

SCHOOL OF SCIENCE & TECHNOLOGY

UNDERGRADUATE



2026
School Calendar

Medium of Instruction

The medium of instruction at the Sefako Makgatho Health Sciences University is English.

Validity

This Calendar is valid for the 2026 academic and financial year. The University reserves the right to amend any date, time, rule, or provision in this Calendar at any time without prior notice. No responsibility is accepted for possible inaccuracies.

University Terms 2026

FIRST SEMESTER	:	05 January 2026	-	17 July 2026
AUTUMN Recess (for students)	:	30 March 2026	-	02 April 2026
WINTER Recess (for students)	:	08 July 2026	-	17 July 2026
SECOND SEMESTER	:	20 July 2026	-	15 Dec 2026
SUMMER Recess (University Recess)	:	23 Dec 2026	-	04 Jan 2027

School Correspondence

All School correspondence to be addressed to:

The Dean
Sefako Makgatho Health Sciences University
School of Science & Technology
Box 60
PO
MEDUNSA
0204

Telephone numbers: +27(0) 12 521

4304

+27(0) 12 521 4372
+27(0) 12 521 5891
+27(0) 12 521 3275
+27(0) 12 521 3362

Email: Lawrence.obi@smu.ac.za. (Dean: School of Science & Technology)
Stanley.gololo@smu.ac.za (Deputy Dean: School of Science and Technology)
tshегоfatso.monegi@smu.ac.za (Interim P.A to the Dean)
Esmey.moema@smu.ac.za (School Operations Manager)

Maseeng.nkobeni@smu.ac.za (Principal Administrator: Postgraduate Studies)
 Refilwe.mashilwane@smu.ac.za (Principal Administrator: Undergraduate Studies)

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1. UNDERGRADUATE PROGRAMMES

	ABBREVIATION	CODE	PAGE
Undergraduate Degree Programme			
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Admission Criteria			
Bachelor of Science – Life Sciences	BSc (ECP)	BSCK01	
Bachelor of Science – Mathematical Sciences	BSc (ECP)	BSCL01	
Bachelor of Science –Physical Sciences	BSc (ECP)	BSCM01	
Bachelor of Sciences – Applied Mathematics	BSC(ECP)	BSCL01	
Bachelor of Science (<i>Baccalaureus Scientiae</i>)			21-37
Admission Criteria			
Bachelor of Science – Life Sciences	BSc	BSCG01	
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Bachelor of Science – Environmental Biology	BSc	BSCG04	
Bachelor of Science – Microbiology & Immunology	BSc	BSCG05	
Bachelor of Science – Botany	BSc	BSCG06	
Bachelor of Science – Mathematical Sciences	BSc	BSCH01	
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MESSAGE FROM THE DEAN SCHOOL OF SCIENCE & TECHNOLOGY

Hearty greetings and welcome to the School of Science and Technology, Sefako Makgatho Health Sciences University. The school is known for providing excellent educational opportunities in the areas of **Mathematical, Life, Physical, Occupational and Environmental Sciences** anchored on Entrepreneurship and Innovation. The school also offers an **Extended Curriculum Program (BSc-ECP)** over a four-year period as a way of enhancing student access and success. Recently, the Department of Higher Education and Training (DHET) approved some major fields. They consist of Biotechnology, Environmental Biology, Environmental Toxicology as well as Honours streams in Information and Communication Technology.

There are eight departments in the school namely, **Academic Literacy and Science Communication, Biology and Environmental Sciences, Biochemistry and Biotechnology, Chemistry and Chemical Technology, Computer Science and Information Technology, Mathematics and Applied Mathematics, Physics, Statistical Sciences.**

The school provides strong articulation from ECP programmes to doctoral degrees. The School offers training in Science and Technology to students registered in the Schools of Oral Health Sciences, Health Care Sciences, Pharmacy and Medicine. Career/work related prospects for students registered in the various streams in the School of Science and Technology are as follows: -

1. **Brewery, Food and Dairy Industries:**
(*Biochemistry, Botany, Chemistry, Biology, Biotechnology, Microbiology and Immunology, ICT*).
2. **Research Institutes** such as Agricultural Research Council (ARC), Botanical Institute, Zoological Gardens, Medical Research Council (MRC), Water Research Commission (WRC), Council for Scientific and Industrial Research (CSIR), National Research Foundation (NRF). All streams (*Biology, Botany, Environmental Biology, Biochemistry, Chemistry, Statistics, Mathematics, Physics, Computer Science, ICT, Biotechnology, Environmental Management and Toxicology, Microbiology and Immunology*).
3. **Government Departments:** Departments of Health, Environmental Affairs, Trade and Industry, Science and Technology, Communications, Public Enterprises, Transport, Education, Statistics South Africa.
(*Mathematics, Biochemistry, Chemistry, Biotechnology, Biology, Botany, Microbiology and Immunology, Statistics, Physics, ICT*).
4. **Financial Institutions:** Banks, Insurance Companies, Stock exchange, Business Analyst.
(*ICT, Computer Science, Statistics, Mathematics*).
5. **Telecommunications:** Vodacom, Cell C, MTN.
(*ICT, Computer Science, Physics, Mathematics, Statistics, Biotechnology*).
6. **Mining:**
(*Chemistry, Biochemistry, Physics, ICT, Computer Science, Biology, Biochemistry, Environmental Biology, Statistics, Environmental Management and Toxicology, Biotechnology, Microbiology and Immunology*).
7. **Retail:**
(*Statistics, ICT, Computer Science, Biochemistry, Biology*).
8. **Artificial Intelligence:**
(*Computer Science, ICT, Mathematics, Statistics, Physics, Chemistry, Biology, Biochemistry*).

To give impetus to Innovation and Entrepreneurship, the School spearheaded the establishment of the Centre for Entrepreneurship and Rapid Incubations, predicated on multi-disciplinarily, internationalization and community engagement.

Our staff members are suitably qualified to deliver on the various disciplines and to produce well-rounded graduates that are in sync with the momentum of modern developments in Science, Technology and Innovation. A gradual move towards commercialisation of research findings or products is envisaged because commercialisation is the key hinge in the overlap between research and innovation.

Considering the array of opportunities and career prospects in the School, it is our pleasure to welcome you to the School of Science and Technology, the home for your future career.



Prof CL Obi

Dean – School of Science & Technology

UNIVERSITY VISION AND MISSION

VISION

In developing a vision for the university, the institution acknowledges a number of critical aspects, which give the institution its identity. These include a focus on excellence in teaching and learning, developing research and innovation, combining clinical practice and community service and focus on a broad range of fields in the health sciences. The university also has a critical role in contributing to the transformation of the health sciences sector in South Africa while at the same time making a meaningful contribution to the needs of the community it serves and South Africa as a whole.

With these components in mind, the institution has adopted as its vision the following: Transforming health services through excellence and innovation

MISSION

The mission statement highlights that the institution provides a comprehensive range of qualifications across a broad range of health sciences fields. The mission also highlights that the institution combines excellence in teaching and learning with a focus on research and innovation with community engagement at the centre of its approach to all that it does.

The mission statement of the institution is as follows: SMU is a dedicated health sciences university providing professional training and education in a range of fields through excellence in teaching, learning, innovative research and community engagement.

School Committees for Science & Technology

Board of the School

Chairperson : Prof CL Obi (Dean)

Members :

Heads of academic departments in the School
Professors and Associate professors in the School
Permanently appointed senior lecturers in the School
Permanently appointed lecturers in the School

Executive Committee

Chairperson : Prof CL Obi (Dean)

Members :

All Heads of Academic Departments in the School

Community Engagement and Marketing Committee

Chairperson : Ms M Masethe

Members :

Departmental representatives
Science outreach coordinator
Marketing Department
Student Representative

Examinations Committee

Chairperson : Prof CL Obi (Dean)

Members :

All Heads of Academic Departments
Departmental Representatives
Assistant Registrar
Examinations Dept. Rep

School Research and Innovation Committee

Chairperson : Prof SS. Gololo

Vice-Chairperson(s) : Prof M. Aphane
Prof M. Manganye

Members:

Departmental Representatives

Student Selection & Admission Committee

Chairperson : Prof CL Obi (Dean)

Members :

All Heads of Academic Department in the school.
Enrolment Dept. Rep
School Administrator
Student Representative

Student Support Committee

Chairperson : Ms N Ntsoka

Members :

Departmental Representatives

Student Success Committee (Institutional)

School Representatives : Dr N Rapulenyane

: Dr E Mathe

Curriculum Review Committee

Chairperson : Prof E Sithole

Members :

Departmental Representatives

Risk Management Committee

Chairperson : Dr T Ramarumo

Members :

Departmental Representatives
Marketing & Communications Chairperson

Marketing and Communication Committee

Chairperson : Mr J Fatlane

Members :

Departmental Representatives

Work Integrated Learning Committee

Chairperson : Prof L.L Mugivhisa

Members :

Departmental Representatives

DATES FOR SCHOOL BOARD MEETINGS = 2026

NB: According to the University General Calendar, only three meetings are scheduled.

Wednesday 17 March 2026

Wednesday 27 May 2026

Tuesday 28 July 2026

MEMBERS OF STAFF

Office of the Dean

Dean	Obi CL , Prof
Deputy Dean	Gololo SS , Prof
Secretary (Interim)	Monegi T, Ms
School Operations Manager	Moema, EBE, Dr
Principal Admin. Officer (Postgrads)	Nkobeni ML, Ms
Principal Admin. Officer (Undergrads)	Mashilwane RE, Ms
Mobile Science Bus	Seseng FC, Ms

Academic Departments

Academic Literacy and Science Communication

Head of Department	Seleka ME , PhD (UNW)
Senior Lecturer	Hungwe V, PhD (UL)
Senior Lecturer	Marutla GB, PhD (UNW)
Lecturer	Nkgadima GM, MA (UL)
Lecturer	Mamabolo JT MA (UL)

Biochemistry and Biotechnology

Assoc. Prof / HoD	Gololo SS , PhD (SMU)
Senior Lecturer	Kgopa AH, PhD (SMU)
Senior Lecturer	Thibane, V, PhD (UKZN)
Senior Lecturer	Mathe EH, PhD (SMU)
Lecturer	Makhubela SD, MSc (WITS)
Lecturer	Nemukula, M, MSc (SMU)
Lecturer	Mncube SC, MSc (SMU)
Laboratory Assistant	Shikwambana MH, MSc (SMU)
Natural Scientist	Nthai, D, MSc (SMU)

Biology and Environmental Sciences

Professor & HoD	King PH , PhD (UFS)
Professor	Vacant
Associate Professor	Vacant
Associate Professor	Mugivhisa L, PhD (SMU)
Associate Professor	Mkolo M, PhD (UP)
Associate Professor	Manganyi MC, PhD (NWU)
Senior Lecturer	Lebepe J, PhD (UL)
Senior Lecturer	Buthelezi NMD, PhD (UKZN & SMU)
Senior Lecturer	Lion GN, PhD (SMU)
Senior Lecturer	Vacant
Senior Lecturer	Vacant
Senior Lecturer	Vacant
Lecturer	Mavimbela C, MSc (UL)
Lecturer	Modise EM, MSc (UL, Medunsa Campus)
Lecturer	Modise T, MSc (SMU)
Lecturer	Aina OE, PhD (SMU)
Lecturer	Mnisi NML, BSc (Hons) (UL, Medunsa Campus)
n-Gap Lecturer	Matodzi N, MSc (SMU)
Junior Lecturer (Contract)	Nodlaba NC, BSc Hons (NMU)
Senior Laboratory Assistant	Mooki KS, MSc (SMU)
Senior Technical Officer	NP Dlamini, MSc (UFS)
Technical Officer	Mathole MC, MSc (SMU)

Chemistry and Chemical Technology

Acting HoD	Rapulenyane N , PhD (NMU)
Professor	Motaung TE, PhD (UFS)
Associate Professor	Mdluli PS, PhD (Uni.Zulu)
Senior Lecturer	Debeila MA, PhD (WITS)
Senior Lecturer	Molefe DM, PhD (UP)
Senior Lecturer	Vacant
Senior Lecturer	Vacant
Lecturer	Mogane MG, PhD (UNISA)
Lecturer	Makhubela NFH, MSc (MEDUNSA)
Lecturer	Mofokeng MJ, MSc (UFH)
Lecturer	Mosebo B, MSc (NWU)
Lecturer	Olivier MT, MSc (SMU)
Natural Scientist	Masilela ZI, MSc (WSU)
Natural Scientist	Mohlala R, PhD (WITS)
Senior Technical Officer	Semenya CJ, PhD (SMU)
Technical Officer	Kgasi AN, B. Tech (TUT)
Laboratory Assistant	Mokose R,

Computer Science and Information Technology

Acting HoD	Hungwe T, PhD (SMU)
Senior Lecturer	Dandadzi TA, PhD (UL, Medunsa Campus)
Lecturer	Mathiba NS, MSc (Southern Univ. USA)
Lecturer	Ndobe TV, Mcom (Information System (WITS)
Lecturer	Masethe MA, M-Tech (TUT)
Junior Lecturer	Sumbana V, BSc (Hons) (UNIVEN)
Junior Lecturer	Masuku NS, BSc (Hons) (UNIZULU)
Laboratory Technician	Nkosi MI, BSc (Hons)SMU

Mathematics and Applied Mathematics

Assos. Prof /HoD	Aphane M , PhD (UNISA)
Senior Lecturer	Adem K, PhD (North-West Univ.)
Senior Lecturer (Part time)	Aremu K O, PhD (UKZN)
Senior Lecturer	Bambe Moutsinga CB, PhD(UP)
Senior Lecturer	Vacant
Senior Lecturer	Vacant
Lecturer	Vijayasenani D, MSc (MAHATMA GANDHI)
Lecturer	Fatlane MJ, MSc (SMU)
Lecturer	Nkwanazana M, PhD (Wits)
Lecturer	Ngwepe M.D, MSc (SMU)
Lecturer	Ndlovu PV, MSc (SMU)
Lecturer (Part time)	Kanyane MLS, BSc (Hons)(SMU)
Lecturer (Part time)	Maluleka R, MSc (SMU)
Junior Lecturer (Part time)	Medupe K, BSc (Hons) (SMU)
Junior Lecturer (Part time)	
Junior Lecturer (Part time)	Mlotshwa S, BSc (Hons) (SMU)
Junior Lecturer (Part time)	Abubakar S.M MSc (SMU)

Physics

Assos. Prof/Acting HoD

Associate Professor
Senior Lecturer
Lecturer
Lecturer
Junior Lecturer
Natural Scientist
Natural Scientist
Technical Officer

Mhlongo MR, PhD (SMU)

Sithole ME, PhD (UL)
Vacant
Selepe TL, MSc (SMU)
Bele A, PhD (SMU)
Moloi AN, B. ED (Hons) (UP)
Rathagane CR, MSc (SMU)
Rambevha TR, BSc (Hons) (UL)
Mphelane MN, MSc (SMU)

Statistical Sciences

Senior Lecturer/Biostatistician/Acting HoD

Senior Lecturer
Lecturer
Lecturer
Lecturer
Junior Lecturer
Junior Lecturer

Ntuli TS, PhD (UL)

Ramarumo T, PhD (SMU)
Lekganyane MM, MSc (UL)
Miyambu GR, MSc (UL)
Rakale G, MSc (SMU)
Tshabalala KD, BSc (Hons)(UL)
Molaba MM, BSc (Hons)(UL)

SCHOOL VISION AND MISSION

Vision

Transforming Science and Technology through Interdisciplinary quality education, research, community engagement and innovation for societal development.

Mission

To provide quality training in Science and Technology with the aim of producing global leaders that inspire solutions to societal problems.

Sefako Makgatho Health Sciences University

Rules of the School of Science & Technology

School Rules in relation to the General Rules

The School Rules must be read together with the General Rules. Unless otherwise indicated, expressly or by necessary implication in the School Rules, the General Rules apply.

Admission

SST1 A candidate for a study programme must comply with the conditions and meet the selection criteria of the School.

Summative Assessment

SST2 To be admitted to the summative assessment for a module a student must have fulfilled the requirements set out in the General rules and must have a record of at least 75% attendance in scheduled formal contact session for the module.

Supplementary Assessment (For Undergraduate Studies Only)

SST3 Unless Senate determines otherwise supplementary assessment is flexibly arranged by the School after the standard summative assessment.

Progression and Admission to subsequent Modules

SST4

SST4.1 Where a student fails a first semester module, he/she will be allowed (a) to proceed with the second semester module in the subject and (b) to repeat the first semester module in the following year unless he/she has been refused readmission in the following year.

SST4.2 Subject to the General rules a student may only take a second-year module in the School if he or she has passed at least three (3) courses at academic first-year level and has completed all prerequisite module(s).

SST4.3 Subject to the General Rules a student may only take a third-year module in the School level if he or she has completed all modules prescribed for the first year and at least 50% of the total credits prescribed for the second-year level and has completed all prerequisite modules.

Composition of a Programme/Curriculum for a qualification

SST5

SST5.1 Each programme/curriculum is composed of several modules as determined by Senate and set out in the rules for the qualification.

SST5.2 The curriculum for an honours degree may prescribe papers, projects, extended essays, practicals, or combinations thereof.

SST5.3 The curriculum for a coursework master's programme must include a mini-dissertation and may include assessment papers, projects, research papers, practicals, or combinations thereof.

SST5.4 The School may permit a student to submit published work based on research while registered to supplement or replace a mini-dissertation for a course-work master's degree.

SST5.5 The School may permit a PhD candidate (a) to incorporate currently relevant material from the student's own published work in the thesis, with appropriate acknowledgement as to the source; and (b) if determined by his/her pre-approved research protocol to submit a collection of published works, or the full text of a monograph reporting on research work done while registered for the degree as his/her thesis monograph.

Bachelor of Science

(Extended Curriculum Programme)

Programmes Offered

The School offers the following *extended BSc degree curriculum programmes*

COURSE CODE	PROGRAMME	MAJOR SUBJECTS*
BSCK01	Life Sciences	Biology, Chemistry, Biochemistry, Physiology
BACL01	Mathematical Sciences	Mathematics, Statistics, Computer Science, Physics, Applied Mathematics
BSCM01	Physical Sciences	Physics, Chemistry, Biochemistry, Mathematics
		* Any Two Majors in Final Year

Admission to BSc-ECP *(Extended Curriculum Programme)*

SSTB 1

SSTB 1.1 An applicant must have obtained (a) an NSC with a Bachelor endorsement; (b) a minimum APS of **24** and (c) the following minimum APS per subject:

Subject	Score
English	4
Mathematics	4
Life Science	4
Physical Science	4
<i>Any two other NSC subjects with a minimum NSC score of 4 each</i>	

SSTB1.2 Admission criteria other than the above shall comply with Rules as described for the **BSc Programme**.

SSTB 2 The curriculum for the **BSc-ECP Programme** shall extend over four years and be composed of a combination of modules that include two majors.

SSTB 3 The Dean may in exceptional circumstances and on the recommendation of the head of Department exempt a student who is repeating a module from the practical component of that module.

SSTB 4 A student enrolled in BSc-ECP must follow the prescribed structured curriculum in

(a) **Years 1 and 2:**

BSc Extended Curriculum Programme					
Year 1			Year 2		
Module Code	4 Core (C) + choice of 1 Electives (E)	Credits	Module Code	3 Core (C) + choice of 2 Electives (E)	Credits
MMTH000	C	24	MMTB000	C	24
MHEL000	C	24	MHEB000	C	24
MAPA000	C	24	MAPB000	C	24
MCHM000	C	24	MCHB000	E	24
MBIO000	E	24	MBIB000	E	24
MCSC000	E	24	MCOB000	E	24
MPHS000	E	24	MPHB000	E	24
MSTS000	E	24	MSTB000	E	24
Total Credits		120	Total Credits		120

(b) **Years 3 & 4:** the curricula of Year 2 and year 3 of the mainstream **BSc Programme**.

(c) The **BSc Extended Curriculum Programme** carries a minimum of 480 SAQA credits, with at least 120 SAQA credits required at each year level.

SSTB 5 To proceed to BSc-ECP 2, a student must have passed MMTH000 and two additional modules.

SSTB 6 To proceed to BSc-ECP 3 (mainstream BSc 2), a student must have passed MMTB000 and two additional modules from the second year of study.

SSTB 7 To register for BSc-ECP 3 a student must have passed all prerequisites for BSc-ECP 3 module(s).

SSTB 8 In exceptional cases a student may be allowed to register year 3 modules of the **BSc Extended Curriculum Programme** without the full complement of modules passed at year 1 and year 2, but then only on recommendation of the Head of Department and approval by the Dean of School, provided that all applicable rules and modular prerequisites are complied with.

