination management issues. Solid waste management issues. Air quality and noise pollution management issues. Industrial ecology. Environmental health and safety. Environmental economics. Environmental impact assessment. Environmental management master plan development.					Formative assignments and two formal semester tests a final summative assessment, examination of 3 hours.	
GEOG6826	**16**	**8**	**140501**	**Selection for honours**	**ENVIRONMENTAL POLICY AND PRACTICE**	**3L**
The course examines various environmental policy and the implications these have on environmental management. This course will introduce students to the main theories and practices pertaining to the environment and consider the implications of environmental practices for environmental policy, planning and decision making, and develop the nexus between theory and practice in environmental decision making contexts. Case studies from across the world will be considered, and highlight how issues of equity, justice, and other ethical dimensions are part of environmental planning and policy and will highlight how practices can shape environmental planning and policy in different domains - from global (climate change) to local (NRM or coastal management) contexts.					Formative assignments and two formal semester tests a final summative assessment, examination of 3 hours.	

GEOT3734	**16**	**7**	**140504**	**GEOT 2614 & GEOT2624**	**Tourism Cultural Studies**	**3L,1T**
The aim of the module is to provide students with the theoretical framework to understand cultural tourism in the broader context of heritage studies. Students are introduced to the most important cultural historical activities in South Africa, with a specific focus on conserving cultural tourism in practice.					Formative & summative, Tests & assignments & projects	
GEOT3724	**16**	**7**	**140504**	**GEOT 2624**	**Nature Tourism Studies**	**3L,1T**
The aim of this module is to introduce various policies, institutional and management practices that can enhance nature tourism's contribution to biodiversity conservation, economic and community development. The focus is on those tourist experiences that are related to natural attractions and includes ecotourism, adventure tourism, wildlife tourism and nature retreats.					Formative & summative, Tests & assignments & projects	

13.7 MATHEMATICS AND APPLIED MATHEMATICS

MATD1554	**16**	**4**	**CESM**	**National Senior Certificate (NCS) Mathematics on performance level 3 (40%)**	**Basic Mathematics**	**3L, 5T**
Development of skills with arithmetic and mathematical calculations. Real numbers, algebraic expressions. Algebraic and graphical solution of equations. Logarithms and exponents. The use of a pocket calculator. Basic geometry and elementary trigonometry, the calculation of areas and volumes. Simple and compound interest. Grouping of data and descriptive statistics.					Tutorials, homework, class/ tutorial/semester tests, and one three-hour paper.	
MATD1564	**16**	**5**	**CESM**	**National Senior Certificate (NCS) Mathematics on performance level 4 (50%)**	**Precalculus II**	**4L, 3P**
Algebra overview. Functions and graphs. Algebraic, linear, quadratic and polynomial functions. Trigonometric functions and trigonometry. Exponential and logarithmic functions.					Tutorials, tutorial/semester tests, and one three-hour paper.	