Modules in Bachelor of Science Programme

(Extended Curriculum Programme)

Module code*	Module Name	Pre-requisites	Co-requisites
BSc (ECP) Level 1		<i>Presented from 2013</i>	
MBIO000	Introduction to Life Science Studies I	Selection Criteria	Fixed Curriculum
MAPA000	Elementary Applied Mathematics		
MCHM000	Introduction to General Chemistry 1A		
MCSC000	Introduction to Computing Concepts and Algorithms		
MHEL000	Health Education and Life Competencies I		
MMTH000	Linear and Introductory Abstract Algebra		

Module code*	Module Name	Pre-requisites	Co-requisites
MPHS000	Introduction to General Physics 1A		
MSTS000	Descriptive Statistics		
Module code*	Module Name	Pre-requisites	Co-requisites
BSc (ECP) Level 2		<i>Presented from 2014</i>	
MBIB000	Introduction to Life Science Studies II	MBIO000	MAPB000 MMTB000
MCHB000	General Chemistry 1B	MMTH000 MCHM000	
MCOB000	Introduction to Data Organization and Artificial Intelligence	MMTH000 MCSC000	
MHEB000	Health Education and Life Competencies II	MHEL000	
MMTB000	Differential and Integral Calculus	MMTH000	
MAPB000	Computational Mathematics	MAPA000	
MPHB000	Introduction to General Physics 1B	MMTH000 MPHS000	
MSTB000	Introduction to Statistics and Statistical Inference	MMTH000 MSTS000	

BSC- ECP CURRICULUM – INFORMATION

LIFE SCIENCES - BSCK01

CURRICULUM INFORMATION

School:	School of Science & Technology	Qualification Code:	BSCK01
Qualification Name:	Bachelor of Science (Life Sciences)	Last Revision date:	2012
Campus:	SMU Campus	Total SAQA Credits for Qualification:	488
Is this a fixed Curriculum:		No	

PERIOD OF STUDY / YEAR LEVEL 1

Year					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
The following 5 module/s are COMPULSORY					
MMTH000	Year	Y	24	0.1	
MHEL000	Year	N	24	0.1	
MBIO000	Year	Y	24	0.1	
MCHM000	Year	Y	24	0.1	
MPHS000	Year	Y	24	0.1	
TOTAL CREDITS FOR YEAR LEVEL 1			120	0.5	

PERIOD OF STUDY / YEAR LEVEL 2

Year					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
The following 5 module/s are COMPULSORY					
MMTB000	Year	Y	24	0.1	
MHEB000	Year	N	24	0.1	
MBIB000	Year	Y	24	0.1	
MCHB000	Year	Y	24	0.1	
MPHB000	Year	Y	24	0.1	
TOTAL CREDITS FOR YEAR LEVEL 1			120	0.5	

CURRICULUM INFORMATION

School:	School of Science & Technology	Qualification Code:	BSCK01
Qualification Name:	Bachelor of Science (Life Sciences)	Last Revision date:	2012
Campus:	SMU Campus	Total SAQA Credits for Qualification:	488
Is this a fixed Curriculum:		No	

PERIOD OF STUDY / YEAR LEVEL 3

1 st Semester / 1 st & 2 nd Quarter Modules					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
Choose 3 of the following ELECTIVES					
MBIA021	S1	Y	20	0.167	
MCHB021 and MCHA021	Q1 Q2	Y Y	10 10	0.083 0.083	
MPLA021	S1	Y	20	0.167	
MZOA021	S1	Y	20	0.167	
Total credits for Semester 1 modules			60	0.5	
TOTAL CREDITS FOR YEAR LEVEL 3			120	1	

PERIOD OF STUDY / YEAR LEVEL 3

2 nd Semester / 3 rd & 4 th Quarter Modules					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
Choose 3 of the following ELECTIVES					
MBIA022	S2	Y	20	0.167	
MCHA022 and MCHB022	Q3 Q4	Y Y	10 10	0.083 0.083	
MPLA022	S2	Y	20	0.167	
MZOB022	S2	Y	20	0.167	
Total credits for Semester 2 modules			60	0.5	
TOTAL CREDITS FOR YEAR LEVEL 3			120	1	

PERIOD OF STUDY / YEAR LEVEL 4					
1 st Semester / 1 st & 2 nd Quarter Modules					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose at least 2 of the following ELECTIVES					
	MBIA031	S1	Y	32	0.25
	MZOA031	S1	Y	32	0.25
	MCHA031 and MCHB031	Q1 Q2	Y Y	16 16	0.125 0.125
	MPLB031	S1	Y	32	0.25
	MZOA031	S1	Y	32	0.25
Total credits for Semester 1 modules				64	0.5
TOTAL CREDITS FOR YEAR LEVEL 4				128	1

PERIOD OF STUDY / YEAR LEVEL 4					
2 nd Semester / 3 rd & 4 th Quarter Modules					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose at least 2 of the following ELECTIVES					
	MBIA 032	S2	Y	32	0.25
	MZOB032	S2	Y	32	0.25
	MCHA032 and MCHB032	Q3 Q4	Y Y	16 16	0.125 0.125
	MPLB032	S2	Y	32	0.125
	MZOA032	S2	Y	32	0.25
Total credits for Semester 2 modules				64	0.5
TOTAL CREDITS FOR YEAR LEVEL 4				128	1

MATHEMATICAL SCIENCES - BSCL01

CURRICULUM INFORMATION

School: School of Science & Technology	
Qualification Name: Bachelor of Science (Mathematical Sciences)	Qualification Code: BSCL01
Campus: SMU Campus	Last Revision date: 2012
Total SAQA Credits for Qualification: 488	Is this a fixed Curriculum: No

PERIOD OF STUDY / YEAR LEVEL 1					
Year					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 module/s are COMPULSORY					
	MMTH000	Year	Y	24	0.1
	MAPA000	Year	Y	24	0.1
	MHEL000	Year	N	24	0.1
	MCSC000	Year	Y	24	0.1
	MPHS000	Year	Y	24	0.1
	MSTS000	Year	Y	24	0.1
TOTAL CREDITS FOR YEAR LEVEL 1				120	0.5

PERIOD OF STUDY / YEAR LEVEL 2					
Year					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 module/s are COMPULSORY					
	MMTB000	Year	Y	24	0.1
	MAPB000	Year	Y	24	0.1
	MHEB000	Year	N	24	0.1
	MCOB000	Year	Y	24	0.1
	MPHB000	Year	Y	24	0.1
	MSTB000	Year	Y	24	0.1
TOTAL CREDITS FOR YEAR LEVEL 1				120	0.5

PERIOD OF STUDY / YEAR LEVEL 3					
1 st Semester / 1 st & 2 nd Quarter Modules					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following modules are COMPULSORY					
	MMTA021	S1	Y	20	0.167
	MAPA021	S1	Y	20	0.167
Choose 1 of the following ELECTIVE					
	MCOA021	S1	Y	20	0.167
	MSTA021	S1	Y	20	0.167
	MPHA 021 and MPHB021	Q1 Q2	Y Y	10 10	0.083 0.083
Total credits for Semester 1				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 3				120	1

PERIOD OF STUDY / YEAR LEVEL 3					
2 nd Semester / 3 rd & 4 th Quarter Modules					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following modules are COMPULSORY					
	MMTA022	S2	Y	20	0.167
	MAPA022	S2	Y	20	0.167
Choose 1 of the following ELECTIVE					
	MCOA022	S2	Y	20	0.167
	MSTA022	S2	Y	20	0.167
	MPHA 022 and MPHB022	Q3 Q4	Y Y	10 10	0.083 0.083
Total credits for Semester 2				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 3				120	1

CURRICULUM INFORMATION

School: School of Science & Technology			
Qualification Name: Bachelor of Science (Mathematical Sciences)		Qualification Code: BSC101	
Campus: SMU Campus		Last Revision date: 2012	
Total SAQA Credits for Qualification:	488	Is this a fixed Curriculum:	No

PERIOD OF STUDY / YEAR LEVEL 4					
1 st Semester / 1 st & 2 nd Quarter					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose 2 of the following ELECTIVE/S					
	MMTA031 and MMTB031	Q1 Q2	Y Y	16 16	0.125 0.125
	MAPA031 and MAPB033	Q1 Q2	Y Y	16 16	0.125 0.125
	MCOA031 and MCOB031	Q1 Q2	Y Y	16 16	0.125 0.125
	MSTA031 and MSTB031	Q1 Q2	Y Y	16 16	0.125 0.125
	MPHA031 and MPHB031	Q1 Q2	Y Y	16 16	0.125 0.125
Total credits for Semester 1 Year level 4				64	0.500
TOTAL CREDITS FOR YEAR LEVEL 4				128	1.000
TOTAL CREDITS FOR QUALIFICATION				488	3.000

PERIOD OF STUDY / YEAR LEVEL 4					
2 nd Semester / 3 rd & 4 th Quarter Modules					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose 2 of the following ELECTIVE/S					
	MMTA032 and MMTB032	Q3 Q4	Y Y	16 16	0.125 0.125
	MAPA032 and MAPB034	Q3 Q4	Y Y	16 16	0.125 0.125
	MCOA032 and MCOB032	Q3 Q4	Y Y	16 16	0.125 0.125
	Two from MSTB032 MSTC032	Q3	Y	16	0.125
		Q4	Y	16	0.125
	MPHA032 and MPHB032	Q3 Q4	Y Y	16 16	0.125 0.125
Total credits for Semester 2 Year level 4				64	0.500
TOTAL CREDITS FOR YEAR LEVEL 4				128	1.000
TOTAL CREDITS FOR QUALIFICATION				488	3.000

PHYSICAL SCIENCES - BSCM01

CURRICULUM INFORMATION

School: School of Science & Technology			
Qualification Name: Bachelor of Science (Physical Sciences)		Qualification Code : BSCM01	
Campus: SMU Campus		Last Revision date: 2012	
Total SAQA Credits for Qualification:	488	Is this a fixed Curriculum:	No

PERIOD OF STUDY / YEAR LEVEL 1					
Year					
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 modules are COMPULSORY					
	MMTH000	Year	Y	24	0.1
	MHEL000	Year	N	24	0.1
	MCHM000	Year	Y	24	0.1
	MPHS000	Year	Y	24	0.1
	MBIO000	Year	Y	24	0.1
TOTAL CREDITS FOR YEAR LEVEL 1				120	0.5

PERIOD OF STUDY / YEAR LEVEL 2					
Year					
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 modules are COMPULSORY					
	MMTB000	Year	Y	24	0.1
	MHEB000	Year	N	24	0.1
	MCHB000	Year	Y	24	0.1
	MPHB000	Year	Y	24	0.1
	MBIB000	Year	Y	24	0.1
TOTAL CREDITS FOR YEAR LEVEL 1				120	0.5

CURRICULUM INFORMATION

School: School of Science & Technology	
Qualification Name: Bachelor of Science (Physical Sciences)	Qualification Code: BSCM01
Total SAQA Credits for Qualification: 488	Is this a fixed Curriculum: No

PERIOD OF STUDY / YEAR LEVEL 3					
1 st Semester / 1 st & 2 nd Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
The following modules are COMPULSORY					
MCHA021 and MCHB021	Q1 Q2	Y Y	10 10	0.083 0.083	
MPHA021 and MPHB021	Q1 Q2	Y Y	10 10	0.083 0.083	
Choose 1 of the following ELECTIVES					
MMTA021	S1	Y	20	0.167	
MBIA021	S1	Y	20	0.167	
Total credits for Semester 1			60	0.50	
TOTAL CREDITS FOR YEAR LEVEL 3			120	1.00	

PERIOD OF STUDY / YEAR LEVEL 3					
2 nd Semester / 3 rd & 4 th Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
The following modules are COMPULSORY					
MCHA022 and MCHB022	Q3 Q4	Y Y	10 10	0.083 0.083	
MPHA022 and MPHB022	Q3 Q4	Y Y	10 10	0.083 0.083	
Choose 1 of the following ELECTIVES					
MMTA022	S2	Y	20	0.167	
MBIA022	S2	Y	20	0.167	
Total credits for Semester 2			60	0.50	
TOTAL CREDITS FOR YEAR LEVEL 3			120	1.00	

PERIOD OF STUDY / YEAR LEVEL 4					
1 st Semester / 1 st & 2 nd Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
Choose 2 or 3 of the following ELECTIVES					
MCHA031 and MCHB031	Q1 Q2	Y	16	0.125 0.125	
MPHA031 and MPHB031	Q1 Q2	Y	16	0.125 0.125	
MMTA031 and MMTB032	Q1 Q2		16	0.125 0.125	
MBIA031	S1	Y	32	0.25	
<i>Physics and Biochemistry cannot be paired</i>					
Total credits for Semester 1			64	0.50	
TOTAL CREDITS FOR YEAR LEVEL 4			128	1.00	

PERIOD OF STUDY / YEAR LEVEL 4					
2 nd Semester / 3 rd & 4 th Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
Choose 2 or 3 from the following ELECTIVES					
MCHA032 and MCHB032	Q3 Q4	Y Y	16 16	0.125 0.125	
MPHA032 and MPHB032	Q3 Q4	Y Y	16 16	0.125 0.125	
MMTA032 and MMTB032	Q3 Q4	Y y	16 16	0.125 0.125	
MMBIA032	S2	Y	32	0.25	
<i>Physics and Biochemistry cannot be paired</i>					
Total credits for Semester 2			64	0.50	
TOTAL CREDITS FOR YEAR LEVEL 4			128	1.00	

Bachelor of Science

(*Baccalaureus Scientiae*)

Admission to BSc Programme

SSTB 9

COURSE CODE	PROGRAMME	MAJOR SUBJECTS*
BSCG01	Life Sciences	Biology, Chemistry, Biochemistry, Physiology
BSCG02	Biotechnology	Biochemistry, Biotechnology
BSCG03	Environmental Management and Toxicology	Environmental Management, Environmental Health Science
BSCG04	Environmental Biology	Environmental Management, Environmental Epidemiology
BSCG05	Microbiology and Immunology	Microbiology
BSCG06	Botany	Botany, Biochemistry, Chemistry, Biology
BSCH01	Mathematical Sciences	Mathematics, Applied Mathematics, Statistics, Computer Science, Physics

BSCI01	Physical Sciences	Physics, Chemistry, Biochemistry, Mathematics
BSCJ01	Occupational & environmental health Sciences	Environmental & Occupational Psychology, Physiology
		* Any Two Majors in Final Year

An applicant must have obtained (a) an NSC with a Bachelor endorsement; (b) a minimum APS of **25** and (c) the following minimum APS per subject:

Subject	Score
English	4
Mathematics	5
Life Science	4
Physical Science	4
Any two other NSC subjects with a minimum NSC score of 4 each	

OR

A Senior Certificate with full University Exemption obtained prior to 2008 with a minimum APS (**A**dmission **P**oint **S**core) of **25** on the following scale:

Senior Certificate Higher Grade	Senior Certificate Standard Grade	APS points
A		7
B	A	6
C	B	5
D	C	4
E	D	3
F	E	2
G	F	1

SSTB 10

Having satisfied the admission requirements in SSTB9, and subject to the availability of space, a student must meet the following minimum APS in a relevant subject to be admitted into a stream of choice:

BSc Stream	Course Code	Subject	Score
Life sciences	BSCG01	Life science	5
Biotechnology	BSCG02	Life science	5
Environmental Management and Toxicology	BSCG03	Life science	5
Environmental Biology	BSCG04	Life science	5
Microbiology and Immunology	BSCG05	Life science	5
Botany	BSCG06	Life science	5
Mathematical Sciences	BSCH01	Mathematics	5
Physical Sciences	BSCI01	Physical Science	5
Occupational and Environmental Sciences	BSCJ01	Life Science	5

BSC CURRICULUM – INFORMATION

LIFE SCIENCES - BSCG01

CURRICULUM INFORMATION

School:	School of Science & Technology	Qualification Code:	BSCG01
Qualification Name:	Bachelor of Science (Life Sciences)	Last Revision date:	2012
Campus:	SMU Campus	Is this a fixed Curriculum:	No
Total SAQA Credits for Qualification:	368		

PERIOD OF STUDY / YEAR LEVEL 1					
1 st Semester					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 modules are COMPULSORY					
	MBIO011	S1	Y	12	0.1
	MCHM011	S1	Y	12	0.1
	MHEL011	S1	N	12	0.1
	MMTH011	S1	Y	12	0.1
	MPHS011	S1	Y	12	0.1
Total credits for Semester 1 modules				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 1				120	1

PERIOD OF STUDY / YEAR LEVEL 1					
2 nd Semester					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 modules are COMPULSORY					
	MCHM012	S2	Y	12	0.1
	MHEL012	S2	N	12	0.1
	MZOO012	S2	Y	12	0.1
	MMTH012	S2	Y	12	0.1
	MPHS012	S2	N	12	0.1
Total credits for Semester 2 modules				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 1				120	1

PERIOD OF STUDY / YEAR LEVEL 2					
1 st Semester					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose at least 3 or 4 of the following ELECTIVES					
	MBIA021	S1	Y	20	0.167
	MCHA021	Q1	Y	10	0.083
	and MCHB021	Q2	Y	10	0.083
	MPLA021	S1	Y	20	0.167
	MZOA021	S1	Y	20	0.167
Total credits for Semester 1 modules				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 2				120	1

PERIOD OF STUDY / YEAR LEVEL 2					
2 nd Semester					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose at least 3 or 4 of the following ELECTIVES					
	MBIA022	S2	Y	20	0.167
	MCHA022 and	Q3	Y	10	0.083
	MCHB022	Q4	Y	10	0.083
	MPLA022	S2	Y	20	0.167
	MZOB022	S2	Y	20	0.167
Total credits for Semester 2 modules				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 2				120	1

PERIOD OF STUDY / YEAR LEVEL 3					
1 st Semester / 1 st & 2 nd Quarter Modules					
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose at least 2 of the following ELECTIVES					
	MBIA031	S1	Y	32	0.25

PERIOD OF STUDY / YEAR LEVEL 3					
2 nd Semester / 1 st & 2 nd Quarter Modules					
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose at least 2 of the following ELECTIVES					
	MBIA032	S2	Y	32	0.25

MCHA031 and MCHA032	Q1 Q2	Y Y	16 16	0.125 0.125
MPLC031	S1	Y	32	0.25
MZOA031	S1	Y	32	0.25
Total credits for Semester 1 modules			64	0.5
TOTAL CREDITS FOR YEAR LEVEL 3			128	1

MCHB031 and MCHB032	Q3 Q4	Y Y	16 16	0.125 0.125
MPLC032	S2	Y	32	0.25
MZOB032	S2	Y	32	0.25
Total credits for Semester 2 modules			64	0.5
TOTAL CREDITS FOR YEAR LEVEL 3			128	1

BIOTECHNOLOGY – BSCG02

SECTION E: CURRICULUM INFORMATION

School:	School of Science and Technology		
Qualification Name:	Bachelor of Science (Biotechnology)	Qualification Code:	BSCG02
Campus:	SMU Campus	Last Revision date:	2019

PROPOSED NEW PROGRAMME

PERIOD OF STUDY / YEAR LEVEL 1

Year Modules

X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MBIO011	S1	N	12	0.1
	MZOO012	S2	N	12	0.1
	MCHM011	S1	N	12	0.1
	MCHM102	S2	N	12	0.1
	MPHS011	S1	Y	12	0.1
	MPHS012	S2	N	12	0.1
	MMTH011	S1	N	12	0.1
	MMTH022	S2	N	12	0.1
	MHEL011	S1	N	12	0.1
	MHEL012	S2	N	12	0.1

TOTAL CREDITS FOR YEAR 1

120

1

PERIOD OF STUDY / YEAR LEVEL 2					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MBIA021	S1	Y	20	0.25
	MBIA022	S2	Y	20	0.25
	BTEC201	S1	Y	20	0.25
	BTEC202	S1	Y	20	0.25
	BTEC203	S2	Y	20	0.25
	BTEC204	S2	Y	20	0.25
TOTAL CREDITS FOR YEAR LEVEL 2				120	

PERIOD OF STUDY / YEAR LEVEL 3					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	BTEC301	S1	Y	30	0.25
	BTEC302	S1	Y	30	0.25
	BTEC303	S2	Y	30	0.25
	BTEC304	S2	Y	30	0.25
TOTAL CREDITS FOR YEAR LEVEL 3				120	1

ENVIRONMENTAL MANAGEMENT & TOXICOLOGY - BSCG03

SECTION E: CURRICULUM INFORMATION REQUIRED			
School:	Science & Technology		
Qualification Name:	Bachelor of Science (Environmental Management and Toxicology)		Qualification Code: BSCG03
Campus:	SMU Campus		Last Revision date: 2019

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 1					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MBIO011	S1	Y	12	0.1
	MZOO012	S2	Y	12	0.1
	MCHM011	S1	Y	12	0.1
	MCHM012	S2	Y	12	0.1
	MPHS011	S1	Y	12	0.1
	MPHS012	S2	Y	12	0.1
	MMTH011	S1	Y	12	0.1
	MMTH012	S2	Y	12	0.1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 2					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	EMT 201	S1	Y	20	0.17
	EMT 202	S2	Y	20	0.17
	EHS 201	S1	Y	20	0.16
	EHS 202	S2	Y	20	0.17
	MICB 201	S1	Y	20	0.16
	MICB 202	S2	Y	20	0.17

	MHEL011	S1	Y	12	0.1
	MHEL012	S2	Y	12	0.1
TOTAL CREDITS FOR YEAR 1				120	1

TOTAL CREDITS FOR YEAR 2				120	1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 3					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	EMT 301	S1	Y	30	0.25
	EMT 302	S2	Y	30	0.25
	EMT 303	S1	Y	30	0.25
	EMT 304	S2	Y	30	0.25
TOTAL CREDITS FOR YEAR 3				120	1

ENVIRONMENTAL BIOLOGY – BSCG04

SECTION E: CURRICULUM INFORMATION REQUIRED			
School:	Science & Technology		
Qualification Name:	Bachelor of Science (Biology)	Qualification Code:	BSCG04
Campus:	SMU Campus	Last Revision date:	2019

EXISTING PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 1					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MBIO011	S1	Y	12	0.1
	MZOO012	S2	Y	12	0.1
	MCHM011	S1	Y	12	0.1
	MCHM012	S2	Y	12	0.1
	MPHS011	S1	Y	12	0.1
	MPHS012	S2	Y	12	0.1
	MMTH011	S1	Y	12	0.1
	MMTH012	S2	Y	12	0.1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 2					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	EMT 201	S1	Y	20	0.17
	EMT 202	S2	Y	20	0.17
	EHS 201	S1	Y	20	0.16
	EHS 202	S2	Y	20	0.17
	MICB 201	S1	Y	20	0.16
	MICB 202	S2	Y	20	0.17

	MHEL011	S1	Y	12	0.1
	MHEL012	S2	Y	12	0.1
	MHEL012	S2	Y	12	0.1
TOTAL CREDITS FOR YEAR 1				120	1

TOTAL CREDITS FOR YEAR 2				120	1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 3					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	EHS 301	S1	Y	30	0.25
	EHS 302	S2	Y	30	0.25
	EPS301	S1	Y	30	0.25
	EPS 302	S2	Y	30	0.25
TOTAL CREDITS FOR YEAR 3				120	1

MICROBIOLOGY & IMMUNOLOGY - BSCG05

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCEINCE and TECHNOLOGY
Last Revision date:	2019		First Year Offered (New):	2022	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSG01	
Migration Strategy:	(If YES, Section G must also be completed)				

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 1					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MBIO011	S1	Y	12	0.1
	MZOO012	S2	Y	12	0.1
	MCHM011	S1	Y	12	0.1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 2					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MICB211	S1	Y	20	0.17
	MICB212	S1	Y	20	0.17
	MICB213	S1	Y	20	0.16

	MCHM012	S2	Y	12	0.1
	MICB011	S1	Y	12	0.1
	MICB011	S2	Y	12	0.1
	MCOA011	S1	Y	12	0.1
	MCOA012	S2	Y	12	0.1
	MHEL011	S1	Y	12	0.1
	MHEL012	S2	Y	12	0.1
TOTAL CREDITS FOR YEAR 1				120	1

	MICB221	S2	Y	20	0.17
	MICB222	S2	Y	20	0.16
	MICB223	S2	Y	20	0.17
TOTAL CREDITS FOR YEAR 2				120	1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 3					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MICB311	S1	Y	20	0.17
	MICB312	S1	Y	20	0.17
	MICB313	S1	Y	20	0.17
	MICB321	S2	Y	20	0.17
	MICB322	S2	Y	20	0.17
	MICB323	S2	Y	20	0.17
TOTAL CREDITS FOR YEAR 3				120	1

BOTANY - BSCG06

MODULAR INFORMATION					
Department of Biology and Environmental Sciences			School:	Science and Technology	
Last Revision date:	2014		First Year Offered (New):	2024	
Replace this Module existing module(s)?		YES	If YES, give the module codes:	BOTYY101 REPLACES MBOTY012 (in part)	
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	NO		(If YES, Section G must also be completed)		

NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 1					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	MBIO011	S1	Y	12	0.1
	MZOO012	S2	Y	12	0.1
	MCHM011	S1	Y	12	0.1
	MCHM012	S2	Y	12	0.1
	MMTH011	S1	Y	12	0.1
	MMTH012	S2	Y	12	0.1
	BOTY101	S1	Y	12	0.1
	BOTY102	S2	Y	12	0.1
Choose 1 of the following ELECTIVES					
	MHEL011	S1	N	12	0.1
	MHEL012	S2	N	12	0.1
	MPHS011	S1	N	12	0.1
	MPHS012	S2	N	12	0.1
TOTAL CREDITS FOR YEAR 1				120	1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 2					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	BOTY201	S1	Y	20	0.17
	BOTY202	S2	Y	20	0.17
Choose 2 of the following ELECTIVES					
	MBIA021	S1	N	20	0.16
	MBIA022	S2	N	20	0.17
	MCHA021	S1; Q1	N	10	0.083
	and MCHB021	S2; Q2	N	10	0.083
	MCHA022 and MCHB022	S2; Q3 S2; Q4	N N	10 10	0.083 0.083
	MZOA021	S1	N	20	0.16
	MZOB022	S2	N	20	0.17
TOTAL CREDITS FOR YEAR 2				120	1

PROPOSED NEW PROGRAMME					
PERIOD OF STUDY / YEAR LEVEL 3					
Year Modules					
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following module/s are COMPULSORY					
	BOTY301	S1	Y	20	0.17
	BOTY302	S1	Y	20	0.17
Choose 1 of the following ELECTIVES					
	MZOA031	S1	N	20	0.17
	MZOB032	S2	N	20	0.17
	MBIA031	S2	N	20	0.17
	MBIA032	S2	N	20	0.17
	MCHA031 and MCHA032	S1; Q1 S1; Q2	N N	16 16	0.125 0.125
	MCHB031 and MCHB032	S2; Q3 S2; Q4	N N	16 16	0.125 0.125
TOTAL CREDITS FOR YEAR 3				120	1

MATHEMATICAL SCIENCES - BSCH01

CURRICULUM INFORMATION

School: Science & Technology			
Qualification Name: Bachelor of Science (Mathematical Sciences)	Qualification Code: BSCH01		
Campus: SMU Campus	Last Revision date: 2012		
Total SAQA Credits for Qualification: 368	Is this a fixed Curriculum: No		

PERIOD OF STUDY / YEAR LEVEL 1					
1 st Semester					
Module Code	Offering Period	Possible major	SAQA Credit	Hemis Credit	
The following 2 modules are COMPULSORY					
MMTH011	S1	Y	12	0.1	
MHEL011	S1	Y	12	0.1	
Choose 3 of the following ELECTIVES					
MAPM011	S1	Y	12	0.1	
MCOA011	S1	Y	12	0.1	
MSTS011	S1	Y	12	0.1	
MPHS011	S1	Y	12	0.1	
Total credits for Semester 1			60	0.5	
TOTAL CREDITS FOR YEAR LEVEL 1			120	1	

PERIOD OF STUDY / YEAR LEVEL 1					
2 nd Semester					
Module Code	Offering Period	Possible major	SAQA Credit	Hemis Credit	
The following 2 modules are COMPULSORY					
MMTH012	S2	Y	12	0.1	
MHEL012	S2	Y	12	0.1	
Choose 3 of the following ELECTIVES					
MAPM012	S2	Y	12	0.1	
MCOA012	S2	Y	12	0.1	
MSTS012	S2	Y	12	0.1	
MPHS012	S2	Y	12	0.1	
Total credits for Semester 2			60	0.5	
TOTAL CREDITS FOR YEAR LEVEL 1			120	1	

PERIOD OF STUDY / YEAR LEVEL 2					
1 st Semester / 1 st & 2 nd Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
The following 1 module are COMPULSORY					
MMTA021	S1	Y	20	0.167	
Choose 2 of the following ELECTIVES					
MAPA021	S1	Y	20	0.167	
MCOA021	S1	Y	20	0.167	
MSTA021	S1	Y	20	0.167	
MPHA021 and MPHB021	Q1 Q2	Y Y	10 10	0.083 0.083	
Total credits for Semester 1			60	0.5	
TOTAL CREDITS FOR YEAR LEVEL 2			120	1	

PERIOD OF STUDY / YEAR LEVEL 2					
Semester / 1 st & 2 nd Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
The following 1 module is COMPULSORY					
MMTA022	S2	Y	20	0.167	
Choose 2 of the following ELECTIVES					
MAPA022	S2	Y	20	0.167	
MCOA022	S2	Y	20	0.167	
MSTA022	S2	Y	20	0.167	
MPHA022 and MPHB022	Q3 Q4	Y Y	10 10	0.083 0.083	
Total credits for Semester 2			60	0.5	
TOTAL CREDITS FOR YEAR LEVEL 2			120	1	

PERIOD OF STUDY / YEAR LEVEL 3					
1 st Semester / 1 st & 2 nd Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
Choose 2 of the following ELECTIVES					

PERIOD OF STUDY / YEAR LEVEL 3					
2 nd Semester / 3 rd & 4 th Quarter					
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴	
Choose 2 of the following ELECTIVES					

MAPA031 and MAPA033	Q1 Q2	Y Y	16 16	0.125 0.125
MMTA031 and MMTB031	Q1 Q2	Y Y	16 16	0.125 0.125
MCOA031 and MCOB031	Q1 Q2	Y Y	16 16	0.125 0.125
MSTA031 and MSTB031	Q1 Q2	Y Y	16 16	0.125 0.125
MPHA031 and MPHB031	Q1 Q2	Y Y	16 16	0.125 0.125
Total credits for Semester 1				0.5
TOTAL CREDITS FOR YEAR LEVEL 3				1
TOTAL CREDITS FOR QUALIFICATION				3

MAPA032 and MAPA034	Q3 Q4	Y Y	16 16	0.125 0.125
MMTA032 and MMTB032	Q3 Q4	Y Y	16 16	0.125 0.125
MCOA032 and MCOB032	Q3 Q4	Y Y	16 16	0.125 0.125
MPHA032 and MPHB032	Q3 Q4	Y Y	16 16	0.125 0.125
Two Type	MSTB032 and MSTC032	Q3 Q4	16 16	0.125 0.125
Total credits for Semester 2				0.5
TOTAL CREDITS FOR YEAR LEVEL 3				1
TOTAL CREDITS FOR QUALIFICATION				3

PHYSICAL SCIENCES - BSCI01

CURRICULUM INFORMATION

School: Science & Technology	
Qualification Name: Bachelor of Science (Physical Sciences)	Qualification Code: BSCI01
Total SAQA Credits for Qualification: 368	Is this a fixed Curriculum: No

PERIOD OF STUDY / YEAR LEVEL 1					
1 st Semester / 1 st & 2 nd Quarter					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 4 modules are COMPULSORY					
	MCHM011	S1	Y	12	0.100
	MPHS011	S1	Y	12	0.100
	MMTH011	S1	Y	12	0.100
	MHEL011	S1	N	12	0.100
Choose 1 of the following ELECTIVES					
	MSTS011	S1	N	12	0.100
	MAPM011	S1	N	12	0.100
	MCOA011	S1	N	12	0.100
	MBIO011	S1	N	12	0.100
Total credits for Semester 1				60	0.5
TOTAL CREDITS FOR YEAR LEVEL 1				120	1.00

PERIOD OF STUDY / YEAR LEVEL 1					
2 nd Semester / 3 rd & 4 th Quarter					
P	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 4 modules are COMPULSORY					
	MCHM012	S2	Y	12	0.100
	MPHS012	S2	Y	12	0.100
	MMTH012	S2	Y	12	0.100
	MHEL012	S2	N	12	0.100
Choose 1 of the following ELECTIVES					
	MSTS012	S2	N	12	0.100
	MAPM012	S2	N	12	0.100
	MCOA012	S2	N	12	0.100
	MZOO012	S2	N	12	0.100
Total credits for Semester 2				60	0.50
TOTAL CREDITS FOR YEAR LEVEL 1				120	1.00

PERIOD OF STUDY / YEAR LEVEL 2					
1 st Semester / 1 st & 2 nd Quarter					
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 4 modules are COMPULSORY					
	MCHA021	Q1	Y	10	0.083
	MCHB021	Q2	Y	10	0.083
	MPHA021	Q1	Y	10	0.083
	MPHB021	Q2	Y	10	0.083
Choose 1 of the following ELECTIVES					
	MMTA021	S1	Y	20	0.167

PERIOD OF STUDY / YEAR LEVEL 2					
2 nd Semester / 3 rd & 4 th Quarter					
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 4 modules are COMPULSORY					
	MCHA022	Q3	Y	10	0.083
	MCHB022	Q4	Y	10	0.083
	MPHA022	Q3	Y	10	0.083
	MPHB022	Q4	Y	10	0.083
Choose 1 of the following ELECTIVES					
	MMTA022	S2	Y	20	0.167

MBIA021	S1	Y	20	0.167
Total credits for Semester 1			60	0.50
TOTAL CREDITS FOR YEAR LEVEL 2				1.00

MBIA022	S2	Y	20	0.167
Total credits for Semester 2			60	0.50
TOTAL CREDITS FOR YEAR LEVEL 2				1.00

PERIOD OF STUDY / YEAR LEVEL 3				
1 st Semester / 1 st & 2 nd Quarter				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose 2 or 3 of the following ELECTIVES				
MCHA031 and MCHB031	Q1 Q2	Y Y	16 16	0.125 0.125
MPHA031 and MPHB031	Q1 Q2	Y Y	16 16	0.125 0.125
MMTA031 and MMTB031	Q1 Q2	Y y	16 16	0.125 0.125
MBIA031	S1	Y	32	0.25
<i>Physics and Biochemistry cannot be paired</i>				
Total credits for Semester 1			64	0.50
TOTAL CREDITS FOR YEAR LEVEL 3			128	1.00
TOTAL CREDITS FOR QUALIFICATION			368	3

PERIOD OF STUDY / YEAR LEVEL 3				
2 nd Semester / 3 rd & 4 th Quarter				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
Choose 2 or 3 of the following ELECTIVES				
MCHA032 and MCHB032	Q3 Q4	Y Y	16 16	0.125 0.125
MPHA032 and MPHB032	Q3 Q4	Y Y	16 16	0.125 0.125
MMTA032 and MMTB032	Q3 Q4	Y y	16 16	0.125 0.125
MBIA032	S2	Y	32	0.25
<i>Physics and Biochemistry cannot be paired</i>				
Total credits for Semester 2			64	0.50
TOTAL CREDITS FOR YEAR LEVEL 3			128	1.00
TOTAL CREDITS FOR QUALIFICATION			368	3

OCCUPATIONAL AND ENVIRONMENTAL SCIENCES - BSCJ01

CURRICULUM INFORMATION

School:	Science & Technology	Faculty:	Faculty of Health Sciences
Qualification Name:	Bachelor of Science	Qualification Code:	BSCJ01
Campus:	SMU Campus	Last Revision date:	2012
Total SAQA Credits for Qualification:	368	Is this a fixed Curriculum:	Y

PERIOD OF STUDY / YEAR LEVEL 1				
1 st Semester				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 modules are COMPULSORY				
MBIO011	S1	Y	12	0.1
MCHM011	S1	Y	12	0.1
MHEL011	S1	N	12	0.1
MPCL011	S1	Y	12	0.1
MMTH011	S1	Y	12	0.1
Total credits for Semester 1 modules			60	0.5
TOTAL CREDITS FOR YEAR LEVEL 1			120	1

PERIOD OF STUDY / YEAR LEVEL 1				
2 nd Semester				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 5 modules are COMPULSORY				
MCHM012	S2	Y	12	0.1
MHEL012	S2	N	12	0.1
MPCL012	S2	Y	12	0.1
MMTH012	S2	Y	12	0.1
MZOO012	S2	Y	12	0.1
Total credits for Semester 2 modules			60	0.5
TOTAL CREDITS FOR YEAR LEVEL 1			120	1

PERIOD OF STUDY / YEAR LEVEL 2				
1 st Semester				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 3 module/s are COMPULSORY				
MBIA021	S1	N	20	0.167
MPLA021	S1	Y	20	0.167

PERIOD OF STUDY / YEAR LEVEL 2				
2 nd Semester				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 3 modules are COMPULSORY				
MPSB022	S2	N	20	0.167
MPLA022	S2	Y	20	0.167

MPSA021	S1	Y	20	0.167
Total credits for Semester 1 modules			60	0.5
TOTAL CREDITS FOR YEAR LEVEL 2			120	1

MPSA022	S2	Y	20	0.167
Total credits for Semester 2 modules			60	0.5
TOTAL CREDITS FOR YEAR LEVEL 2			120	1

PERIOD OF STUDY / YEAR LEVEL 3				
1st Semester / 1st & 2nd Quarter Modules				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 2 module/s are COMPULSORY				
MPLC031	S1	Y	32	0.25
MPSA031	S1	Y	32	0.25
Total credits for Semester 1 modules			64	0.5
TOTAL CREDITS FOR YEAR LEVEL 3			128	1
TOTAL CREDITS FOR QUALIFICATION			368	3

PERIOD OF STUDY / YEAR LEVEL 3				
2nd Semester / 1st & 2nd Quarter Modules				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit ⁴
The following 2 module/s are COMPULSORY				
MPLC032	S2	Y	32	0.25
MPSA032	S2	Y	32	0.25
Total credits for Semester 2 modules			64	0.5
TOTAL CREDITS FOR YEAR LEVEL 3			128	1
TOTAL CREDITS FOR QUALIFICATION			368	3

DEPARTMENT: ACADEMIC LITERACY AND SCIENCE COMMUNITATION

CURRICULUM INFORMATION

Department: Academic Literacy & Science Communications	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes: N/A

Module Code:	MHEL000				
Module Name:	Health Education and Life Competencies I				
Module Content:	Respect for all forms of life Sexual health Safety in my environment Successful scientific communication Successful study skills Computer literacy				
Learning Outcomes:	<ul style="list-style-type: none"> List different life forms, list differences between humans and explain how to have respect for all living things. Know the basic male and female reproductive structure and function Shortly describe pregnancy and human development List and compare the effectiveness of different methods of contraception Explain what safe sex is and why it is important Know the importance of family planning 				
Learning Outcomes:	<ul style="list-style-type: none"> Know the rights and responsibilities with regard to his/her own body List different types of abuse, define rape and shortly discuss the causes and the health and social effects of abuse and rape Know how to ensure safety at home, in the laboratory and in the future place of work Know some aspects of the South African Occupational Health and Safety Act Know how to plan for his/her future, including financial responsibilities Know how to take notes and study effectively Find good quality scientific information on a variety of topics Write short notes on scientific topics Understand plagiarism, its consequences and how to reference in a correct way Organize & manage activities & observations Identify & solve problems using critical & creative thinking Work effectively as a member of a group Collect, analyze & organise information Communicate effectively using scientific language skills in written form and in presentations Know how to access good scientific information using the internet Know how to use MS Word to type documents Be able to compile factual, scientific documents using a computer 				
Module Information:	SAQA Credits	ITS Course Level Code		CESM Code (3rd Order)	
	12	2		091305	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min.	1 x 3 h	1	0	2 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and summative theory and practical assessments at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%)				
	Min Summative Assessment mark for exam admission (%)				40

Assessment Weighting:	Final Mark =	% Summative Assessment Mark	60		
		% Summative Assessment Mark	40		
	Min Final Assessment mark to pass (%)		50		
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Practical	Theory		
	Duration	3 hrs	3 hrs		
	Sub minimum	40%	40%		

CURRICULUM INFORMATION					
Department:	Academic Literacy & Science Communications			School:	Science & Technology
Last Revision date:	2011			First Year Offered (New):	2013
Replace this Module existing module(s)?	No			If YES, give the module codes:	N/A

Module Code:	MHEB012
Module Name:	Health Education and Life Competencies II
Module Content:	Sexual health Healthy lifestyle My environment influences my health The scientific method Successful scientific communication Information literacy
Learning Outcomes:	<ul style="list-style-type: none"> • Define infertility, list different causes of infertility and shortly explain how it can be treated • Know what abortion is, and understand the consequences of abortions • List and distinguish between different types of sexual orientation • Define sexually transmitted diseases, list some examples of sexually transmitted diseases, and shortly explain the signs and symptoms of these diseases • Explain the effects of HIV on the community and the country • Write short notes on practical advice to living with HIV • Know the importance of being examined for sexually transmitted diseases and what such an examination consists of • Describe the importance of a healthy lifestyle • Know the importance of following a healthy diet and explain what a healthy diet consists of • List and discuss the effects of smoking, alcohol abuse and substance abuse • Understand the importance of exercise and know how often, and which types of exercise to do. • Write short notes on the effects of exposure to sunlight, air pollution and water pollution on the human body • Know what radiation is, list some sources of radiation and shortly describe the effects of radiation on the human body • Review and discuss the scientific method • Find good quality scientific information on a variety of topics • Write short notes on scientific topics • Create slide shows using MS PowerPoint and be able to present such slide shows in class

Learning Outcomes:	<ul style="list-style-type: none"> • Create tables and graphs from scientific data using MS Exell • Be able to create and interpret tables and graphs depicting scientific information • Organize & manage activities & observations • Identify & solve problems using critical & creative thinking • Work effectively as a member of a group • Collect, analyze & organize information • Communicate effectively using scientific language skills in written form and in presentations 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		2		091305
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	1	0	2 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports, and a summative theory assessment at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory and practical assessments (40%)				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory	Theory		
	Duration	3 hrs	3 hrs		
	Sub minimum	40%	40%		

CURRICULUM INFORMATION			
Department:	Academic Literacy & Science Communications	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	N/A

Module Code:	MHEL011
Module Name:	Health Education and Life Competencies I
Module Content:	Respect for all forms of life Sexual health Safety in my environment Successful scientific communication Successful study skills
Learning Outcomes:	<ul style="list-style-type: none"> • List different life forms, list differences between humans and explain how to have respect for all living things • Know the basic male and female reproductive structure and function • Shortly describe pregnancy and human development • List and compare the effectiveness of different methods of contraception • Explain what safe sex is and why it is important • Know the importance of family planning

Learning Outcomes:	<ul style="list-style-type: none"> • Know the rights and responsibilities with regard to his/her own body • List different types of abuse, define rape and shortly discuss the causes and the health and social effects of abuse and rape • Know how to ensure safety at home, in the laboratory and in the future place of work • Know some aspects of the South African Occupational Health and Safety Act • Know how to plan for his/her future, including financial responsibilities • Know how to take notes and study effectively • Find good quality scientific information on a variety of topics • Write short notes on scientific topics • Understand plagiarism, its consequences and how to reference in a correct way • Organize & manage activities & observations • Identify & solve problems using critical & creative thinking • Work effectively as a member of a group • Collect, analyse & organize information • Communicate effectively using scientific language skills in written form and in presentations 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		2		091305
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	1	0	2 hrs
Pre-requisite module/s:	None				
Co-requisites module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and summative theory and practical assessments at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%)				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Practical	Theory		
	Duration	3 hrs	3 hrs		
	Sub minimum	40%	40%		

CURRICULUM INFORMATION					
Department:	Academic Literacy & Science Communications			School:	Science & Technology
Last Revision date:	2011			First Year Offered (New):	2013
Replace this Module existing module(s)?	No			If YES, give the module codes:	N/A

Module Code:	MHEL012
Module Name:	Health Education and Life Competencies II
Module Content:	Sexual health Healthy lifestyle My environment influences my health The scientific method Successful scientific communication

Learning Outcomes:	<ul style="list-style-type: none"> • Define infertility, list different causes of infertility and shortly explain how it can be treated • Know what abortion is, and understand the consequences of abortions • List and distinguish between different types of sexual orientation • Define sexually transmitted diseases, list some examples of sexually transmitted diseases and shortly explain the signs and symptoms of these diseases • Explain the effects of HIV on the community and the country • Write short notes on practical advice to living with HIV • Know the importance of being examined for sexually transmitted diseases and what such an examination consists of • Describe the importance of a healthy lifestyle • Know the importance of following a healthy diet and explain what a healthy diet consist of • List and discuss the effects of smoking, alcohol abuse and substance abuse • Understand the importance of exercise and know how often, and which types of exercise to do. • Write short notes on the effects of exposure to sunlight, air pollution and water pollution on the human body • Know what radiation is, list some sources of radiation and shortly describe the effects of radiation on the human body • Review and discuss the scientific method • Find good quality scientific information on a variety of topics • Write short notes on scientific topics • Be able to create and interpret tables and graphs depicting scientific information • Organize & manage activities & observations • Identify & solve problems using critical & creative thinking • Work effectively as a member of a group • Collect, analyze & organize information • Communicate effectively using scientific language skills in written form and in presentations 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		2		091305
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	1	0	2 hrs
Pre-requisite modules:	None				
Co-requisites modules:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and a summative theory assessment at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory and practical assessments (40%)				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Practical	Theory		
	Duration	3 hrs	3 hrs		
	Sub minimum	40%	40%		
Module Information:	SAQA Credits		ITS Course Level	CESM Code (3rd Order) (Six Numbers)	
	20		2	131205	
Delivery Information:	Campus		Full/Part Time	Period Year/1st/2nd Semester	
	SMU		Contact	Year	
	Classes	Practicals	Tutorial	Seminar	Independent Learning

Periods per week:				s	
		5	3 hours	1	30 hours
Pre-requisite modules for this module:		MZOO011, MZOO012, MCHM011, MCHM012			
Co-requisites modules for module:		No			
Assessment		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment Summative assessment: Test, Quiz and Practicals.			
Assessment criteria (see Annex 1 for assessment criteria grid)		<ul style="list-style-type: none"> Specific educational outcome 1: <ul style="list-style-type: none"> Understand and describe ecological aspects of biodegradation Understand and describe the role of microorganisms in water pollution and treatment. Specific educational outcome 2: <ul style="list-style-type: none"> Understand and describe water quality testing and purification technology 			
Assessment methods		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment For the practicals students will write a practical exam and submit a report on research carried out during the course. Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme. Final portfolio contains completed pre- and post-module questionnaires, Blackboard assessment results, and practice certificates for Modules 6 to 11.			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Formative Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory/Practical	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

DEPARTMENT: BIOCHEMISTRY & BIOTECHNOLOGY

CURRICULUM INFORMATION			
Department:	Biochemistry & Biotechnology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module Code:	MBIA021				
Module Name:	Essential biomolecules, functions and signal transduction				
Module Content:	pH, water and buffers; Ionization of water; weak acids and weak bases and their titration curves; Structure and function of amino acids and their side chains in relation to their surroundings; Proteins and their primary, secondary, tertiary and quaternary structures, which includes all the stabilizing forces involved, kinetics and vitamins ;Introduction of fundamental biochemical concepts of nucleic acids, lipids and carbohydrates; Chemistry of nucleic acids and their phosphorylated derivatives and their importance; Structure and functions of fatty acids, terpenoids, triacylglycerols, phospholipids and nature of biological membranes; Structure and functions of simple sugars and their properties; Signal transduction (mechanism and pathways to include nature of hormone action, signal transduction receptors, G-proteins, second messenger systems, steroid and intracellular receptors)				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Explain water as a component of living organisms, as universal solvent, and how it influences the properties of many important components of the cell • Explain the basis for the classification of amino acids according to whether the side chain group is aromatic, polar or non-polar; positively or negatively charged and know that amino acids have chemical functional groups that can participate in hydrogen bonding • Explain the structure of proteins in terms of peptide bonds and discuss the characteristics of primary, secondary, tertiary and quaternary structures of proteins, different types of protein stabilization and functions of proteins • Know the properties, functions, basic kinetics of enzymes and their applications • Discuss the structures, stereochemistry, reactions and functions of monosaccharides, polysaccharides and oligosaccharides • Describe the similarities and differences between the structures and functions of DNA and RNA • Demonstrate an understanding of lipid chemistry and structure • Demonstrate an understanding of the structure and composition of biological membranes • Demonstrate an understanding of the function of the membrane with regard to transport of molecules across the membrane and the role of the membrane and its various components in signal transduction 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		130201
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	Per arrangement	0	8 hrs
Pre-requisite modules:	MCHM011 & MCHM012				
Co-requisite modules:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			

Assessment Paper:	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department: Biochemistry & Biotechnology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MBIA022				
Module Name:	Bioenergetics and intermediary metabolisms				
Module Content:	Standard free energy change; Coupling of production and use of energy; Calculations of free energies; Overview of the glycolytic pathway; Anaerobic reactions of pyruvate; Control of glycogen metabolism; Control mechanisms of carbohydrate metabolism; Oxidative and non-oxidative pathways; Control of pentose phosphate pathway; The role of the citric acid cycle in metabolism; Energetics and control of the citric acid cycle; The glyoxylate pathway; Catabolism of lipids; The energy yield from oxidation of fatty acids; Formation of ketone bodies; The anabolism of fatty acids; The anabolism of acylglycerols and compound lipids; The anabolism of cholesterol; The role of electron transport in metabolism; Electron transport from NADH to oxygen; The coupling of oxidation to phosphorylation; Respiratory inhibitors and uncouplers; Shuttle mechanisms between mitochondria and cytosol; The ATP yield from complete oxidation of glucose; Energy considerations in glycolysis; An overview of the Nitrogen Cycle; Regulation of Nitrogen Metabolism; Catabolism of Amino Acids; Biosynthesis of amino acids; Inborn Errors of Metabolism Involving Amino Acids and their Derivatives; Anabolism of Purine Nucleotides; Catabolism and Salvage Pathways for Purine Nucleotides; Metabolic Defects Associated with Purine Nucleotide Metabolism; Metabolic Defects Associated with Pyrimidine Nucleotide Metabolism; The Reduction of Ribonucleotides to Deoxyribonucleotides; Thymine Biosynthesis				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Understand the principles of Thermodynamics • Know the metabolism of carbohydrates and lipids • Calculate ATP used/produced during metabolism • Know the metabolism of nitrogen and amino acids • Understand the biosynthesis and degradation of purine and pyrimidine ribonucleotides 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		130201
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	Per arrangement	0	8 hrs
Pre-requisite modules:	MCHM011 & MCHM012				
Co-requisite module:	MBIA021				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports, and summative theory assessment at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biochemistry & Biotechnology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module Code:	MBIA031				
Module Name:	Proteins, enzymes and biochemical techniques				
Module Content:	Protein Primary structure; Protein secondary and tertiary structure; Overview of use of bioinformatics in protein structure and function; Quaternary Structure and Structure/Function Relationships; Enzymology, assays and kinetics; Enzyme Inhibition; Basic laboratory principles, safety and statistics; Basic laboratory techniques: fractionation; centrifugation; dialysis and ultrafiltration; photometry; Radioisotopes; Protein purification and characterization techniques; Overview of modern protein structure determination techniques				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Master the information on protein structure and function and apply it to varying practical situations and problem solving • Use a multidisciplinary approach to evaluate information given on protein structure and function to give evidence for and against different theories • Communicate an understanding of the subject matter in both the oral and written forms • Create new information on protein structure and function using the concepts learnt • Holistically use the information in the module to solve problems on protein isolation and characterization techniques 				
Module Information:	SAQA Credits	ITS Course Level Code		CESM Code (3 rd Order)	
	32	3		130201	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 3 hrs	Per arrangement	0	10 hrs
Pre-requisite modules:	MBIA021 and MBIA022				
Co-requisite modules:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, assignments, short summative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment Paper:	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biochemistry & Biotechnology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	BIOC302