MATM1534	**16**	**5**	**CESM**	**Mathematics on performance level 5 (60%) or WTW164/MATD1564 .**	**Calculus**	**3L, 3T**
Functions, graphs, limits, continuity and the derivative. Polynomial, trigonometric, exponential and logarithmic functions. Differentiation. Critical points and local maxima and minima. Introduction to modelling. The definite integral. Integration techniques.					Tutorials, tutorial/semester tests, and one three-hour paper.	
MATM1544	**16**	**6**	**CESM**	**MATM1534 or at least 40% in MATR1614.**	**Calculus and linear algebra**	**3L, 3T**
Further integration, elementary differential equations, systems of linear equations, matrices, complex numbers.					Tutorials, tutorial/semester tests, and one three-hour paper.	
MATM1614	**16**	**6**	**CESM**	**National Senior Certificate Mathematics on performance level 7 (80%) or a minimum pass mark of at least 70% in WTW164/MATD1564 or at least 60% in WTW184 or a pass in MATM1534 is required.**	**Calculus**	**4L, 3T**
The real numbers. Functions. Limits and continuity. Differentiation: theory, techniques and applications. The Mean Value theorem. Sketching curves. Inverse functions. Transcendental functions. Integration: theory, techniques and applications.					Tutorials, tutorial/semester tests, and one three-hour paper.	
MATM1624	**16**	**6**	**CESM**	**NCS Mathematics on performance level 7 (80%) or a minimum pass mark of at least 70% in WTW164/ MATD1564 or at least 60% in WTW184 or a pass in MATM1534 is required**	**Algebra and differential equations**	**4L, 3T**
The binomial theorem. Complex numbers. Introductory linear algebra: Systems of linear equations, matrices, determinants, vectors in R^2 and R^3, lines and planes, Conic sections. Multivariable functions. Partial derivatives. Elementary differential equations.					Tutorials, tutorial/semester tests, and one three-hour paper.	
MATM2614	**16**	**6**	**CESM**	**MATM1614 & minimum 40% in MATM1624**	**Vector analysis**	**2L, 2P**
Vector functions: limits, derivatives and integrals. Curves: parameterization, tangent vectors, arc length. Multivariable functions: quadratic surfaces, partial derivatives, limits, continuity, differentiability, gradients and directional derivatives, the Mean Value theorem, the chain rule for partial derivatives, tangent planes. Multiple and line integrals: Theory and applications.					Tutorials, tutorial/semester tests, and one three-hour paper.	
MATM2624	**16**	**6**	**CESM**	**minimum 40% in MATM1614of MATM1534 en minimum 40% in MATM1614of**	**Linear algebra**	**2L, 2P**
Real vector spaces: basis, dimension, subspace. Linear mappings: kernel, image, representation of a linear mapping as a matrix, inverse. Inner product and orthogonality: orthogonal bases, rank, bilinear mappings, quadratic forms. Determinants. Eigenvalues and eigen-vectors: characteristic polynomial of a linear mapping, symmetric matrices, diagonalisation. The Cayley-Hamilton theorem.					Tutorials, tutorial/semester tests, and one three-hour paper.	
MATM2664	**16**	**6**	**CESM**	**MATM1614 and MATM1624**	**Sequences and series**	**3L, 2P**
Sequences of real numbers: convergence, limits, boundedness, indeterminate forms, L'Hospital's rule. Improper integrals. Infinite series: tests for convergence, absolute and conditional convergence. Taylor series. Power series: intervals of convergence. Fourier analysis					Tutorials, tutorial/semester tests, and one three-hour paper.	
EBCS1514	**16**	**5**	**CESM 041002**	**Equivalent modules:EBCS1514**	**Introduction to Statistics (I)**	**3L, 3T**
Elementary calculations, Interest calculations, Index numbers, Time series, Introduction to statistics, and, collection of data					This is a promotion module (70%), Semester mark (50%): assignments (50%), two semester tests (50%), Examination mark (50%): one three-hour exam paper.	
EBCS1524	**16**	**5**	**CESM 150301**	**Equivalent module: BMT124, EBCS52405**	**Introduction to Statistics (II)**	**3L, 3T**
The organising, graphical presentation and description of data, Elementary principles of probability, Confidence intervals and hypothesis testing, Correlation and regression, Contingency tables, analysis of variance					This is a promotion module (70%), Semester mark (50%): assignments (50%), two semester tests (50%), Examination mark (50%): one three-hour exam paper.	

MATA2644	**16**	**6**	**CESM 041002**	**MATM1624 65% MATM1544**	**Ordinary differential Equations**	**2L, 2T**
Non-linear first order differential equations: substitution techniques, exact equations, in¬tegration factors. Non-homogeneous second order differential equations with constant coefficients. Series methods. Systems of linear first order differential equations. Elementary eigenvalue pro¬blems. Applications in Physics, Chemistry, Biology and Medical Science such as mixtures, mechanical vibrations, electronic circuits and resonance pro¬blems.						
The content of the following modules can be found in the EMS RULEBOOK						
EBUS1514	**16**	**5**	**CESM 150301**		**Business functions**	**3L, 3T**
EBUS1624	**16**	**5**	**CESM 150301**		**General management**	**3L, 3T**
EBUS2714	**16**	**5**	**CESM 150301**		**Entrepreneurship**	**3L, 3T**
SOCP2624	**16**	**5**	**CESM 150301**		**The population-environment-development interface**	**3L, 3T**
SOCP2624	**16**	**5**	**CESM 150301**		**Sociology of Developing Societies**	**3L, 3T**