Module Code:	MBIA032
Module Name:	Gene structure, function and molecular biology

Module Content:	DNA Metabolism; Gene Expression and Regulation; Biochemistry of Viruses – Structure & function; Regulation of Eukaryotic Cell Cycle Controls; Genetic Basis of Cancer – An Introduction; Basic Molecular Biology Techniques; Recombinant DNA Technology; PCR and Applications; Sequencing Techniques				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Understand the chemistry and structure of DNA and RNA, and to understand their functional importance in biochemical reactions • Understand the complexity of DNA organization, replication, mutation, damage and repair, recombination & transposition • Understand the meaning of genes and genomes • Understand and outline the flow (Central Dogma) and regulation of genetic information with particular emphasis on the events leading to RNA synthesis (transcription) and protein synthesis (translation) in both the prokaryotic and eukaryotic systems 				
Learning Outcomes:	<ul style="list-style-type: none"> • Understand all concepts regarding recombinant DNA technology i.e., gene cloning, cloning vectors, gene libraries and associated screening techniques • To discuss tumour viruses and oncogenes • To discuss different types of PCRs and their applications • To understand the molecular mechanisms of the regulation of eukaryotic cell division cycle. • Discuss different kinds of sequencing and sequence analysis using a GENEBANK • To understand the molecular mechanisms of cancer and the types of genetic change involved in carcinogenesis • Discuss the molecular biology advances that have potential for development of new cancer therapies • Describe nucleic acid isolation/purification and hybridization techniques • Demonstrate an understanding of some latest functional genomics techniques 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	32		3		130203
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 3 hrs	Per arrangement	0	10 hrs
Pre-requisite modules	MBIA021 and MBIA022				
Co-requisite modules for	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, assignments, short summative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment Paper:	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION					
Department:	Biochemistry & Biotechnology			School:	Sciences & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			

Module Code:	BTEC201				
Module Name:	Cellular Biology				
Content:	Structure, function, and biosynthesis of cellular membranes and organelles; cell growth and oncogenic transformation; transport, receptors, and cell signaling; the cytoskeleton, the extracellular matrix, and cell movements and chromatin structure. Molecular mechanisms of DNA replication, repair, transcription, protein synthesis, and gene regulation in different organisms. genome editing techniques, RNA polymerase dynamics, and regulation of gene expression by different types of RNAs. Techniques and procedures commonly utilized in modern cell and molecular biology research				
Learning Outcomes:	<ul style="list-style-type: none"> • Understand how molecular machines are constructed and regulated so that they can accurately copy, repair, and interpret genomic information. • Appreciate that molecular biology is a dynamic and ever-changing experimental science. • Distinguish between different molecular biology techniques that are used to isolate, separate, and probe for specific proteins, nucleic acids, and their interactions. Identify limitations of these techniques. • Compare and contrast the mechanisms of bacterial and eukaryotic DNA replication, DNA repair, transcription, and translation. • Explain how DNA topology and chromatin structure affects the processes of DNA replication, repair, and transcription. • Give examples of DNA and histone modifications and predict how they will affect gene expression. • Describe mechanisms by which DNA can be damaged and describe the molecular mechanisms by which protein complexes repair different forms of DNA damage. • Explain how endogenous biological processes like site-specific recombination, transposition, and the bacterial CRISPR-Cas9 system are being used to modify eukaryotic genomes. • Describe how pre-mRNA splicing occurs and explain how alternative splicing generates protein diversity. 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	20		2		130401
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Full		2/1 ST Sem
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	3 hours	1		40 hours
Pre-requisite modules for this module:	MBIO011, MZOO012, MCHM011, MCHM012				
Co-requisites modules for module:	BTEC202. BTEC 203 and BTEC 204				
Assessment	Formative assessment: <ul style="list-style-type: none"> • Theoretical and Practical testing at end of Module with feedback. • Draft Portfolio of Cellular Biology Theory and Practice assessed mid-year. Summative assessment:				
	Final Portfolio of Cellular Biology Theory and Practice assessed at end of programme.				

Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> Understand how molecular machines are constructed and regulated so that they can accurately copy, repair, and interpret genomic information. Specific educational outcome 2: <ul style="list-style-type: none"> Distinguish between different molecular biology techniques that are used to isolate, separate, and probe for specific proteins, nucleic acids, and their interactions. Identify limitations of these techniques. 			
Assessment methods		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment. During the programme students to develop a Portfolio of Cellular Biology Theory and Practice. A first draft of this portfolio (including completed pre- and post-module questionnaires with proof of Blackboard assessments) to be assessed mid-year; with formative feedback given for improvement. Summative assessment: Test and Practicals			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Formative Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

CURRICULUM INFORMATION					
Department:	Biochemistry & Biotechnology			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			

Module Code:	BTEC202
Module Name:	Introduction to Biotechnology
Content:	Definition, scope and development of Biotechnology, Bioethics and Bioinformatics. Use of in vitro genetic manipulations and recombinant DNA methods to genetically alter plants, animals, and microbes. Use of biotechnology in health care, agriculture, environmental bioremediation and energy production as well as an ethics course that examines the social and legal ramifications of biotechnical advances
Learning Outcomes:	<ul style="list-style-type: none"> Define Biotechnology and explain the scope Biotechnology Understand the concepts of Bioethics and Bioinformatics and their application in Biotechnology Understand the concept of genetic engineering Understand the principles of recombinant DNA technology

	<ul style="list-style-type: none"> Understand and explain the use of and recombinant DNA methods to genetically alter plants, animals, and microbes 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	20		2		131101
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Contact/Full Time		2/2 nd Sem
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	3 hours	1		40 hours
Pre-requisite modules for this module:	MBIO011, MZOO012, MCHM011, MCHM012				
Co-requisites modules for module:	BTEC201. BTEC 203 and BTEC 204				
Assessment	<ul style="list-style-type: none"> Formative assessment: Theoretical and Practical Assessment. Draft Portfolio of Biotechnology Theory and Practice assessed mid-year. Summative assessment: Final Portfolio of Biotechnology Theory and Practice assessed at end of programme. 				
Assessment criteria (see Annex 1 for assessment criteria grid)	<p>Specific educational outcome 1:</p> <ul style="list-style-type: none"> Understand the scope Biotechnology Understand the concepts of Bioethics and Bioinformatics and their application in Biotechnology Specific educational outcome: Explain how vaccines are distributed Understand the concept of genetic engineering Understand the principles of recombinant DNA technology 				
Assessment methods	<p>Formative assessment:</p> <ul style="list-style-type: none"> Theoretical and Practical Assessment During the programme students to develop a Portfolio of Biotechnology Theory and Practice. A first draft of this portfolio (including completed pre- and post-module questionnaires with proof of Blackboard assessments) to be assessed mid-year; with formative feedback given for improvement. <p>Summative assessment: Test, Quiz and Practicals</p>				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%		
		% Formative Assessment Mark	60%		
		% Summative Assessment Mark	40%		
	Minimum final mark to pass (%)		50%		
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

CURRICULUM INFORMATION							
Department: Biochemistry & Biotechnology			School: Science & Technology				
Last Revision date: 2019		First Year Offered (New):		2020			
Replace this Module existing module(s)?		No		If YES, give the module codes:			
Module Code:			BTEC 203				
Module Name:			Introduction to Microbiology				
Content:			History and development of microbiology. Key concepts in microbiology. Classification and characterization of the different types of microorganisms. Comparison of prokaryotic and eukaryotic cells. Nutritional and requirement and microbiological media, cultivation and growth of microorganisms. Physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and membrane components. Bacterial toxins and Methods for identification of bacteria				
Learning Outcomes:			<ul style="list-style-type: none"> Understand the history and development of microbiology Discuss key concepts in microbiology Classify and characterize different types of microorganisms Differentiate between prokaryotic and eukaryotic cells Describe the nutritional requirements of bacteria Discuss the nature and uses of different types of bacteria growth media Describe the physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and bacterial components Understand and describe different methods for identification of bacteria 				
Module Information:		SAQA Credits		ITS Course Level		CESM Code (3 rd Order) (Six Numbers)	
		20		2		130501	
Delivery Information:		Campus		Full/Part Time		Period Year/1 st /2 nd Semester	
		SMU		Contact		2/1 st Sem	
Periods per week:		Classes	Practicals	Tutorial	Seminars	Independent Learning	
		5	3 hours	1		40 hours	
Pre-requisite modules for this module:			MBIO011, MZOO012, MCHM011, MCHM012				
Co-requisites modules for module:			BTEC202. BTEC 202 and BTEC 204				
Assessment			Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment Draft Portfolio of introduction to microbiology Theory and Practice assessed mid-year. Summative assessment: Test, Quiz and Practicals				
Assessment criteria (see Annex 1 for assessment criteria grid)			Specific educational outcome 1: <ul style="list-style-type: none"> Classify and characterize different types of microorganisms Differentiate between prokaryotic and eukaryotic cells Specific educational outcome 2: <ul style="list-style-type: none"> Describe the nutritional requirements of bacteria Discuss the nature and uses of different types of bacteria growth media Describe the physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and bacterial components Understand and describe different methods for identification of bacteria 				

Assessment methods		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment Summative assessment: Test, Quiz and Practical. During the programme students to develop a Portfolio of Environmental and Fungal Microbiology Theory and Practice. A first draft of this portfolio (including completed pre- and post-module questionnaires with proof of Blackboard assessments) to be assessed mid-year; with formative feedback given for improvement. 			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Formative Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

CURRICULUM INFORMATION					
Department:	Biochemistry & Biotechnology			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			

Module Code:	BTEC 204		
Module Name:	Immunology: Concepts, Mechanisms and Applications in Biotechnology		
Content:	Innate and acquired immunity. Cells of the immune system and their development, pattern recognition receptors and innate immunity, molecular mechanisms of antigen processing and presentation, long distance communication and immune cells' migration, homing, and trafficking. The workings of the mammalian immune system; Application of immunology in Biotechnology and autoimmune diseases; Use of immunotherapy in industry will also be discussed.		
Learning Outcomes:	<ul style="list-style-type: none"> Differentiate between innate and adaptive immunity Describe the development of both B-lymphocytes and T-lymphocytes Describe the classification and structure of antibodies Understand the biochemical, molecular, cellular, and organ-level principles that govern the workings of the mammalian immune system. Describe molecular mechanisms of antigen processing and presentation Describe the application of immunology in Biotechnology 		
Module Information:	SAQA Credits		CESM Code (3rd Order) (Six Numbers)
	20	2	130505

Delivery Information:		Campus		Full/Part Time		Period Year/1st/2nd Semester	
		SMU		Contact		Year	
Periods per week:		Classes	Practicals	Tutorial	Seminars	Independent Learning	
		5	3 hours	1		40 hours	
Pre-requisite modules for this module:		MBIO011, MZOO012, MCHM011, MCHM012					
Co-requisites modules for module:		BTEC201. BTEC 202 and BTEC 203					
Assessment		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment. Summative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment 					
Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> Differentiate between innate and adaptive immunity Describe the development of both B-lymphocytes and T-lymphocytes Describe the classification and structure of antibodies Specific educational outcome 2: <ul style="list-style-type: none"> Understand the biochemical, molecular, cellular, and organ-level principles that govern the workings of the mammalian immune system. Describe molecular mechanisms of antigen processing and presentation Describe the application of immunology in Biotechnology Understand and describe ecological aspects of biodegradation 					
Assessment methods		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment. Summative assessment: Final Portfolio of Environmental and Fungal Microbiology Theory and Practice assessed at end of programme. Final portfolio contains completed pre- and post-module questionnaires, Blackboard assessment results, and practice certificates for Modules 6 to 11					
Mark Structure:		Minimum Form Assessment Mark for exam admission (%)		40%			
		% Formative Assessment Mark		60%			
		% Summative Assessment Mark		40%			
		Minimum final mark to pass (%)		50%			
Summative Assessment Paper:				Paper 1	Paper 2	Paper 3	Paper 4
		Theory/Practical		Theory	N/A	N/A	N/A
		Duration		3hrs	N/A	N/A	N/A
		% contribution to Summative Assessment Mark		100%	N/A	N/A	N/A
		Sub minimum		40%	N/A	N/A	N/A

CURRICULUM INFORMATION

Department:	Biochemistry & Biotechnology			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		

Replace this Module existing module(s)?	No	If YES, give the module codes:	
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Module Code:	BTEC 301				
Module Name:	Industrial and Environmental Biotechnology				
Content:	Biocatalysis and Biotransformation, Industrial enzymology and immobilization of enzymes. Approaches to enzyme modification and large-scale industrial enzyme applications. Bioreactor design and product yield, introduction to process control and management. Use of Biotechnological techniques in Forensic Science, Wildlife, Fisheries, and Forestry Management as well as in the management of Greenhouse gases, Floral Design and Environmental Science				
Learning Outcomes:	<ul style="list-style-type: none"> • Understand the principles of Biocatalysis and Biotransformation • Describe the production of enzymes used in Industrial Biotechnology • Describe the different methods of modifying enzymes for industrial usage • Understand and describe the different applications of enzymes in Biotechnology • Understand and describe the concept of enzyme engineering • Describe the different methods of mobilizing enzymes • Describe the properties of immobilized enzymes • Describe the use of biotechnology in Forensic medicine and Environmental science 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	30		3		131101
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Full		Year
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	3 hours	1		30 hours
Pre-requisite modules for this module:	BTEC 201; BTEC 202, BTEC 203, BTEC 204, MBIA021 & MBIA022				
Co-requisites modules for module:	BTEC 302, BTEC 303 and BTEC 304				
Assessment	Formative assessment: Theoretical and Practical Assessment <ul style="list-style-type: none"> • Draft Portfolio of Environmental Science Theory and Practice assessed mid-year. Summative assessment: <ul style="list-style-type: none"> • Test, Quiz and Practicals. 				
Assessment criteria (see Annex 1 for assessment criteria grid)	Specific educational outcome 1: <ul style="list-style-type: none"> • Understand the principles of Biocatalysis and Biotransformation • Describe the production of enzymes used in Industrial Biotechnology • Describe the different methods of modifying enzymes for industrial usage Specific educational outcome 2: <ul style="list-style-type: none"> • Understand and describe the different applications of enzymes in Biotechnology • Understand and describe the concept of enzyme engineering • Describe the different methods of mobilizing enzymes • Describe the properties of immobilized enzymes 				
Assessment methods	Formative assessment: Theoretical and Practical Exam- Summative assessment: Test and Practicals				
Mark	Minimum Form Assessment Mark for exam admission (%)		40%		
	% Formative Assessment Mark		60%		

Structure:	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

CURRICULUM INFORMATION					
Department:	Biochemistry & Biotechnology			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			

Module Code:	BTEC 302				
Module Name:	Plant and Microbial Biotechnology				
Content:	Micro-propagation and adaptation of plants to specific conditions. Production and use of transgenic plants. Genetically modified crops. . Production and development of plant-made pharmaceuticals . Production and development of plant-made pharmaceuticals. Microbial fermentation. Thermophilic, Pschothrophic, actinomycetes and extremophilic bacteria. Production and use of genetically altered microorganisms such as E. coli or yeast for the production of pharmaceuticals and antibiotics				
Learning Outcomes:	<ul style="list-style-type: none"> Define and explain the concept of micro-propagation Describe the production and use of transgenic plants Describe the production and use of genetically modified crops Describe the production and development of man-made pharmaceuticals Describe the process and use of microbial fermentation Describe the different types of bacteria that are used in Biotechnology Understand the production and use of genetically altered microorganism for production of pharmaceuticals and antibiotics 				
Module Information:	SAQA Credits		ITS Course Level	CESM Code (3rd Order) (Six Numbers)	
	30		3	131101	
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Full		Year
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	3hours	1		30 hours
Pre-requisite modules for this module:	BTEC 201 2, BTEC 203, BTEC 204, MBIA021 and MBIA022				

Co-requisites modules for module:		BTEC 301, BTEC 302 and BTEC 304			
Assessment		Formative assessment: <ul style="list-style-type: none"> Practical and Theoretical Assessment Summative assessment: Final Portfolio of Biotechnology Theory and Practice assessed at end of programme.			
Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> Define and explain the concept of micro-propagation Describe the production and use of transgenic plants Describe the production and use of genetically modified crops Describe the production and development of man-made pharmaceuticals Specific educational outcome 2: <ul style="list-style-type: none"> Describe the process and use of microbial fermentation Describe the different types of bacteria that are used in Biotechnology Understand the production and use of genetically altered microorganism for production of pharmaceuticals and antibiotics. 			
Assessment methods		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment For the practicals students visit a company and understand various processes involve in monitoring pollutants. Students are expected to submit a report. Summative assessment: Report on visit to Industrial Companies, Practical and Tests			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)			40%	
	% Formative Assessment Mark			60%	
	% Summative Assessment Mark			40%	
	Minimum final mark to pass (%)			50%	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

CURRICULUM INFORMATION					
Department:	Biochemistry & Biotechnology			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			
Module Code:	BTEC 303				
Module Name:	Biosensors and Biochips				

Content:	Conventional biosensors based on whole cells, nucleic acids, antibodies and enzymes (e.g., enzymatic glucose monitoring) as well as new and emerging technologies related to designing, fabricating and applying multi-array biochips and micro-fluidic systems (lab-on-the-chip). The interface between biotechnology, nanotechnology and micro-electronics industries.				
Learning Outcomes:	<ul style="list-style-type: none"> • Understand the basic principles of biosensors design and their applications. • Understand the basic principles of biochip design and its applications. • Describe and understand the applications of biosensors and biochips in health care, medical diagnostics, defense and other areas. 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	30		3		131101
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Full		Year
Periods per week:	Classes	Practical's	Tutorial	Seminars	Independent Learning
	5	3 hours	1		40 hours
Pre-requisite modules for this module:	BTEC 201 and BTEC 202, BTEC 203, BTEC 204, MBIA 021 & MBIA 022				
Co-requisites modules for module:	BTEC 301, BTEC 302 and BTEC 304				
Assessment	Formative assessment: <ul style="list-style-type: none"> • Theoretical and Practical Assessment. Summative assessment: Final Portfolio of Biotechnology Theory and Practice assessed at end of programme.				
Assessment criteria: (see Annex 1 for assessment criteria grid)	Specific educational outcome 1: <ul style="list-style-type: none"> • Understand and describe the central dogma of molecular biology (DNA replication, transcription and translation) in prokaryocytes • Describe the causes, types and mechanisms of mutation in prokaryocytes • Describe microbial sex and conjugation Specific educational outcome 2: <ul style="list-style-type: none"> • Understand the nature and use of plasmids and bacteriophages • Understand concepts and use of genetic engineering • Understand and describe the principles of nucleic acid mapping, hybridization, sequencing and self-directed mutagenesis 				

Assessment methods		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment. For the practicals students attend visit a Microbiology laboratory and understand various management practices. Summative assessment:				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%			
		% Formative Assessment Mark	60%			
		% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)		50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/Practical		Theory	N/A	N/A	N/A
	Duration		3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark		100%	N/A	N/A	N/A
	Sub minimum		40%	N/A	N/A	N/A

CURRICULUM INFORMATION					
Department:	Biochemistry & Biotechnology			School:	Science & Technology
Last Revision date:	2019		First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module Code: (4 alphabetic & 3 numeric)	BTEC 304				
Module Name:	Biotechnology and Health Care				
Content:	An overview of key cutting-edge technologies such as stem-cell research and therapeutic cloning. Human Genome Project and its implications for health care and epigenetic modifications of the genome and their role in disease. The role of biotechnology in managing a number of sociologically high-impact diseases in developed and developing				
Learning Outcomes:	<ul style="list-style-type: none"> Understand the role of biotechnology in health care systems Understand and describe the principle of and application of stem cell research in health care Understand and describe the principle and application of therapeutic cloning Describe the Human Genome Project and its implication for health care Describe epigenetic and epigenetic modification mechanisms and their roles in disease 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	30		3		131101
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Full		Year
	Classes	Practical's	Tutorial	Seminars	Independent Learning

Periods per week:		5	3 hours	1		30 hours
Pre-requisite modules for this module:		BTEC 201 and BTEC 202, BTEC 203, BTEC 204, MBIA 021 & MBIA 022				
Co-requisites modules for module:		BTEC 301, BTEC 302 and BTEC 303				
Assessment		Formative assessment: <ul style="list-style-type: none"> • Practical and Theoretical Assessment • Draft Portfolio of Environmental Science Theory and Practice assessed mid-year. Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme.				
Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> • Understand different concepts in environmental legislation. • Understand the need for environmental sustainability. Specific educational outcome 2: <ul style="list-style-type: none"> • Explain various methods of environmental administration in South Africa. 				
Assessment methods		Formative assessment: <ul style="list-style-type: none"> • Theoretical and Practical Assessment. • For the practicals students attend will visit a nearby community and discuss issues around environmental management. Student will submit a report on the attitude and feelings towards environmental management Summative assessment:				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%			
		% Formative Assessment Mark	60%			
		% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)		50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/Practical	Theory/Practical	N/A	N/A	N/A	
	Duration	3hrs	N/A	N/A	N/A	
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A	
	Sub minimum	40%	N/A	N/A	N/A	

DEPARTMENT: BIOLOGY & ENVIRONMENTAL SCIENCES

CURRICULUM INFORMATION

Department: Biology & Environmental Sciences	School: Science & Technology
Last Revision date: 2018	First Year Offered (New): 2019
Replace this Module existing module(s)? Yes	If YES, give the module codes: MBIO000 (in part)

Module Code:	MBIO000
Module Name:	Introduction to Life Science Studies I

Module Content:	An introduction to biology with the emphasis on general laboratory procedures, basic microscopy skills, scientific method, biological terminology and the introduction to fields of Evolution (origin of life; genetics of evolution; evidence of macroevolution), Introduction to Ecology (ecosystems; biomes of the world; carbon-nitrogen and phosphorous cycles; point and non-point sources of pollution; air, soil, water, and noise pollution), Taxonomy and Systematics (characteristics of living organisms; groupings of organisms and the Kingdoms of life), Embryology (an introduction to developmental biology), Cytology (chemistry of biological molecules, classes of biological molecules, cell types and cellular structure; cellular transport, energy storage and release during chemical reactions, enzymes regulate chemical reactions in living organisms, ATP as primary energy carrier; mitosis and meiosis), Genetics (Mendelian genetics) and an introduction to fundamental concepts of Ecology, Environmental health and Pollution				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Understand the historical ideas of the “evolution” of evolutionary thinking • Know the changes that occurred on planet earth throughout time • Apply genetics as background of evolution and evaluate the evidence for macroevolution • List the elements of the chemistry of life • Compare the structure of cells • Distinguish between mitosis and meiosis • Apply the principles of genetics, Mendelian patterns of inheritance and exceptions • Understand the phenomenon known as a mutation, and the types of mutations • Understand the importance of human genetics and genetics in agriculture, forensics and medicine • Describe the basic ecological concepts, biomes of the world • Distinguish between the carbon, water, nitrogen and phosphorous cycles • Evaluate the threat of pollution, destruction of the environment by man • Discuss the measures of ecosystem health, the impact of alien plant and animal invasion • Discuss the impact of the use of insecticides on the environment • Discuss the cause of man-made disasters, pollution, ozone depletion and greenhouse effects • Apply the binomial nomenclature system, taxonomic Kingdom. • List the characteristics of the Kingdom Protista, Phyla Porifera, Cnidaria, Platyhelminthes, Nematoda, Mollusca, Annelida, Arthropoda, Echinodermata and Chordata • Describe the reproductive system, gametogenesis, the ultrastructure of gametes (of humans); • Discuss the process of fertilization, cleavage and gastrulation in mammals • Apply the early development of Branchiostoma and avian embryo to human embryology • Discuss the early development of the mammalian embryo in terms of general embryology 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		3		130101
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 40 min	1 x 3 hrs	Per arrangement	0	1.25 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final mark =			% Formative Assessments Mark	60
				% Summative Assessments Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences	School:	Science & Technology
Last Revision date:	2018	First Year Offered (New):	2019
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	MBIB000 (in part)

Module Code:	MBIB000				
Module Name:	Introduction to Life Science Studies II				
Module Content:	Introduction of fundamental concepts of parasitology with reference to medical and pharmaceutical importance. A comparative study of the anatomy and physiology of selected vertebrate systems (epithelial-, connective, (blood & bone). muscular- and nervous tissues; digestive-, skeletal-, respiratory-, nervous-, muscular-, endocrine and circulatory systems)				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Define the general biological terms used in parasitology • Identify and discuss different types of medically important parasites • Define and explain different types of carriers/vectors of sickness-producing organisms • Name and describe the structure and functions of epithelia tissues, connective tissues, muscle tissue and nervous tissue • Explain the anatomy and growth of bones • Discuss the role of blood • Demonstrate the structure and function of the human respiratory system, digestive system, circulatory system, and skeletal system • Describe skeletal muscle contraction and aerobic and anaerobic muscle activity • Describe the autonomic nervous system • Differentiate between endocrine and exocrine systems • List the different functions of the different endocrine in the body • Discuss tropic hormones, pineal glands and circadian rhythm 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		3		130601
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 40 min	1 x 3 hrs	Per arrangement	0	1.25 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =			% Formative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Biology & Environmental Sciences	School: Science & Technology
Last Revision date: 2018	First Year Offered (New): 2019
Replace this Module existing module(s)? Yes	Give the module codes: MBIO011 (in part)

Module Code:	MBIO011				
Module Name:	Introduction to Biological Studies				
Module Content:	An introduction to biology with the emphasis on the scientific method, biological terminology and the introduction to fields of Evolution (origin of life; genetics of evolution; evidence of macroevolution), Introduction to Ecology (ecosystems; biomes of the world; carbon- nitrogen and phosphorous cycles; point and non-point sources of pollution; air, soil, water, and noise pollution), Taxonomy and Systematics (characteristics of living organisms; groupings of organisms and the Kingdoms of life), Embryology (an introduction to developmental biology), Cytology (chemistry of biological molecules, classes of biological molecules, cell types and cellular structure; cellular transport, energy storage and release during chemical reactions, enzymes regulate chemical reactions in living organisms, ATP as primary energy carrier; mitosis and meiosis) and Genetics (Mendelian genetics)				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Understand the historical ideas of the "evolution" of evolutionary thinking • Know the changes that occurred on planet earth throughout time • Apply genetics as background of evolution and evaluate the evidence for macroevolution • List the elements of the chemistry of life • Compare the structure of cells • Distinguish between mitosis and meiosis • Apply the principles of genetics, Mendelian patterns of inheritance and exceptions • Understand the phenomenon known as a mutation, and the types of mutations • Understand the importance of human genetics and genetics in agriculture, forensics and medicine • Describe the basic ecological concepts, biomes of the world • Distinguish between the carbon, water, nitrogen and phosphorous cycles • Evaluate the threat of pollution, destruction of the environment by man • Discuss the measures of ecosystem health, the impact of alien plant and animal invasion • Discuss the impact of the use of insecticides on the environment • Discuss the cause of man-made disasters, pollution, ozone depletion and greenhouse effects • Apply the binomial nomenclature system, taxonomic Kingdoms • List the characteristics of the Kingdom Protista, Phyla Porifera, Cnidaria, Platyhelminthes, Nematoda, Mollusca, Annelida, Arthropoda, Echinodermata and Chordata • Describe the reproductive system, gametogenesis, the ultrastructure of gametes (of humans); • Discuss the process of fertilization, cleavage and gastrulation in mammals • Apply the early development of Branchiostoma and avian embryo to human embryology • Discuss the early development of the mammalian embryo in terms of general embryology 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	12		3		130101
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 40 min	1 x 3 hrs	Per arrangement	0	3.5 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =		% Formative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences	School:	Science & Technology
Last Revision date:	2018	First Year Offered (New):	2019
Replace this Module existing module(s)?	Yes	Give the module codes:	MZOO012 (in part)

Module Code:	MZOO012				
Module Name:	Animal Biology				
Module Content:	Introduction of fundamental concepts of parasitology with reference to medical and pharmaceutical importance. A comparative study of the anatomy and physiology of selected vertebrate systems (epithelial-, connective, (blood & bone). muscular- and nervous tissues; digestive-, skeletal-, respiratory-, nervous-, muscular-, endocrine and circulatory systems)				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Define the general biological terms used in parasitology • Identify and discuss different types of medically important parasites • Define and explain different types of carriers/vectors of sickness-producing organisms • Name and describe the structure and functions of epithelia tissues, connective tissues, muscle tissue and nervous tissue • Explain the anatomy and growth of bones • Discuss the role of blood • Demonstrate the structure and function of the human respiratory system, digestive system, circulatory system, and skeletal system • Describe skeletal muscle contraction and aerobic and anaerobic muscle activity • Describe the autonomic nervous system • Differentiate between endocrine and exocrine systems • List the different functions of the different endocrine in the body • Discuss tropic hormones, pineal glands and circadian rhythm 				
Module Information:	SAQA Credits		ITS Course Level Code	CESM Code (3rd Order)	
	12		3	130601	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 40 min	1 x 3 hrs	Per arrangement	0	3.5 hrs
Pre-requisite module/s:	Compulsory registration of BIO010M and/or MBIO011				
Co-requisites module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =			% Formative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences	School:	Science & Technology
Last Revision date:	2018	First Year Offered (New):	2019
Replace this Module existing module(s)?	Yes	Give the module codes:	MZOA021 (in part)

Module Code:	MZOA021				
Module Name:	Biodiversity of Invertebrates				
Module Content:	Systematic review and adaptive biodiversity of the invertebrates and non-vertebrate chordates: Protists, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nemertea, Nematoda, Mollusca, Annelida, Arthropoda, and Echinodermata. Non-vertebrate chordates: Hemichordata, Urochordata, Cephalochordata, Agnatha and Chondrichthyes. The economic importance and effect on humans of parasitic forms will be highlighted. Poisonous or venomous animals in each group will be studied in terms of the poisonous or venomous structures, type of toxin, effect on humans and possible treatment of toxin				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Distinguish between morphological characteristics of Protists, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nemertea, Nematoda, Mollusca, Annelida, Arthropoda, and Echinodermata • Evaluate and compare the functions of all organ systems and related structures in the diverse invertebrate phyla • Describe the life cycle strategies and survival potential of various invertebrate groups • Define invertebrate terminology and exemplify these on behalf of examples • Evaluate and discuss the evidence that links hemichordates to chordates • Understand and compare between the diverse body structure and function of representatives of hemichordate and lower chordate subgroups • Assess and discuss the adaptive nature of the body structure and organization of representatives of hemichordates and lower chordates to their way of life • Evaluate and compare the reproductive and development strategies of the representatives of hemichordates and lower chordates 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		130601
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 40 min	1 x 3 hrs	2 x 40 min	0	5 hrs
Pre-requisite module/s	MBIO011 & MZOO012				
Co-requisite module/s	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =			% Formative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2018		First Year Offered (New): 2019
Replace this Module existing module(s)?	Yes		Give the module codes: MZOB022 (in part)

Module Code:	MZOB022				
Module Name:	Adaptive Biodiversity of Vertebrates				
Module Content:	The module comprehensively illustrates the diversity of animal life at vertebrate level (Pisces, Amphibia, Reptilia and Aves). Relationships among groups, basic body plans and adaptations to make the most of and be successful in their respective environments are examined. The module is based on review, morpho-functional and adaptation studies of vertebrates. Additionally, specific examples of poisonous and venomous animals in each group will be highlighted as well as their poisonous or venomous structures, effects and possible treatment				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Discuss fish evolution and transition to amphibians and modern fish • Understand and compare between the diversity body structure and function of representatives of bony fishes • Recognize the integration of fishes with another relevant affecting human and environmental health • Understand the origin and evolution of tetrapods • Know the diversity, classification, structure and functional adaptation of modern day amphibians • Understand the status of modern-day amphibians and identify the South African frogs • Critically evaluate the origin and evolution of higher vertebrate classes • Define and explain the external and internal morphology of the classes Reptilia and Aves • Recognize and demonstrate an understanding of the general physiology and special adaptations of reptiles and birds • Discuss the general and unique behavioural patterns occurring in reptiles and birds • Critically evaluate the classification of reptiles and birds 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	20		3		130601
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 40 min	1 x 3 hrs	2 x 40 min	0	5 hrs
Pre-requisite module/s:	MBIO011 & MZOO012				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =			% Formative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2018		First Year Offered (New): 2019
Replace this Module existing module(s)?	Yes		Give the module codes: BLGY301 & MZOA031(in part)

Module Code:	MZOA031				
Module Name:	Ecology				
Module Content:	<p>Basic ecology: in which the fundamental ecological concepts are illustrated with a balanced overview of the applications of these concepts in populations, communities and ecosystems. Animal associations are discussed as the relationships among members of populations and communities within an ecosystem</p> <p>Freshwater ecology: freshwater ecosystems with the emphasis on interactions among animal and plant species, structure, biotic and abiotic components and water quality standards. The role of fish in the ecosystem is studied from the point of view of resource partitioning, physiological adaptations, fish health and the ecosystem and pollution</p> <p>Mammals and Wildlife Management: introduction to ecological principles of wildlife conservation and the rationale for conservation management. It deals with the practical applications of ecological principles in the design of management plans for conservation purposes and commercial wildlife farming</p>				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Understand the concepts of Ecology and vegetation types of South Africa • Prepare herbarium specimens and know how to manage a herbarium • Identify a variety of trees and grasses of South Africa • Understand the structure of freshwater ecosystems, organisms in lakes, streams, and estuaries, the role of light and heat in the freshwater ecosystems and the chemistry of natural waters • Describe pollution in the freshwater ecosystems • Understand the habitat requirements of terrestrial wildlife • Understand the factors determining habitat preferences of Southern African wildlife • Understand the factors influencing carrying capacity and population dynamics of wildlife species, and basic applications of such factors in wildlife management • Have knowledge of various economic- and conservation aims, and an understanding of selected strategies to achieve such aims by applying • Have knowledge of habitats influencing wildlife distribution and population dynamics • Critically evaluate the origin and evolution of the higher vertebrate classes • Define and explain the external morphology, physiology, special adaptation and unique behavioural patterns of mammals • Critically evaluate the classification of mammals 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	32		3		130605; 131201; 131204
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5 x 40 min	1 x 3 hrs	Per arrangement	0	10 hrs
Pre-requisite module/s:	MZOA021 and MZOB022 and MCHM011				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =		% Formative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2018		First Year Offered (New): 2019
Replace this Module existing module(s)?	Yes		Give the module codes: BLGY302 & MZOB032 (in part)

Module Code:	MZOB032				
Module Name:	Conservation Genetics				
	Applied Biology				
Module Content:	Part of this course deals with the fundamental principles of evolution and evolutionary analysis. The accent in this part is on an introduction to basic evolutionary concepts, mechanisms of evolutionary change, Mendelian genetics in populations, adaptation, mechanisms of speciation, continental drift, palaeo-environment, stratigraphy, geological timetable, human and animal evolution. The last part of the course includes Laboratory & research techniques and Scientific reporting (biostatistics)				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Understand the forces that shaped the palaeo-environment of southern Africa over the past 3.2 billion years • Apply palaeontology knowledge of the major steps in plant and animal evolution in understanding the present day flora of southern Africa • Discuss human anatomical evolution in the light of information of the hominins out of Africa • Apply evolution as the underlying principle of Biological Science • Integrate knowledge of Genetics with the mechanism of evolution • Know how to defend Neo-Darwinism • Know the procedure to calibrate a microscope • Describe the procedure of a microscopic and macroscopic examination of material • Perform and describe a sedimentation technique • Describe and illustrate fixation techniques • Perform and describe staining with haematoxylin and silver nitrate • Describe the various techniques to isolate eggs in urine • Perform and describe thin and thick blood films and the staining process • Describe the technique to isolate microfilariae and pinworm eggs 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	32		3		130701
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5 x 40 min.	1 x 3 h	Per arrangement	0	10 h
Pre-requisite module/s:	MZOA031and MCHM012				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40
	Final Mark =			% Formative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

ENVIRONMENTAL BIOLOGY - BSCG04

CURRICULUM INFORMATION

Department:	Biology & Environmental Sciences	School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EMT 201					
Module name	Introduction to Environmental Science					
Module Content	<p>Meaning and types of Environments, New trends in Environmental Science, Man - Environment Interaction, The Atmosphere: Structure, Functions, Composition and Factors influencing the Composition of the Atmosphere; Man-Environment Interaction. Physical and Chemical processes in basic plants and animal physiology. Basic Elements of Respiration, Photosynthesis, Transportation or Circulation. Reproduction, Germination, Growth hormones and Enzymology. Classification of Environmental Problems. Methods in environmental analysis, types of precipitate/crystal formation, contamination, and appropriate handling environmental samples. Titrimetric analysis: Acid-base redox, complexometric, precipitation, non-aqueous titrations, indicators. Colorimetric: Spectrophotometric reagents, elementary visible Spectrophotometry: spectrophotometric titrations.</p>					
Learning Outcomes	<ul style="list-style-type: none"> ▪ Understand the different types of environment and different trends in environmental science. ▪ Describe the composition and structure of the atmosphere. ▪ Identify different types of environmental problems. ▪ Appreciate the impact of humans in managing the environment efficiently through man – environment interactions. ▪ Understand and identify various factors that may bring about changes in the environment. ▪ Understand various methods used in environmental analysis and Identify limitations of these methods. ▪ Explain reasons why contaminants should be avoided during sampling and various sources of these contaminants. ▪ Give examples of different types of precipitate and crystal formation. ▪ Identify various instruments used for environmental sampling and analysis. ▪ Ability to operate and use spectrophotometers for environmental samples. 					
Module information	SAQA Credits		ITS Course Level Code		CESM Code	
	Classes	Practicals	Tutorial	Seminars	Independent Learning	
Periods per week						
Pre-requisite module(s)	MPHS011 & MPHS012, MCHM011 & MCHM012, MBIO011 & MZOO012, MMTH011 & MMTH012					
Co-requisite module(s)	EMT202, EHS201, MICB201 & MICB202					
Assessment Methods	Formative tests, Assignments, Summative written examination					
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)					40
	Final Mark =			% Formative Assess Mark		60
				% Summative Assess Mark		40
	Min Final mark to pass to pass (%)					50
Summative assessment Paper:		Paper 1	Paper 2			
	Theory/Practical					
	Duration					
	Sub minimum					

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EMT 202			
Module name	Environmental Management			
Module Content	Definition, scope and element of Environmental management and planning, History and Rise of Environmental Management and Concern in South Africa. Elements of environment management, environmental problems such as pollution including solid waste, land degradation and soil and water conservation as well as health implication of noise. Issues related to Environmental Standards and Regulations Enforcement Agency. Environmental Protection Agencies Mandates and Limitations. Environmental Law and Implementation in South Africa. Contributions or otherwise, of International Institutions to manage the Environment such as United Nations Conference on Environment and Development (UNCED); Non-governmental Organizations (NGOs).			
Learning Outcomes	<ul style="list-style-type: none"> ▪ Define and understand environmental management and planning. ▪ Appreciate the need for Environmental Management in South Africa. ▪ Identify some elements of environmental management and principles. ▪ Describe the role and functions of Environmental Managers. ▪ Integrate the role of International Institutions and Non-Governmental Organizations. 			
Module information	SAQA Credits	ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars Independent Learning
Pre-requisite module(s)	MPHS011 & MPHS012, MCHM011 & MCHM012, MBIO011 & MZOO012, MMTH011 & MMTH012			
Co-requisite module(s)	EMT 201, EHS 201 & EHS202, MICB201 & MICB202			
Assessment Methods	Formative tests, Assignments, Summative written examination			
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)			40
	Final Mark =		% Formative Assess Mark	60
			% Summative Assess Mark	40
	Min Final mark to pass to pass (%)			50
Summative assessment Paper:		Paper 1	Paper 2	
	Theory/Practical			
	Duration			
	Sub minimum			

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EHS 201		
Module name	Fundamentals of Environmental Health Science		
Module Content	Definition of Environmental Health, Environmental Effects on Health, Cleanliness, Conservation the Environment and Law, Exposure to Environmental Stressors: Biological, Physical and Ergonomic Surveillance and Susceptibility, How Chemicals Cause Harm: Toxicokinetics and Toxicodynamics, Cancer: Role of the Environment in the Carcinogenic Process, Community Solid Wastes and Hazardous		

	Wastes and their Management, Drinking Water - Procurement and Treatment; Wastewater Management, Air Pollution, Indoor Air Pollution and the Health Effects of Air Pollution, Climate Change and human health.				
Learning Outcomes	<ul style="list-style-type: none"> Understand the co-evolution of human civilization, environmental exposures, and disease Describe environmental hazards in communities and the workplace Describe surveillance procedures for hazards in communities and the workplace Understand the basis of genetic and non-genetic susceptibility to environmental disease Describe the major mechanisms of toxicity Understand basic principles of toxicokinetic and toxicodynamics Understand how a risk assessment document is prepared, the information it contains, and how it is used to manage risk to environmental hazards Describe the major environmental problems caused by solid and hazardous waste, water pollution, air pollution and agriculture Understand basic principles that underlie climate change and its impact on human and ecological health 				
Module information	SAQA Credits	ITS Course Level Code		CESM Code	
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MPHS011 & MPHS012, MCHM011 & MCHM012, MBIO011 & MZOO012, MMTH011 & MMTH012				
Co-requisite module(s)	EMT 201 & EMT202, EHS 202, MICB201 & MICB202				
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION

Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No		If YES, give the module codes:		

Module code	EHS 202
Module name	Food borne Diseases and Human Parasitic Diseases
Module Content	Significance and brief description of food borne diseases, Definition of food borne diseases, Epidemiology of food borne diseases, Classification and Etiology of some food borne diseases, Pathogenesis and clinical features of some food borne disease, Food-borne Infections, Food poisonings/intoxications, diagnosis of food-borne diseases, General management approaches of food-borne diseases, Prevention and control of food-borne diseases, Investigation of outbreaks of food-borne diseases. Human parasitic diseases, epidemiology of parasitic diseases, sources and management of parasitic diseases, Common parasitic diseases in South Africa.
Learning Outcomes	<ul style="list-style-type: none"> Describe food borne diseases. Understand the epidemiology of food borne diseases. Identify pathogens causing food borne diseases. Explain various ways of managing food borne diseases. Describe methods that can be used to prevent food borne diseases. Identify some common parasites in South Africa.

	<ul style="list-style-type: none"> Understand the importance of managing the parasites. 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MPHS011& MPHS012, MCHM011&MCHM012 , MBIO011 & MZOO012,MMTH011 &MMTH012				
Co-requisite module(s)	EMT 201, EHS 201 & EHS 202, MICB201 & MICB202				
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			

Module code	MICB201				
Module name	Introduction to Microbiology				
Module Content	History and development of microbiology. Key concepts in microbiology. Classification and characterization of the different types of microorganisms. Comparison of prokaryotic and eukaryotic cells. Nutritional and requirement and microbiological media, cultivation, and growth of microorganisms. Physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and membrane components. Bacterial toxins and Methods for identification of bacteria				
Learning Outcomes	<ul style="list-style-type: none"> Understand the history and development of microbiology. Discuss key concepts in microbiology. Classify and characterize different types of microorganisms. Differentiate between prokaryotic and eukaryotic cells. Describe the nutritional requirements of bacteria. Discuss the nature and uses of different types of bacteria growth media. Describe the physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and bacterial components Understand and describe different methods for identification of bacteria. 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MPHS011& MPHS012, MCHM011&MCHM012 , MBIO011 & MZOO012,MMTH011 & MMTH012				
Co-requisite module(s)					
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
	Paper 1	Paper 2			

Summative assessment Paper:	Theory/Practical			
	Duration			
	Sub minimum			

CURRICULUM INFORMATION

Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No		If YES, give the module codes:		

Module code	MICB202				
Module name	Environmental and Fungal Microbiology				
Module Content	Zoospore fungi. The Deuteromycotina, Yeast. Fungi as saprotrophs. Fungi and humans. Microbial populations in air, water and soil. The effects of abiotic factors on microorganisms. Measurement of bacterial numbers, biomass and activities in microbial ecosystems. The roles of microorganisms in carbon, oxygen, nitrogen, sulphur and phosphorus cycles. Ecological aspects of biodegradation of waste. Microorganisms in mineral and energy recovery. The role of microorganisms in water quality (water pollution, water treatment, sewage treatment and solid municipal waste). Indices of sanitary quality and microbiological standards. Water quality testing techniques and water purification technology				
Learning Outcomes	<ul style="list-style-type: none"> ▪ Understand and describe the classification of fungi ▪ Describe the effects of abiotic factors on microorganisms ▪ Measure bacterial numbers in air, biomass and ecosystems ▪ Describe the roles of microorganisms in carbon, oxygen, nitrogen, sulphur and phosphorus cycles ▪ Understand and describe ecological aspects of biodegradation ▪ Understand and describe the role of microorganisms in water pollution and treatment. ▪ Understand and describe water quality testing and purification technology. 				
Module information	SAQA Credits	ITS Course Level Code		CESM Code	
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MPHS011 & MPHS012, MCHM011 & MCHM012, MBIO011 & MZOO012, MMTH011 & MMTH012				
Co-requisite module(s)					
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
Summative assessment Paper:	Min Final mark to pass to pass (%)				50
		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION

Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No		If YES, give the module codes:		

Module code	EHS 301
Module name	Human Nutrition in Health and Diseases

Module Content	Historical Perspectives and General Definitions (Nutrition, Health, Disease, Food, Food Groups, etc.). Food Classification (Why and How, Which), Food Presentation, purchasing and preparation. Formulation of Special Diets, Nutritional Diseases and how some of these are prevented: (Energy-related Diseases, Vitamin-related Disease, Mineral-related Diseases, and Nutritional Excesses). Management of Nutritional Diseases. Microorganisms Causing Most Food Contamination. Food spoilage, Food poisoning, Food borne infection and intoxication. Prevention of food borne diseases outbreak.				
Learning Outcomes	<ul style="list-style-type: none"> ▪ Define basic terminology in human nutrition and diseases. ▪ Classify food into groups. ▪ Hygienic methods of food preparation and preservation. ▪ Understand some diseases caused by improper food diet. ▪ Analyse and understand various methods that can be used in managing nutritional diseases. ▪ Identify different microorganisms causing food poisoning. 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	EMT 201 & EMT 202, EHS201 & EHS202				
Co-requisite module(s)	EHS302				
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019		First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:		

Module code	EHS 302				
Module name	Occupational and Health Safety				
Module Content	What is occupational health? Challenges for the development of occupational health and safety. Interrelationship between occupational health and human development. Elements of a work environment. Interactions in the workplace. Relationship between work and health. Health and safety policies in industries and work environments, Strategies and objectives, First Aid and Techniques; burns, poison stings and bites, artificial respiration etc. Accidents; classification, causes and costs; Fire and firefighting. Health and safety audits as management tools. Health and safety plans. Accidents: case studies.				
Learning Outcomes	<ul style="list-style-type: none"> ▪ Define occupational health. ▪ Discuss challenges for the development of occupational health and safety. ▪ Explain the scope of occupational health and safety. ▪ Describe the interrelationship between occupational health and development. ▪ Identify the elements of a work environment. ▪ Discuss the three common interactions in the workplace. ▪ Explain the interrelationships between work and health 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning

Pre-requisite module(s)	EMT 201 & EMT 202, EHS201 & EHS202		
Co-requisite module(s)	EHS301, EPS301, & EPS302		
Assessment Methods	Formative tests, Assignments, Summative written examination		
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)		40
	Final Mark =	% Formative Assess Mark	60
		% Summative Assess Mark	40
	Min Final mark to pass to pass (%)		50
Summative assessment Paper:		Paper 1	Paper 2
	Theory/Practical		
	Duration		
	Sub minimum		

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EPS 301			
Module name	Community Health and Development			
Module Content	<p>Definition of concepts in community and public health, Influence of the environment and development on Community health, Agencies involved in international health, Distinction between community/public health in developed and less developed countries, The vicious circles of population pressure, Malnutrition and infection, Problem solving in the developing world, Sources of community/public health problems in rural and Urban areas in less developed countries: water availability/scarcity, vehicular emission, population increase, air pollution, sanitation; Control of health problems arising from contamination of Water, air in communities, Spatial Epidemiological Approach to community/public health Problems analysis, Planning intervention programme for community/public Health problems. The ecological and spatial approaches to the study of communicable diseases (epidemic and pandemic etc.), measures, methods and techniques of controlling diseases in general, the major patterns of diseases in Southern Africa; the possible control strategies the provision and utilization of health care services and the factors influencing these.</p>			
Learning Outcomes	<ul style="list-style-type: none"> ▪ Describe the difference between community health and public health. ▪ Describe the influence of the environment on community health. ▪ Distinguish between the impact of community health in developed and less developed countries. ▪ Understand the relationship between malnutrition and infection. ▪ Analyse and understand various methods that can be used in solving problems within the community. ▪ Identify factors that can mitigate against health hazards within the community health perspectives. ▪ Appreciate the importance of good environment. ▪ Discuss the impact of pollution on community health. 			
Module information	SAQA Credits	ITS Course Level Code		CESM Code
	Classes	Practicals	Tutorial	Seminars
Periods per week				Independent Learning
Pre-requisite module(s)	EMT201 & EMT202, EHS201 & EHS202			
Co-requisite module(s)	EHS301 & EHS302, EPS302			
Assessment Methods	Formative tests, Assignments, Summative written examination			
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)		40	
	Final Mark =	% Formative Assess Mark		60
		% Summative Assess Mark		40
	Min Final mark to pass to pass (%)		50	
Summative assessment		Paper 1	Paper 2	
	Theory/Practical			

Paper:	Duration		
	Sub minimum		

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences		School: Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EPS 302			
Module name	Environmental Epidemiology			
Module Content	Social and behavioural perspectives in environmental health, Social, cultural & environmental health behaviour theories, Health promotion programs in South Africa, Global health challenges, Principles of health System and Administration in South Africa. Epidemiological evidence			
Learning Outcomes	<ul style="list-style-type: none"> ▪ Use theory, research, and the problem-solving process in examining the health status of people across the life span. ▪ Negotiate outside learning experiences that will enhance the application of health and wellness concepts. ▪ Examine the impact of the health care professional on health care systems at local, state, national, and international levels. ▪ Analyze environmental, sociocultural, and economic factors that influence health care practices across cultures. ▪ Explore past, present, and future trends in the health care system and the changing role of selected health care professionals. ▪ Articulate the role of values, beliefs, ethics, and public policy on health and wellness. 			
Module information	SAQA Credits	ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars Independent Learning
Pre-requisite module(s)	EMT 201 & EMT 202, EHS201 & EHS202			
Co-requisite module(s)	EHS301 & EHS302, EPS301			
Assessment Methods	Formative tests, Assignments, Summative written examination			
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)			40
	Final Mark =		% Formative Assess Mark	60
			% Summative Assess Mark	40
	Min Final mark to pass to pass (%)			50
Summative assessment Paper:		Paper 1	Paper 2	
	Theory/Practical			
	Duration			
	Sub minimum			

ENVIRONMENTAL MANAGEMENT & TOXICOLOGY - BSCG03

CURRICULUM INFORMATION			
Department:	Biology & Environmental Sciences	School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EMT 201				
Module name	Introduction to Environmental Science				
Content:	<p>Meaning and types of Environment, New trends in Environmental Science, Man - Environment Interaction, The Atmosphere: Structure, Functions, Composition and Factors influencing the Composition of the Atmosphere; Man-Environment Interaction. Physical and Chemical processes in basic plants and animal physiology. Basic Elements of Respiration, Photosynthesis, Transportation or Circulation. Reproduction, Germination, Growth hormones and Enzymology. Classification of Environmental Problems. Methods in environmental analysis, types of precipitate/crystal formation, contamination and appropriate handling environmental samples. Titrimetric analysis: Acid-base redox, complexometric, precipitation, non-aqueous titrations, indicators. Colorimetric: Spectrophotometric reagents, elementary visible Spectrophotometry: spectrophotometric titrations.</p>				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Understand the different types of environment and different trends in environmental science. ▪ Describe the composition and structure of the atmosphere. ▪ Identify different types of environmental problems. ▪ Appreciate the impact of humans in managing the environment efficiently through man – environment interactions. ▪ Explain reasons why contaminants should be avoided during sampling and various sources of these contaminants. ▪ Give examples of different types of precipitate and crystal formation. 				
Module Information:	SAQA Credits	ITS Course Level	CESM Code (3rd Order (Six Numbers))		
	20	2	140503		
Delivery Information:	Campus	Full/Part Time	Period Year/1st/2nd Semester		
	SMU	Full	2/1 ST Sem		
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	3 hours	1		40 hours
Pre-requisite modules for this module:	MZOO011& MZOO012, MCHM011& MCHM012,MPHS011& MPHS012,MMTH011& MMTH012				
Co-requisites modules for module:	EMT202,EHS201,MICB201 & MICB202				
Assessment	<p>Formative assessment:</p> <ul style="list-style-type: none"> ▪ Theoretical and Practical testing at end of Module with feedback. ▪ Draft Portfolio of Environmental Science Theory and Practice assessed mid-year. <p>Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme.</p>				
Assessment criteria (see Annex 1 for assessment criteria grid)	Specific educational outcome 1:				

		<ul style="list-style-type: none"> Understand and identify various factors that may bring about changes in the environment. Understand various methods used in environmental analysis and Identify limitations of these methods. <p>Specific educational outcome 2:</p> <ul style="list-style-type: none"> Identify various instruments used for environmental sampling and analysis. Ability to operate and use spectrophotometers for environmental samples. 			
Assessment methods		<p>Formative assessment:</p> <ul style="list-style-type: none"> Theoretical and Practical Assessment. During the programme students to develop a Portfolio of Environmental Health Theory and Practice. A first draft of this portfolio (including completed pre- and post-module questionnaires with proof of Blackboard assessments) to be assessed mid-year; with formative feedback given for improvement. <p>Summative assessment: Test, Quiz and Practicals</p>			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Formative Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory	Theory	N/A	N/A
	Duration	3hrs	3hrs	N/A	N/A
	% contribution to Summative Assessment Mark	100%	100%	N/A	N/A
	Sub minimum	40%	40%	N/A	N/A

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science and Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			
Module code	EMT 202				
Module name	Environmental Management				
Content:	Definition, scope and element of Environmental management and planning, History and Rise of Environmental Management and Concern in South Africa. Elements of environment management, environmental problems such as pollution including solid waste, land degradation and soil and water conservation as well as health implication of noise. Issues related to Environmental Standards and Regulations Enforcement Agency. Environmental Protection Agencies Mandates and Limitations. Environmental Law and Implementation in South Africa. Contributions or otherwise, of International Institutions to manage the Environment such as United Nations Conference on Environment and Development (UNCED); Non-governmental Organisations (NGOs).				
Learning Outcomes:	<ul style="list-style-type: none"> Define and understand environmental management and planning. Identify some elements of environmental management and principles. Describe the role and functions of Environmental Managers. 				

Module Information:		SAQA Credits		ITS Course Level		CESM Code (3 rd Order (Six Numbers)	
		20		2		140503	
Delivery Information:		Campus		Full/Part Time		Period Year/1 st /2 nd Semester	
		SMU		Contact/Full Time		2/2 nd Sem	
Periods per week:		Classes	Practicals	Tutorial	Seminars	Independent Learning	
		5	3 hours	1		40 hours	
Pre-requisite modules for this module:		MZOO011, MZOO012, MCHM011, MCHM012, MPHS011 & MPHS012, MMTH011 & MMTH012					
Co-requisites modules for module:		EMT 202					
Assessment		<p>Formative assessment:</p> <ul style="list-style-type: none"> Theoretical and Practical Assessment. Draft Portfolio of Environmental Health Theory and Practice assessed mid-year. <p>Summative assessment:</p> <p>Final Portfolio of Environmental Health Theory and Practice assessed at end of programme.</p>					
Assessment criteria (see Annex 1 for assessment criteria grid)		<p>Specific educational outcome 1:</p> <ul style="list-style-type: none"> Appreciate the need for Environmental Management in South Africa. <p>Specific educational outcome: Explain how vaccines are distributed</p> <ul style="list-style-type: none"> Integrate the role of International Institutions and Non-Governmental Organizations. 					
Assessment methods		<p>Formative assessment:</p> <ul style="list-style-type: none"> Theoretical and Practical Assessment During the programme students to develop a Portfolio of Environmental Theory and Practice. A first draft of this portfolio (including completed pre- and post-module questionnaires with proof of Blackboard assessments) to be assessed mid-year; with formative feedback given for improvement. <p>Summative assessment: Test, Quiz and Practicals</p>					
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%				
		% Formative Assessment Mark	60%				
		% Summative Assessment Mark	40%				
	Minimum final mark to pass (%)		50%				
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4		
	Theory/Practical	Theory/Practical	N/A	N/A	N/A		
	Duration	3hrs	N/A	N/A	N/A		
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A		
	Sub minimum	40%	N/A	N/A	N/A		
CURRICULUM INFORMATION							

Department:	Biology & Environmental Sciences	School:	Science & Technology
Last Revision date:	2019	First Year Offered (New):	2020
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module code	EHS 201				
Module name	Fundamentals of Environmental Health Science				
Module Content	Definition of Environmental Health, Environmental Effects on Health, Cleanliness, Conservation the Environment and Law, Exposure to Environmental Stressors: Biological, Physical and Ergonomic Surveillance and Susceptibility, How Chemicals Cause Harm: Toxicokinetics and Toxicodynamics, Cancer: Role of the Environment in the Carcinogenic Process, Community Solid Wastes and Hazardous Wastes and their Management, Drinking Water - Procurement and Treatment; Wastewater Management, Air Pollution, Indoor Air Pollution and the Health Effects of Air Pollution, Climate Change and human health.				
Learning Outcomes	<ul style="list-style-type: none"> • Understand the co-evolution of human civilization, environmental exposures, and disease • Describe environmental hazards in communities and the workplace • Describe surveillance procedures for hazards in communities and the workplace • Understand the basis of genetic and non-genetic susceptibility to environmental disease • Describe the major mechanisms of toxicity • Understand basic principles of toxicokinetic and toxicodynamics • Understand how a risk assessment document is prepared, the information it contains, and how it is used to manage risk to environmental hazards • Describe the major environmental problems caused by solid and hazardous waste, water pollution, air pollution and agriculture • Understand basic principles that underlie climate change and its impact on human and ecological health 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MZOO011, MZOO012, MCHM011, MCHM012 ,MPHS011& MPHS012,MMTH011&MMTH012				
Co-requisite module(s)	EMT202, EHS201,MICB201,MICB202				
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019		First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module code	EHS 202				
Module name	Food borne Diseases and Human Parasitic Diseases				
Module Content	Significance and brief description of food borne diseases, Definition of food borne diseases, Epidemiology of food borne diseases, Classification and Etiology of some food borne diseases, Pathogenesis and clinical features of some food borne disease, Food-borne Infections, Food poisonings/intoxications, diagnosis of food-borne diseases, General management approaches of food-borne diseases, Prevention and control of food-borne diseases, Investigation of outbreaks of food-borne diseases. Human parasitic diseases, epidemiology of parasitic diseases, sources and management of parasitic diseases, Common parasitic diseases in South Africa.				
Learning Outcomes	<ul style="list-style-type: none"> ▪ Describe food borne diseases ▪ Understand the epidemiology of food borne diseases. ▪ Identify pathogens causing food borne diseases. ▪ Explain various ways of managing food borne diseases. ▪ Describe methods that can be used to prevent food borne diseases. ▪ Identify some common parasites in South Africa. ▪ Understand the importance of managing the parasites. 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MZOO011, MZOO012, MCHM011, MCHM012 ,MPHS011& MPHS012,MMTH011&MMTH012				
Co-requisite module(s)					
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science & Technology
Last Revision date:	2019		First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module code	MICB201				
Module name	Introduction to Microbiology				

Module Content	History and development of microbiology. Key concepts in microbiology. Classification and characterization of the different types of microorganisms. Comparison of prokaryotic and eukaryotic cells. Nutritional and requirement and microbiological media, cultivation and growth of microorganisms. Physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and membrane components. Bacterial toxins and Methods for identification of bacteria				
Learning Outcomes	<ul style="list-style-type: none"> ▪ Understand the history and development of microbiology ▪ Discuss key concepts in microbiology ▪ Classify and characterize different types of microorganisms ▪ Differentiate between prokaryotic and eukaryotic cells ▪ Describe the nutritional requirements of bacteria ▪ Discuss the nature and uses of different types of bacteria growth media ▪ Describe the physical organization of bacteria, bacterial chromosomes , cytoplasm, cell wall and bacterial components ▪ Understand and describe different methods for identification of bacteria. 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MZOO011, MZOO012, MCHM011, MCHM012 ,MPHS011& MPHS012,MMTH011&MMTH012				
Co-requisite module(s)					
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION

Department:	Biology & Environmental Sciences		School:	Science and Technology
Last Revision date:	2019	First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:	

Module code	MICB202
Module name	Environmental and Fungal Microbiology
Module Content	Zoosporic fungi. The Deuteromycotina, Yeast. Fungi as saprotropots. Fungi and humans. Microbial populations in air, water and soil. The effects of abiotic factors on microorganisms. Measurement of bacterial numbers, biomass and activities in microbial ecosystems. The roles of microorganisms in carbon, oxygen, nitrogen, sulphur and phosphorus cycles. Ecological aspects of biodegradation of waste. Microorganisms in mineral and energy recovery. The role of microorganisms in water quality (water pollution, water treatment, sewage treatment and solid municipal waste). Indices of sanitary quality and microbiological standards. Water quality testing techniques and water purification technology

Learning Outcomes	<ul style="list-style-type: none"> ▪ Understand and describe the classification of fungi ▪ Describe the effects of abiotic factors on microorganisms ▪ Measure bacterial numbers in air, biomass and ecosystems ▪ Describe the roles of microorganisms in carbon, oxygen, nitrogen, sulphur and phosphorus cycles ▪ Understand and describe ecological aspects of biodegradation ▪ Understand and describe the role of microorganisms in water pollution and treatment. ▪ Understand and describe water quality testing and purification technology. 				
Module information	SAQA Credits		ITS Course Level Code		CESM Code
Periods per week	Classes	Practicals	Tutorial	Seminars	Independent Learning
Pre-requisite module(s)	MZOO011, MZOO012, MCHM011, MCHM012, MPHS011& MPHS012,MMTH011&MMTH012				
Co-requisite module(s)					
Assessment Methods	Formative tests, Assignments, Summative written examination				
Assessment Weighting	Min Formative Assessment Mark for exam admission (%)				40
	Final Mark =		% Formative Assess Mark		60
			% Summative Assess Mark		40
	Min Final mark to pass to pass (%)				50
Summative assessment Paper:		Paper 1	Paper 2		
	Theory/Practical				
	Duration				
	Sub minimum				

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science and Technology
Last Revision date:	2019		First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module code	EMT 301				
Module Name	Environmental Toxicology				
Content:	<p>The nature, origin and classification of hazardous toxic substances; Characteristics of wastes and hazardous substance. Identification of hazardous substances. Sources and pathways of hazardous substances. Disposal methods and technology of hazardous substance. Geological environmental factors affecting choice of disposal site; contamination of water bearing strata; soil, plants, food webs and bio-concentration. Analysis of hazardous and toxic substances. Regulations and law governing the sale, importation, transportation, storage and disposal of hazardous and toxic substances. Origin of Metals. Classification of metals. Utilisation of metals in industries. Sources of metal pollution; geological weathering, industrial discharge, metals fabricating and furnishing, leaching of metals from garbage, agricultural waste products. Effect of metals on the environment sediment, waste, air and food. Adverse effect of nearby metals – poisoning effects of Pb, Cd, Zn and Hg. Other effects e.g. neurologic, and renal effects. Analysis of metals in environmental samples.</p>				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Classify and characterise hazardous substances in the environment. ▪ Understand different pathways of hazardous substance into food chain. ▪ Describe various disposal methods for hazardous substances 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	30		3		130906
	Campus		Full/Part Time		Period Year/1st/2nd

Delivery Information:				Semester		
		SMU	Full	Year		
Periods per week:		Classes	Practicals	Tutorial	Seminars	Independent Learning
		5	3 hours	1		30 hours
Pre-requisite modules for this module:		EMT 201 AND 202				
Co-requisites modules for module:		No				
Assessment		Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment Draft Portfolio of Environmental Science Theory and Practice assessed mid-year. Summative assessment: Test, Quiz and Practicals.				
Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> Explain how hazardous substance enters into water, soil and plants List different methods of hazardous disposal Specific educational outcome 2: <ul style="list-style-type: none"> Understand and describe the effect of metals in the environment Describe the adverse effects of metals in humans, plants and animals. 				
Assessment methods		Formative assessment: Theoretical and Practical Exam- Summative assessment: Test, Practicals and Quiz				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%				
	% Formative Assessment Mark	60%				
	% Summative Assessment Mark	40%				
	Minimum final mark to pass (%)	50%				
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/Practical	Theory/Practical	N/A	N/A	N/A	
	Duration	3hrs	N/A	N/A	N/A	
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A	
	Sub minimum	40%	N/A	N/A	N/A	

CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science and Technology
Last Revision date:	2019	First Year Offered (New):	2020		
Replace this Module existing module(s)?	No	If YES, give the module codes:			
Module code	EMT 302				
Module Name	Pollution Monitoring Techniques and Control				

Content:		Waste: Identification and Classification, Techniques for water purification, Types of waste, Selecting technology. Air Pollution: factors affecting air pollution, methods for monitoring air pollution, improved technologies in reducing air pollution, measurement of air pollutants. Waste water treatment, Wastewater treatment principles, Wastewater treatment plants, Primary treatment, Secondary treatment and Tertiary treatment. Soil pollution, bioremediation techniques in soil. Noise Control, Noise Guidelines and Techniques.				
Learning Outcomes:		<ul style="list-style-type: none"> ▪ Identify and classify different waste management techniques. ▪ List different factors affecting air pollution. ▪ Understand different methods of monitoring air pollution. 				
Module Information:		SAQA Credits		ITS Course Level		CESM Code (3rd Order (Six Numbers))
		30		3		140503
Delivery Information:		Campus		Full/Part Time		Period Year/1st/2nd Semester
		SMU		Full		Year
Periods per week:		Classes	Practicals	Tutorial	Seminars	Independent Learning
		5	3hours	1		30 hours
Pre-requisite modules for this module:		EMT 201 AND EMT 202				
Co-requisites modules for module:		No				
Assessment		Formative assessment: <ul style="list-style-type: none"> ▪ Practical and Theoretical Assessment Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme.				
Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> • Identify different methods for treating waste water Specific educational outcome 2:				
		<ul style="list-style-type: none"> ▪ Understand bioremediation techniques used for soil. ▪ List different methods for noise control and techniques. 				
Assessment methods		Formative assessment: <ul style="list-style-type: none"> ▪ Theoretical and Practical Assessment ▪ For the practicals students visit a company and understand various processes involve in monitoring pollutants. Students are expected to submit a report. Summative assessment: Report on visit to Industrial Companies, Practical, Test and Quiz.				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%			
		% Formative Assessment Mark	60%			
		% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)		50%			
Summative Assessment Paper:			Paper 1	Paper 2	Paper 3	Paper 4
		Theory/Practical	Theory/Practical	N/A	N/A	N/A
		Duration	3hrs	N/A	N/A	N/A
		% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A

	Sub minimum	40%	N/A	N/A	N/A
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CURRICULUM INFORMATION					
Department:	Biology & Environmental Sciences			School:	Science and Technology
Last Revision date:	2019		First Year Offered (New):	2020	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module code	EMT 303				
Module Name	Natural Resources Management				
Content:	<p>Natural resources types and origin, environment, resource and development; rational use of resources and concept of sustainable development. Classification of resources, Survey of resources within the ecological regions of South Africa (Earth Minerals, Water resources, Forest resources, etc) Management of forests, grazing, lands, soils, foods, minerals, etc. Community resource development, population and pressure on resource utilization, administration and management of natural resources in South Africa. Resource economics and management. Environmental conservation – Protection of nature and conservation of species. Conservation of agricultural landscape. Case studies concerned with concepts of balanced approach to natural resources management. Development of planning and management principles of natural resources and ecosystem subject to increasing development processes.. Current uses and potentials of South African resources. Links between the resources of the Earth, Approaches to resources management concept, Resources utilization and sustainability. Waste minimization in resources utilization. Techniques for resources processing and value-adding.</p>				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Identify different natural resources in South Africa. ▪ Describe different ways of managing natural resources. ▪ Understand the impact of population growth on natural resources. 				
Module Information:	SAQA Credits		ITS Course Level		CESM Code (3rd Order (Six Numbers))

		30	3	131207	
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester
	SMU		Full		Year
Periods per week:	Classes	Practical's	Tutorial	Seminars	Independent Learning
	5	3 hours	1		40 hours
Pre-requisite modules for this module: EMT 201 and EMT 202					
Co-requisites modules for module: No					
Assessment Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment. Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme.					
Assessment criteria: (see Annex 1 for assessment criteria grid) Specific educational outcome 1: <ul style="list-style-type: none"> Describe different ways of conserving natural resources Specific educational outcome 2: <ul style="list-style-type: none"> Understand current use and potential use of natural resources. Understand the techniques involved in resource processing and utilization. 					
Assessment methods Formative assessment: <ul style="list-style-type: none"> Theoretical and Practical Assessment. For the practicals students attend visit a natural game reserve and understand various management practices. Summative assessment:					
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%		
		% Formative Assessment Mark	60%		
		% Summative Assessment Mark	40%		
	Minimum final mark to pass (%)		50%		
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory/Practical	N/A	N/A	N/A
	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

CURRICULUM INFORMATION

Department:	Biology & Environmental Sciences		School:	Science and Technology
Last Revision date:	2019	First Year Offered (New):	2020	
Replace this Module existing module(s)?	No	If YES, give the module codes:		
Module code	EMT 304			

Module Name		Environmental Education					
Content:		Environmental Management and Assessment: Our planet, The need for environmental sustainability, Environmental legislation, Environmental Management Systems (EMS), Environmental impact assessment, Strategic environmental assessment, Environmental audit, Cost benefit analysis, Life cycle assessment, Clean technology, Environmental risk management, Sustainable development; Health and safety policies in industries and work environments, Strategies and objectives. Socio Political factors involves in environmental management, Environmental Administration in South Africa.					
Learning Outcomes:		<ul style="list-style-type: none"> ▪ Describe basic environmental management principles. ▪ Understand and describe the steps involves in EIA. ▪ Analyse some socio political factors involve in environmental management. 					
Module Information:		SAQA Credits		ITS Course Level		CESM Code (3rd Order) (Six Numbers)	
		30		3		131205	
Delivery Information:		Campus		Full/Part Time		Period Year/1st/2nd Semester	
		SMU		Full		Year	
Periods per week:		Classes	Practical's	Tutorial	Seminars	Independent Learning	
		5	3 hours	1		30 hours	
Pre-requisite modules for this module:		EMT 201 and 202					
Co-requisites modules for module:		No					
Assessment		Formative assessment: <ul style="list-style-type: none"> ▪ Practical and Theoretical Assessment ▪ Draft Portfolio of Environmental Science Theory and Practice assessed mid-year. Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme.					
Assessment criteria (see Annex 1 for assessment criteria grid)		Specific educational outcome 1: <ul style="list-style-type: none"> ▪ Understand different concepts in environmental legislation. ▪ Understand the need for environmental sustainability. Specific educational outcome 2: <ul style="list-style-type: none"> ▪ Explain various methods of environmental administration in South Africa. 					
Assessment methods		Formative assessment: <ul style="list-style-type: none"> ▪ Theoretical and Practical Assessment. ▪ For the practicals students attend will visit a nearby community and discuss issues around environmental management. Student will submit a report on the attitude and feelings towards environmental management Summative assessment:					
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%				
		% Formative Assessment Mark	60%				
		% Summative Assessment Mark	40%				
	Minimum final mark to pass (%)		50%				
		Paper 1	Paper 2	Paper 3	Paper 4		
Theory/Practical		Theory/Practical	N/A	N/A	N/A		

Summative Assessment Paper:	Duration	3hrs	N/A	N/A	N/A
	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A
	Sub minimum	40%	N/A	N/A	N/A

MICROBIOLOGY & IMMUNOLOGY - BSCG05

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCEINCE and TECHNOLOGY
Last Revision date:	2019	First Year Offered (New):	2022		
Replace this Module existing module(s)?	No	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSG01	
Migration Strategy:	(If YES, Section G must also be completed)				

Module Code: (4 alphabetic & 3 numeric)	MICB211		
Module Name:	INTRODUCTION TO MICROBIOLOGY		
Content:	<p>Aim: Historical perspective of microbiology, Germ theory of disease, Koch postulate, spontaneous generation, classification and nomenclature, shapes and different type morphologies of bacteria, methods of cultivation of bacteria, staining in microbiology, growth requirements of bacteria, bacterial nutrition, differences between the two cell types prokaryotic and eukaryotic, Characteristics of different groups of microorganisms. General structure of bacteria, functions of the different bacterial organelles, shapes of bacteria, Gram- positive and Gram- negative bacteria. Factors affecting bacterial growth are bacterial nutrition, metabolism and genetics. Methods of control of microorganisms- heat, cold, chemicals, radiations physical means like salting and drying.</p>		
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Understand the history and developments of the field of microbiology. ▪ Describe the germ theory of disease and the Koch postulate. ▪ The staining techniques in bacteriology. ▪ Identify different morphology of bacteria and internal cell structure of bacteria. ▪ Discuss the two cell types and their major differences and their roles in classification. ▪ Discuss the different methods of control of microorganisms ▪ Appreciate the impact of bacteria in the life and existence of humans. ▪ Understand the ubiquity of bacteria. ▪ Understand the bacteria growth curve and the implications of the different phases in treatment and sterilization. ▪ Describe the different methods of sterilization and control of microorganisms 		
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)	ITS Course Level	CESM Code (3rd Order) (Six Numbers)
	20	3	130501
Delivery Information:	Campus	Full/Part Time	Period (Year/1 st /2 nd Sem)
	SMU	Full	1 st

Periods per week:	Classes	Practical's	Tutorial	Seminars	Independent Learning
	3x40 min	1X3 hrs.	1x40 min	0	20 hours
Pre-requisite modules for this module:		MICB011 & MZOO012			
Co-requisites modules for module:					
Assessment criteria		<p>Ability to state the history and developments of the field of microbiology. Be able to describe the germ theory of disease and the Koch postulate. Be able to perform staining techniques in bacteriology. Be able to outline the different morphology of bacteria and internal cell structure of bacteria. Be able to discuss the two cell types and their major differences and their roles in classification. Enumerate the different methods of control of microorganisms State the impact of bacteria in the life and existence of humans. Define the ubiquity of bacteria and its implications Discuss the bacteria growth curve and the implications of the different phases in treatment and sterilization. Describe the different methods of sterilization and control of microorganisms</p>			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40		
		% Formative Assessment Mark	60		
		% Summative Assessment Mark	40		
	Minimum final mark to pass (%)		50		
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3hrs	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40%	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:	2019		First Year Offered (New):	2022	
Replace this Module existing module(s)?	No		If YES, give the module codes:		

Module linked to Qualification/s:	BSc (Life Sciences Stream)	BSc	
Migration Strategy:	(If YES, Section G must also be completed)		

Module Code: (4 alphabetic & 3 numeric)	MICB212				
Module Name:	BACTERIOLOGY				
Content:	<p>Aim: Mechanisms and modes of spread of bacterial infections such as Staphylococci, Streptococci, Corynebacteria, Bacilli, Lactobacilli, Neisseria, Clostridia, the Enterobacteriaceae- Escherichia, Salmonella, Shigella, Campylobacter, Helicobacter. Vibrio, Klebsiella, Proteus, Yersinia, Aeromonas, Plesiomonas, Haemophilus, Mycobacterium tuberculosis, Mycobacterium leprae, Brucella, Bordetella, Rickettsiae, Mycoplasma, Coxiella, Treponemas, Bacterial chemotherapy: characteristics of antibiotics, kinds of antimicrobial agents and their primary modes of action, antimicrobial agents used in the treatment of infectious disease :- antibacterial agents, antifungal agents, antiviral agents, antiprotozoan and anthelmintic agents, microorganisms that produce antibiotics.</p>				
Learning Outcomes:	<p>Explain the following terminologies - Normal flora, symbiosis, resident flora, disease, adhsensins, transient flora, opportunists, commensalism, mutualism, parasitism.</p> <p>Explain the different environmental factors that affect bacteria in their habit</p> <ul style="list-style-type: none"> ▪ Explain reasons why contaminants should be avoided during sampling and various sources of these contaminants. ▪ Understand bacteria nutrition, culturing, growth requirements and physiology. ▪ Discuss the different types of bacteria. ▪ Detailed understanding of the roles of some Gram positive and Gram-negative bacteria in disease pathogenesis. ▪ Ability to obtain pure culture from mix culture, ▪ Ability to operate and use laboratory equipment. ▪ Be able to obtain a pure culture from a mix culture. ▪ What are the challenges that face pathogens? Be able to explain each challenge. ▪ Describe how pathogens are transmitted by the various means, i.e. respiratory droplets, parenteral means, etc. ▪ Compare the properties of endotoxins and exotoxins, giving examples of each. ▪ Define epidemiology and explain its importance to nosocomial infections. ▪ Define the following terms: infection, reservoir, zoonosis, communicable, vector, fomite, toxins, portal of entry and exit, surface proteins, phagocytosis. ▪ Understand antibiotics modes of action, bacterial resistance mechanisms and antibiotics stewardship. 				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	20		3		130501
Delivery Information:	Campus		Full/Part Time		Period (Year/1st/2ndSem)
	SMU		Full		1 st
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3x40 min	1x3 hrs.	Per arrangement	0	20 hrs
Pre-requisite modules for this module:	MBIO011, MCHM011 & MCHM102				

Co-requisites modules for module:		-			
Assessment criteria		<p>Students should be able to explain the following terminologies - normal flora, symbiosis, resident flora, disease, adhesins, transient flora, opportunists, commensalism, mutualism, parasitism.</p> <p>Be able to explain the different environmental factors that affect bacteria in their habit</p> <p>Be able to state why contaminants should be avoided during sampling and various sources of these contaminants.</p> <p>Be able to explain bacteria nutrition, culturing, growth requirements and physiology.</p> <p>Be able to discuss the different types of bacteria.</p> <p>Ability to give detailed understanding of the roles of some Gram positive and Gram-negative bacteria in disease pathogenesis.</p> <p>Ability to discuss how to obtain pure culture from mix culture,</p> <p>Be able to state and explain the challenges that face pathogens.</p> <p>Be able to describe pathogens transmission by the various means, i.e., respiratory droplets, parenteral means, etc.</p> <p>Able to compare the properties of endotoxins and exotoxins, giving examples of each.</p> <p>Be able to define epidemiology and explain its importance in nosocomial infections.</p> <p>Be able to define the following terms: infection, reservoir, zoonosis, communicable, vector, fomite, toxins, portal of entry and exit, surface proteins, phagocytosis.</p> <p>Understand antibiotics modes of action, bacterial resistance mechanisms and antibiotics stewardship.</p>			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40			
	% Formative Assessment Mark	60			
	% Summative Assessment Mark	40			
	Minimum final mark to pass (%)	50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3 hrs.	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:	2019		First Year Offered (New):	2022	
Replace this Module existing module(s)?	No		If YES, give the module codes:		
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				

Module Code: (4 alphabetic & 3 numeric)	MICB213				
Module Name:	Environmental Microbiology and Biotechnology				
Content:	<p>Aim: Soil microbiology, aero-microbiology, aquatic microbiology, water quality biotechnology, diagnostic microbiology, industrial microbiology, hazardous waste/bioremediation, food safety. Methods used in environmental microbiology for identification and enumeration of microorganisms: - Light microscopy and cultivation, the 16S rRNA gene approach, hybridization techniques using rRNA-targeted Probes, Fluorescent in Situ hybridization, microarray technology, denaturing gradient gel electrophoresis (DGGE) and temperature gradient gel electrophoresis (TGGE, Polymerase Chain Reaction (PCR), 16S rRNA gene-based fingerprinting techniques</p> <p>Interactions among soil microorganisms; biotic and abiotic factors: - Neutral: neutralism, positive or beneficial: mutualism, commensalism, negative or detrimental: antagonism, competition, parasitism, and predation Positive associations, mutualism, syntrophism, and commensalism; negative association, antagonism, competition, and parasitism</p> <p>Soil-borne bacteria, fungi –saprophytes and parasites, algae, protozoan, autotrophs, heterotrophs, mesophiles, thermophiles, Psychrophiles (cryophiles), aerobes, anaerobes, cellulose degraders, sulfur oxidizers, sulfur reducers, nitrogen fixers, protein digesters. Microorganisms in the various environments: viruses, bacteria, fungi, algae, protozoans, helminths. Soil classification, characteristics of microorganisms in the soil environment, Microbial activities in soil/soil borne pathogens. Role of microorganisms in nutrient/biogeochemical cycles- oxygen, water, carbon, nitrogen, sulphur. Mycorrhiza, lichens. Microbial interactions. Microorganisms in aquatic environment. Water and food borne pathogens. Indicator organisms. Domestic waste and waste treatment. Drinking water treatment and distribution. Microbiological Standards/criteria for water quality control. Airborne pathogens/toxins, bio aerosols and their control, microbial survival in the air. Beneficial and pathogenic microorganisms in Agriculture, Bioremediation, Biofilms and Microbial corrosion/biofilms. Environmental sample collection- specific methods for the isolation of pathogens from stools, food, water, air, soil. Introduction to molecular techniques. Pollution factors. Seminars/reports</p>				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Define and understand environmental microbiology ▪ Understand the role of microorganisms in the environment. ▪ Understand the roles of different molecular techniques in studying environmental microbiology and biotechnology. ▪ Describe the role and microorganisms in waste water treatment plants. ▪ Describe microorganisms and their roles in bioremediation ▪ Describe the interactions between microorganisms in the environment 				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	20		3		130599
Delivery Information:	Campus		Full/Part Time		Period (Year/1st/2ndSem)
	SMU		Full		1 st
Periods per week:	Classes	Practical's	Tutorial	Seminars	Independent Learning
	3X40 hrs.	1x3 hrs.	Per arrangement	0	20 hrs
Pre-requisite modules for this module:	MBIO011, MCHM011 & MCHM102				
Co-requisites modules for module:	-				
Assessment criteria	<p>Students should be able to understand environmental microbiology and the role of microorganisms in the environment</p> <p>Demonstrate thorough Understanding of the roles of different molecular techniques in studying environmental microbiology and biotechnology.</p> <p>Describe the role and microorganisms in waste water treatment plants and the various</p>				

		waste water treatment processes Describe microorganisms and their roles in bioremediation Describe the interactions between microorganisms in the environment			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40			
	% Formative Assessment Mark	60			
	% Summative Assessment Mark	40			
	Minimum final mark to pass (%)	50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3 hrs.	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)		BSc		
Migration Strategy:	(If YES, Section G must also be completed)				

Module Code: (4 alphabetic & 3 numeric)	MICB221
Module Name:	Immunology
Content:	<p>Aim: Introduction of essential knowledge and principles in immunology and providing a foundation for more advanced studies.</p> <p>This module introduces the student to the basic concepts, components and functions of the vertebrate immune system: Innate immunity. Adaptive immunity. Cells and tissues of the immune system. Classification. Structure and properties of antibodies, monoclonal antibodies. Concepts of antigen and antigenicity. Immunogen and immunogenicity. Haptens. Adjuvants. Human leucocyte antigens. Genetic basis of the immune response. Antigen-antibody reactions. Definitions of immunological tolerance. Organ and tissue transplantation. Allergy. Autoimmunity. Autoimmune and Immunodeficiency diseases. Hypersensitivity and immunosuppression. Principles of immunization, EPI in South Africa, vaccines.</p>
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Describe immunology and basic immunological terminologies ▪ Define the immune system. ▪ Describe the benefits of inflammation in fighting infection ▪ Outline ways by which pathogens can evade the innate immune system. ▪ Define the term 'antigen'. ▪ Explain the roles of antigen presenting cells.

		<ul style="list-style-type: none"> ▪ Know the three functions of antibodies (opsonisation, neutralisation and complement activation). ▪ Describe the protective responses mediated by T cells, B cells and antibodies, epitopes, paratopes, idiotypes ▪ Describe the mechanisms involved with active and passive immunisation. ▪ Understand why attenuated and inactivated vaccines are optimal for protection against viruses ▪ Understand how allergies develop ▪ Describe the mechanisms involved in allergies. ▪ Describe the major histocompatibility complex, transplantation and graft rejection 				
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
		20		3		130506
Delivery Information:		Campus		Full/Part Time		Period (Year/1st/2ndSem)
		SMU		Full		2 nd
Periods per week:		Classes	Practical's	Tutorial	Seminars	Independent Learning
		3x40 hrs.	1x3 hrs.	Per arrangement	0	20 hrs
Pre-requisite modules for this module:		MBIO011, MCHM011& MCHM102				
Co-requisites modules for module:		-				
Assessment criteria		<ul style="list-style-type: none"> ▪ Description of immunology and basic immunological terminologies ▪ Define the immune system and components of the immune system. ▪ Describe the benefits of inflammation in fighting infection ▪ Outline ways by which pathogens can evade the innate immune system. ▪ Define the term 'antigen'. ▪ Explain the roles of antigen presenting cells. ▪ Know the three functions of antibodies (opsonisation, neutralisation and complement activation). ▪ Describe the protective responses mediated by T cells, B cells and antibodies, epitopes, paratopes, idiotypes ▪ Describe the mechanisms involved with active and passive immunisation. ▪ Understand why attenuated and inactivated vaccines are optimal for protection against viruses ▪ Understand how allergies develop ▪ Describe the mechanisms involved in allergies. <p>Describe the major histocompatibility complex, transplantation and graft rejection</p>				
Assessment method		<p>Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests.</p> <p>Summative Assessment: Examination (written) x 3 hrs examination</p>				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40			
		% Formative Assessment Mark	60			
		% Summative Assessment Mark	40			
	Minimum final mark to pass (%)		50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
		Theory/practical	Theory	Practical		
		Duration	3 hrs.	1 hour		
		% contribution to Summative	40			

	Assessment Mark		20%		
	Sub minimum	40	40%		

MODULAR INFORMATION					
Department:	BIOLOGICAL SCIENCE			School:	SCIENCE and TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB222				
Module Name:	VIROLOGY				
Content:	<p>Aim: Historical development of the science of virology, nature of viruses, general terminology and the variety of virus infections. Nature and general characteristics of viruses: Structure and classification of viruses. Chemical composition of viruses. Viral susceptibility to chemical and physical agents, chemical composition of virus, cultivation of viruses/growth and detection of viruses in the laboratory. Viral cell interactions- lytic, steady and integrated State. Viral replication. Host responses to viral infections and outcome of viral infections. Viral genetics, viral interference and interferon. Some Virus infections: Hepatitis viruses, SARS virus infections, Herpes virus infections, Viral infections of the respiratory tract, alimentary tract, skin and mucous surfaces. Viral infections of the foetus and target organs. Measles, mumps, Rubella viruses. Enteroviruses. Influenza and parainfluenza viruses. Ebola and Marburg viruses. Dengue fever and Lassa fever viruses. Rhabdovirus, pathogenesis and immunology. Diagnosis, treatment and prevention of viral disease (including viral vaccines, gene therapy and antiviral drugs). Molecular Virology and Bioinformatics including antiretroviral resistance and recombinant DNA technology) Bacteriophages. viroids, virusoids and prions. Virus chemotherapy. Animal and plant viruses, Seminars</p>				
Learning Outcomes:	<ul style="list-style-type: none"> • Understand the properties of viruses • Describe the different viral symmetries • Describe methods of viral cultivation • Understand the basis of viral replication • Describe the major mechanisms of toxicity • Understand basic principles of viral classification • Understand basic viral genetics • Describe the common viral diseases • Understand basic principles of chemotherapy of viral diseases • The role of vaccine in the control and prevention of viral diseases 				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	20		3		130503
Delivery Information:	Campus		Full/Part Time		Period (Year/1 st /2 nd Sem)
	SMU		Full		2 nd
Periods per week:	Classes	Practical's	Tutorial	Seminars	Independent Learning
	3X40 hrs.	1x3 hrs.	Per arrangement	0	20 hrs

Pre-requisite modules for this module:		MBIO011, MCHM011 & MCHM102			
Co-requisites modules for module:		-			
Assessment criteria		<ul style="list-style-type: none"> • State the properties of viruses • Describe the different viral symmetries • Describe methods of viral cultivation • Understand the basis of viral replication • Describe the major mechanisms of toxicity • Understand basic principles of viral classification • Demonstrate knowledge of basic viral genetics • Describe the common viral diseases • Understand basic principles of chemotherapy of viral diseases • Show in-depth understanding of the role of vaccine in the control and prevention of viral diseases 			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40			
	% Formative Assessment Mark	60			
	% Summative Assessment Mark	40			
	Minimum final mark to pass (%)	50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3 hrs.	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40	40%		

MODULAR INFORMATION					
Department:	BIOLOGICAL SCIENCE			School:	SCIENCE and TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB223				
Module Name:	Mycology				
Content:	Aim: Structure and features of fungi and algae. Classification of fungi: Chytridiomycota, Zygomycota, Basidiomycota, Ascomycota, Deuteromycetes, Yeasts, Lichens. Fungal cells growth and reproduction/life cycle. Role of fungi and algae in nature and human life: Fungal diseases of humans, Fungal diseases of plants and animals. Importance of fungi in agriculture. Industrial uses of fungi. Mycorrhiza. Diagnosis of fungal infections. Mycotoxins. Antifungal agents. Seminars/reports.				

Learning Outcomes:		<ul style="list-style-type: none"> ▪ Describe the characteristics of fungi ▪ Understand the classification of fungi and be able to relate it with their life cycles ▪ Roles of fungi in the environment ▪ Economic importance ▪ Understand the epidemiology of fungi diseases of humans and animals. ▪ Identify fungal plant pathogens. 				
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
		20		3		130505
Delivery Information:		Campus		Full/Part Time		Period (Year/1 st /2 nd Sem)
		SMU		Full		1st
Periods per week:		Classes	Practical's	Tutorial	Seminars	Independent Learning
		3X40 min	1x3 hrs.	Per arrangement	0	20 hrs
Pre-requisite modules for this module:		MBIO011, MCHM011 & MCHM102				
Co-requisites modules for module:						
Assessment criteria		<ul style="list-style-type: none"> ▪ Describe the characteristics of fungi ▪ Understand the classification of fungi and be able to relate it with their life cycles ▪ Explain the different reproductive methods amongst fungi ▪ Roles of fungi in the environment ▪ Explain the economic importance of fungi ▪ Understand the epidemiology of fungi diseases of humans and animals. ▪ Identify fungal plant pathogens. ▪ Describe the different fungal toxins and their modes of action 				
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40			
		% Formative Assessment Mark	60			
		% Summative Assessment Mark	40			
	Minimum final mark to pass (%)		50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/practical	Theory	Practical			
	Duration	3	1 hour			
	% contribution to Summative Assessment Mark	40	20%			
	Sub minimum	40	40%			

MODULAR INFORMATION

Department:	BIOLOGY & ENVIRONMENTAL SCIENCES	School:	SCIENCE and
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					TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)		BSc		
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB311				
Module Name:	Food Microbiology 3rd year				
Content:	<p>Aim: Roles and significance of microorganisms in food. Incidence and types of bacteria, molds and yeasts, viruses, parasites in meat, seafood and vegetables, dairy products, delicatessen and related products, frozen foods, dehydrated foods. Intrinsic and extrinsic parameters of food that affect microbial growth. Food Spoilage- fruit and vegetables, fresh and processed meat, poultry and seafood, dairy products, canned foods, beers/wines/fermented foods, sugars/candies. Food preservation- with chemical/irradiation, with low temperature/high temperatures, with drying/fermentation. Microbiological Standards and criteria for food safety. Guidelines for different foods (National and International). Indicators for food sanitary quality. Determination of microorganisms in food: culture sampling methods, microscopic method, physical methods, chemical methods, immunological methods, bioassay, cell culture system. Factors affecting microbial growth in food. Food bore infections and food intoxications- Etiology, transmission, pathogenesis, epidemiology and control of food and water borne diseases. Quality assurance of food. Seminars/reports</p>				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Describe food borne diseases ▪ Understand the epidemiology of food borne diseases. ▪ Intrinsic and extrinsic factors that aids in food spoilage ▪ Factors that affect microbial growth in foods ▪ Methods of food preservation ▪ Microbial fermentation of food ▪ The major components of risk analysis in the food industry ▪ Identify pathogens causing food borne diseases. 				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order (Six Numbers)
	20		3		130599
Delivery Information:	Campus		Full/Part Time		Period (Year/1st/2ndSem)
	SMU		Full		1 st
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4x40 hrs	1x3hrs	2x40	0	20 hrs
Pre-requisite modules for this module:	MICB211, MICB212, MICB222 & MICB223				
Co-requisites modules for module:	-				
Assessment criteria	<ul style="list-style-type: none"> ▪ Describe food borne diseases ▪ Understand the epidemiology of food borne diseases. ▪ Intrinsic and extrinsic factors that aids in food spoilage ▪ Factors that affect microbial growth in foods ▪ Methods of food preservation ▪ Microbial fermentation of food 				

		<ul style="list-style-type: none"> The major components of risk analysis in the food industry Identify pathogens causing food borne diseases. Describe the importance of HACCP in the food industry 			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination and 1 hr practical			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40			
	% Formative Assessment Mark	60			
	% Summative Assessment Mark	40			
	Minimum final mark to pass (%)	50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3hrs	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40%	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB312				
Module Name:	Parasitology				
Content:	Aim: Introduction to parasites. Classification of parasites. Structure and features of protozoan. Life cycle patterns of protozoan- Amoebae, Flagellates, Haemoflagellates, Ciliates, Sporozoa. Epidemiology, pathogenesis, symptoms, laboratory diagnosis, treatment, prevention and control of protozoa diseases. Classification of Helminths. General features/characteristics of helminthes. Life cycle patterns of helminthes. Epidemiology, pathogenesis, symptoms, laboratory diagnosis, treatment, prevention and control of – Trematodes, Cestodes and Nematodes infections. Host-parasite relationship/immune response to parasitic infections. Arthropods and Arthropod borne infections.				
Learning Outcomes:	<ul style="list-style-type: none"> Understand and describe the classification of parasites Describe the different types of parasites Mode of transmission of parasites Methods of control of parasites Life cycle of some parasites 				

	<ul style="list-style-type: none"> Identify some common parasites in South Africa. Understand the importance of managing the parasites. 				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	20		3		130504
Delivery Information:	Campus		Full/Part Time		Period (Year/1 st /2 nd Sem)
	SMU		Full/Part-time		1 st
Periods per week:	Classes	Practical's	Tutorial	Seminars	Independent Learning
	4X40 min	1x3 hrs	2x40 min	0	20 hrs
Pre-requisite modules for this module:	MICB211, MICB221 & MICB222				
Co-requisites modules for module:					
Assessment criteria	<ul style="list-style-type: none"> Understand and describe the classification of parasites Describe the different types of parasites Modes of transmission of parasites Methods of control of parasites Life cycle of some parasites Identify some common parasites in South Africa. Understand the importance of managing the parasites. 				
Assessment method	Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination and 1 hr practical				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40		
		% Formative Assessment Mark	60		
		% Summative Assessment Mark	40		
	Minimum final mark to pass (%)		50		
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3hrs	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40%	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				

Module Code: (4 alphabetic & 3 numeric)		MICB313					
Module Name:		Advanced Immunology and Medical Virology					
Content:		Immunotherapy, immune-prophylaxis. Bacterial/viral/parasitic/fungal immunity, vaccines, types and formulation. The synthesis of antibody, roles of the small lymphocytes, cellular cooperation in the immune response, generation of antibody diversity, development of immunological tolerance, theory of antibody synthesis, monoclonal antibody and development, nature of antigen-antibody reactions, affinity and avidity, specificity and cross reactivity, antigen-antibody reactions (<i>in vitro</i>), complement system and its role in immunity, agglutination, antigen-antibody reactions (<i>in vivo</i>), immunochemotherapy, immunodiagnosics					
Learning Outcomes:		<ul style="list-style-type: none"> ▪ Describe and use basic immunology terminology ▪ Understand and describe the immune system - the cells and organs of the immune system ▪ Describe the causes, types and mechanisms of immune reactions ▪ Describe the classes of antibody and class switching in antibody production ▪ Understand the nature of innate and humoral immunity ▪ Understand concepts, production and uses of monoclonal antibody ▪ Understand and describe the principles of immunological tolerance ▪ Describe the principle and application of immunology in diagnostics ▪ Understand the immunology of organ transplants and graft rejection 					
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)	
		20		3		130506	
Delivery Information:		Campus		Full/Part Time		Period (Year/1 st /2 nd Sem)	
		SMU		Full		1 st	
Periods per week:		Classes	Practical's	Tutorial	Seminars	Independent Learning	
		4X40 min	1x3hrs	2x40 min	0	20 hrs	
Pre-requisite modules for this module:		MICB211, MICB221 & MICB222					
Co-requisites modules for module:							
Assessment criteria		<ul style="list-style-type: none"> ▪ Describe and use basic immunology terminology ▪ Understand and describe the immune system - the cells and organs of the immune system ▪ Describe the causes, types and mechanisms of immune reactions ▪ Describe the classes of antibody and class switching in antibody production ▪ Understand the nature of innate and humoral immunity ▪ Understand concepts, production and uses of monoclonal antibody ▪ Understand and describe the principles of immunological tolerance ▪ Describe the principle and application of immunology in diagnostics ▪ Understand the immunology of organ transplants and graft rejection 					
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination and 1 hr practical					
Mark	Minimum Form Assessment Mark for exam admission (%)				40		
Structure:		% Formative Assessment Mark			60		

	% Summative Assessment Mark	40			
	Minimum final mark to pass (%)	50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3hrs	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40%	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:		First Year Offered (New):	2022		
Replace this Module existing module(s)?	NO	If YES, give the module codes:			
Module linked to Qualification/s:	BSc (Life Sciences Stream)		BSc		
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB321				
Module Name:	Microbial Genetics and Molecular Biology				
Content:	<p>Genomics - the study of the structure and function of whole genomes, structural Genomics -the study of the sequences of genomes, Functional Genomics -the study of the functions of genetic information contained within genomes, Proteomics - characterization of all proteins encoded by a genome, bases, nucleosides, & nucleotides building blocks nucleic acid building blocks. DNA vs RNA, mechanism of DNA Replication (Semi-Conservative mechanism -Meselson–Stahl experiment), nucleotide sequence and its importance, DNA polarity, DNA replication, proteins involved-topoisomerases, helicase, gyrase, DNA polymerases 1 and 3, primase, ligase, DNA directionality- antiparallel, general model of DNA replication, genetic of E.coli DNA replication, comparisons between prokaryotic and eukaryotic DNA replications, Semi-discontinuous DNA synthesis- Okazaki fragments, Mutations, basic concepts, types, classes and causes of mutation, UV radiation, Ionization radiation, chemical mutagens, mechanisms of mutations, SOS DNA repair induced mutation, spontaneous mutation, adaptive mutation, DNA repair mechanisms, Detection of mutants-Selections vs. screens , Carcinogenicity testing , methods of gene transfer in bacteria vertical versus horizontal, transformation, conjugation fertility factor HFR, transduction, Transposons, Introduction to RNA & its Functions, types of RNA coding and noncoding RNA, transcription and translation, concept of a gene and gene expression, protein synthesis, ingredients and mechanisms. Basic molecular cloning techniques such as restriction digestion and agarose gel electrophoresis, hybridization, biosynthesis of DNA, RNA and proteins; repair mechanisms and recombination; techniques used in nucleic acid manipulation; types of plasmids and the main vector types used in molecular cloning; basic genetic engineering.</p>				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Describe and use basic genetic terminology ▪ Understand and describe the central dogma of molecular biology (DNA replication, transcription and translation) in prokaryocytes ▪ Describe the causes, types and mechanisms of mutation in prokaryocytes ▪ Describe microbial sex and conjugation ▪ Understand the nature and use of plasmids and bacteriophages 				

		<ul style="list-style-type: none"> ▪ Understand concepts and use of genetic engineering ▪ Understand and describe the principles of nucleic acid mapping, hybridization, sequencing and site-directed mutagenesis ▪ Describe the principle and application of the polymerase chain reaction ▪ Differentiate between the concepts of lysis and lysogeny ▪ Discuss the mechanisms behind food spoilage and food preservation ▪ Understand the concept of gene cloning and different types of cloning ▪ Gene regulation and expression 				
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
		20		3		130599
Delivery Information:		Campus		Full/Part Time		Period (Year/1st/2ndSem)
		SMU		Full		2 nd
Periods per week:		Classes	Practical's	Tutorial	Seminars	Independent Learning
		4X40 min	1x3hrs	2x40 min	0	20 hrs
Pre-requisite modules for this module:		MICB211 & MICB222				
Co-requisites modules for module:						
Assessment criteria		<ul style="list-style-type: none"> ▪ Describe and use basic genetic terminology ▪ Understand and describe the central dogma of molecular biology (DNA replication, transcription and translation) in prokaryocytes ▪ Describe the causes, types and mechanisms of mutation in prokaryocytes ▪ Describe microbial sex and conjugation ▪ Understand the nature and use of plasmids and bacteriophages ▪ Understand concepts and use of genetic engineering ▪ Understand and describe the principles of nucleic acid mapping, hybridization, sequencing and site-directed mutagenesis ▪ Describe the principle and application of the polymerase chain reaction ▪ Differentiate between the concepts of lysis and lysogeny ▪ Discuss the mechanisms behind food spoilage and food preservation ▪ Understand the concept of gene cloning and different types of cloning and its importance in the field of biotechnology ▪ Detailed description of gene regulation and expression 				
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination and 1 hr practical				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40			
		% Formative Assessment Mark	60			
		% Summative Assessment Mark	40			
	Minimum final mark to pass (%)		50			
Summative Assessment Paper:			Paper 1	Paper 2	Paper 3	Paper 4
		Theory/practical	Theory	Practical		
		Duration	3hrs	1 hour		
		% contribution to Summative Assessment Mark	40	20%		

	Sub minimum	40%	40%		
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MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:			First Year Offered (New):	2022	
Replace this Module existing module(s)?	NO		If YES, give the module codes:		
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB322				
Module Name:	Medical Microbiology and Antimicrobial agents				
Content:	Aetiology, pathogenesis, laboratory diagnosis, epidemiology and treatment and control of bacterial infections. Pathogenic mechanisms of micro-organisms, Host defence mechanisms, principles of antimicrobial activity, sterilization and disinfection, molecular approach to infectious diseases e.g. outbreak and population-based analysis for epidemiological control of infection, syndrome based infections. The mechanisms of action and resistance of the various classes of antibiotics used in clinical, veterinary and agricultural practice, mechanisms of resistance dissemination, microbial resistance to antibiotics, the genetic basis of bacterial resistance to antibiotics, the medical problem of bacterial resistance, laboratory studies on antibiotic action. Strategies for the prevention and containment of antibiotics in the context of inter alia surveillance, risk factors, infection control, pharmacokinetics and pharmacodynamics, antibiotic stewardship models and approaches, socio-behavioural aspects related to antibiotic prescription, dispensing/distribution and consumption and international and national stewardship and conservation initiatives.				
Learning Outcomes:	<ul style="list-style-type: none"> ▪ Describe the role of medically-significant micro-organisms, their immuno-pathogenesis and the role of the laboratory in the diagnosis of infection ▪ Students should be able to describe the principle of antibiotic stewardship and conservation, ▪ Understand specifically the mechanisms of action and resistance of antibiotics used in clinical, veterinary and agricultural practice, Understand strategies for resistance prevention and containment, ▪ Understand national and international stewardship and conservation initiatives and an appreciation for the need to adopt a multi- and inter-disciplinary approach to these issues. 				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level	CESM Code (3rd Order) (Six Numbers)	
	12		3	130502	
Delivery Information:	Campus		Full/Part Time		Period (Year/1st/2ndSem)
	SMU		Full		2 nd
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4X40 min	1x3hrs	2x40 min	0	20 hrs

Pre-requisite modules for this module:		MICB211, MICB221, MICB222 & MICB223			
Co-requisites modules for module:		-			
Assessment criteria		<ul style="list-style-type: none"> ▪ Describe the role of medically-significant micro-organisms, their immunopathogenesis and the role of the laboratory in the diagnosis of infection ▪ Students should be able to discuss the principle of antibiotic stewardship and conservation and why antibiotics stewardship ▪ Understand specifically the mechanisms of action and resistance of antibiotics used in clinical, veterinary and agricultural practice. ▪ Understand strategies for resistance prevention and containment ▪ Understand national and international stewardship and conservation initiatives and an appreciation for the need to adopt a multi- and inter-disciplinary approach to these issues. 			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination and 1 hr practical			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40			
	% Formative Assessment Mark	60			
	% Summative Assessment Mark	40			
	Minimum final mark to pass (%)	50			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory	Practical		
	Duration	3hrs	1 hour		
	% contribution to Summative Assessment Mark	40	20%		
	Sub minimum	40%	40%		

MODULAR INFORMATION					
Department:	BIOLOGY & ENVIRONMENTAL SCIENCES			School:	SCIENCE and TECHNOLOGY
Last Revision date:			First Year Offered (New):		
Replace this Module existing module(s)?	NO		If YES, give the module codes:		
Module linked to Qualification/s:	BSc (Life Sciences Stream)			BSc	
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code: (4 alphabetic & 3 numeric)	MICB323				
Module Name:	Agricultural and Veterinary Microbiology				
Content:	Aim: Plant pathogens and classification- bacterial, fungi, protozoans and viruses, identification, spread of and control of plant pathogens, mechanisms of pathogenesis				

		and virulence genes of plant pathogens, examples of some plant diseases caused by bacterial, fungal, protozoan and viral pathogens. A comprehensive reference on the bacterial, fungal, and viral pathogenic agents that cause diseases of domesticated vertebrate animals (livestock, companion animals, fur-bearing animals, game, poultry,) that supply food, other useful products or companionship. Control of veterinary diseases, zoonosis, diagnoses and treatment.			
Learning Outcomes:		<ul style="list-style-type: none"> ▪ Describe the roles of important plant pathogens in plant diseases, their pathogenesis, virulence, diagnosis and control. ▪ Examples of important crop diseases and economic implications ▪ Discuss different veterinary pathogens, their virulence factors, diagnosis, treatment and controls ▪ Zoonotic diseases, diagnosis, treatment, and control. ▪ The roles of vectors and reservoirs in zoonotic diseases ▪ Specific diseases of domestic and companion animals 			
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level	CESM Code (3rd Order) (Six Numbers)
		12		3	091608
Delivery Information:		Campus		Full/Part Time	Period (Year/1st/2ndSem)
		SMU		Full	2 nd
Periods per week:		Classes	Practical's	Tutorial	Seminars
		3	1	1	
Pre-requisite modules for this module:		MICB201, MICB202, MICB203, MICB204, MICB205 & MICB206			
Co-requisites modules for module:		-			
Assessment criteria		<ul style="list-style-type: none"> ▪ Describe the roles of important plant pathogens in plant diseases, their pathogenesis, virulence, diagnosis and control. ▪ Examples of important crop diseases and economic implications ▪ Discuss different veterinary pathogens, their virulence factors, diagnosis, treatment and controls. ▪ Zoonotic diseases, diagnosis, treatment, and control. ▪ The roles of vectors and reservoirs in zoonotic diseases ▪ Specific diseases of domestic and companion animals 			
Assessment method		Formative Assessment: Six main tests each consisting of theory, practical (spotter) and computer tests. Summative Assessment: Examination (written) x 3 hrs examination and 1 hr practical			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40		
		% Formative Assessment Mark	60		
		% Summative Assessment Mark	40		
	Minimum final mark to pass (%)		50		
Summative Assessment Paper:			Paper 1	Paper 2	Paper 3
		Theory/practical	Theory	Practical	
		Duration	3 Hours	1 hour	
		% contribution to Summative Assessment Mark	40%	20%	

	Sub minimum	40%	40%		
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BOTANY - BSCG06

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	2014	First Year Offered (New):	2024		
Replace this Module existing module(s)?	YES	If YES, give the module codes:	BOTYY101 REPLACES MBOTY012 (in part)		
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	NO (If YES, Section G must also be completed)				
Module Code (4 alphabetic & 3 numeric)	BOTY101				
Module Name	Introduction to Botany				
NQF Level of this module	NQF 5				
Purpose of the module	The module will introduce students to the basic principles and concepts of Botany including plant cell structure, metabolism, ecology habitation zones, physiology, reproduction, plant diversity, and genetics.				
Content (list topics):	The origin and diversity of living organisms and plants in form, growth, habit, reproduction, ecology, metabolism, and genetic composition. The emphasis is on how the structure (biological molecules and metabolic processes) and anatomy cell theory) of plants enable them to carry out certain functions, adapt to certain ecological habitats, carry out different physiological processes; and modes of reproduction. Introductory genetics (mitosis and meiosis).				
Exit Level Outcomes addressed by this module	ELOs 1&2				
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc. Indicate the proportion of each in a table format by using percentages	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).				
Work integrated Learning/clinical practice	N/A				
Total credits for WIL	N/A				
Level at which WIL commences and tabulate the programme/blocks	N/A				
Prescribed/recommended texts	Botany: An Introduction to Plant Biology: An Introduction to Plant Biology 7th Edition by James D. Mauseth (Author).				

Learning outcomes		Assessment Criteria				
<ul style="list-style-type: none"> Describe the importance of plants to life on Earth and their structural and functional adaptations in various environmental settings. 		The core concepts and principles of the basic structure and function of plants are identified, described, and explained. The relationships among plant functional adaptations are demonstrated.				
<ul style="list-style-type: none"> Classify plants based on their genetic diversity 		Recognize and discuss the haploid and diploid stages of plant life cycles (general). Describe mitosis and meiosis.				
<ul style="list-style-type: none"> Explain and indicate the roles played by the meristem and other plant structures in plant growth and development. 		Illustrate the derivation of the permanent tissues from meristems. Recognize the different tissue types that constitute the plant body and differentiate between primary and secondary growth in plants. Identify and describe modification and function changes in roots, stems, and leaves.				
<ul style="list-style-type: none"> Recognize, distinguish, and organize standard methods and procedures to identify basic plant metabolic processes and their respective functions. 		The range and limits of core concepts and principles of metabolic processes are identified. Arrange, describe, and discuss the steps of photosynthesis, respiration, synthesis, and degradation of organic compounds in plants.				
<ul style="list-style-type: none"> Identify, arrange, and discuss the physiological and reproduction processes in angiosperms 		Identify and describe adaptation features of plants growing in different environments. Identify and describe adaptation features in fruits for different modes of dissemination.				
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
		12		N/A		130301
Delivery Information:		Campus		Full/Part Time		Period (Year 1/1 st Sem)
		SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY		Full/Part-time		FULL TIME
Periods per week:		Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
		4	One three hour session	1	0	4
Pre-requisite modules for this module:		N/A				
Co-requisites modules for module:		NONE				
Assessment strategy		Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, and practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, and practical reports. Summative Assessment Methods: Main exam at the end of the module.				
Internal Moderation		Prof. PH King				
External Moderation		Prof CL Obi				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%			
	% Continuous Assessment Mark		60%			
	% Summative		40%			

	Assessment Mark				
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	2015		First Year Offered (New):	2024	
Replace this Module existing module(s)?	YES		If YES, give the module codes:	BOTY102 REPLACES MBOT012 (in part)	
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	No (If YES, Section G must also be completed)				
Module Code (4 alphabetic & 3 numeric)					
BOTY102					
Module Name					
Evolutionary survey of the plant kingdom					
NQF Level of this module					
NQF 5					
Purpose of the module					
To develop basic knowledge and understanding of the diversity of plant organisms, their origin, major plant kingdoms divisions, and their importance from viruses, bacteria, algae, mosses, ferns, and seed-bearing plants.					
Content (list topics):					
Levels of biological complexity (adaption to life on land). Evolutionary innovations and radiation of organisms (bacteria, fungi, plants, and relationship with animals). Development and function of major structures. Life cycles: Bryophytes, vascular plants, seed plants (gymnosperms and angiosperms). Principles of classification.					
Exit Level Outcomes addressed by this module					
ELO 1&2					
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc. Indicate the proportion of each in a table format by using percentages					
Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).					
Work integrated Learning/clinical practice					
N/A					
Total credits for WIL					
N/A					
Level at which WIL commences and tabulate the programme/blocks					
N/A					

Prescribed/recommended texts		Campbell Biology, 12th edition. Published by Pearson (July 13th 2021) - Copyright © 2021. Lisa A. Urry Mills College, Oakland, California; Michael L. Cain New Mexico State University, Las Cruces, New Mexico; Steven A. Wasserman University of California, San Diego; Peter V. Minorsky Mercy College, Dobbs Ferry, New York; Rebecca Orr Collin College, McKinney, Texa.				
Learning outcomes		Assessment Criteria				
<ul style="list-style-type: none"> Critically evaluate the origin of plants and establish evolutionary relationships among the major divisions of the Kingdom Plantae. 		Define the various concepts used in plant origins and classification systems. Differentiate among terms used in the classification of major plant groups. Arrange and order the different divisions of the plant kingdom.				
<ul style="list-style-type: none"> Describe 'the Alteration of Generations "master plan" in the completion of life cycles. 		Locate, identify, and explain the structures of Bryophytes, vascular plants, and seed plants. Draw and annotate the life cycles of Bryophytes, vascular plants, and seed plants (gymnosperms and angiosperms).				
<ul style="list-style-type: none"> Discuss the origin, structure, and growth of viruses and bacteria. 		Define the various concepts related to viruses and bacteria. Draw and explain the structure and associated functions of major viruses and bacteria. Discuss the mechanisms and factors that affect the growth of bacteria and viruses.				
<ul style="list-style-type: none"> Recognise and indicate the differences between monocots and dicots 		List the major differences between monocots and dicots (structural, functional, and advantages). Interpret or distinguish the features of dicots and monocots using diagrams.				
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level	CESM Code (3rd Order) (Six Numbers)	
		12		N/A	130301	
Delivery Information:		Campus		Full/Part Time	Period (Year 1/ 2ndSem)	
		SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY		Full/Part-time	FULL TIME	
Periods per week:		Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
		4	One three-hour session	1	0	4
Pre-requisite modules for this module:		BOTY101				
Co-requisites modules for module:		NONE				
Assessment strategy		Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, and practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, and practical reports. Summative Assessment Methods: Main exam at the end of the module.				
Internal Moderation		Prof. PH King				
External Moderation		Prof CL Obi				
Mark	Minimum Form Assessment Mark for exam admission (%)	40%				
Structure:	% Continuous Assessment Mark	60%				

	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	2015	First Year Offered (New):	2024		
Replace this Module existing module(s)?	YES	If YES, give the module codes:	BOTY201 REPLACES MBOA022 (IN PART)		
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	No	(If YES, Section G must also be completed)			
Module Code (4 alphabetic & 3 numeric)	BOTY201				
Module Name	Plant taxonomy, ecology, and diversity				
NQF Level of this module	NQF 6				
Purpose of the module	<p>Plant Taxonomy will equip students with knowledge of the taxonomy /systematics of higher plants and familiarity with the naming and hierarchical position of the different groups. Ecology will introduce the principles of rangeland ecology and management in conservation, agricultural & communal systems.</p> <p>Plant diversity will provide students with an evolutionary framework of the continuity from unicellular organisms through the evolution of complex lifecycles to the explosive radiation of the Anthophyta.</p>				
Content (list topics):	<p>Plant Taxonomy: introduction to systematic Botany, definitions, objectives, phases of systematic Botany, critical problems, and opportunities, historical background to classification, the influence of Darwin's theory of evolution on systematics, plant nomenclature, basis of scientific names, rules of nomenclature. Concepts of plant taxonomy, sources of taxonomic information, Ecological principles and applications in agricultural & wildlife management. Responses of grasses to defoliation, grazing systems, veld condition, veld burning, and rangeland monitoring techniques. Plant diversity: Algae. Lichens. Liverworts & mosses. Lower vascular plants. Evolution of seeds; radiation of gymnosperms. Origin and radiation of angiosperms, their success and diversification into contemporary families.</p>				
Exit Level Outcomes addressed by this module	ELO 3				
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).				

work; self study; etc. Indicate the proportion of each in a table format by using percentages					
Work integrated Learning/clinical practice	N/A				
Total credits for WIL	N/A				
Level at which WIL commences and tabulate the programme/blocks	N/A				
Prescribed/recommended texts	Introduction to the Principles of Plant Taxonomy. 2nd Edition; Author: V. V. Sivarajan; Editor: N. K. P. Robson Date Published: October 1991				
Learning outcomes	Assessment Criteria				
<ul style="list-style-type: none"> Demonstrate knowledge of the concepts of Plant taxonomy and the sources of taxonomic information. 	<p>Define the various concepts in plant taxonomy in the module. Examine the criteria for classifying plants based on taxonomic information. Apply the criteria and methodology in classifying plants.</p>				
<ul style="list-style-type: none"> Assess the evolution of new species and various types of classification methods. 	<p>Demonstrate an understanding of the sources of taxonomic information using Darwin's theory of evolution. Apply the evolution theory to different taxonomic scenarios. Analyze the various sources of information associated with taxonomy, such as anatomy, ecology, morphology, and chemistry.</p>				
<ul style="list-style-type: none"> Recognize principles of ecology, management, and conservation 	<p>Analyze ecological principles and applications in agricultural & wildlife management. Examine the various responses of grasses to defoliation, grazing systems, veld condition, veld burning, and rangeland monitoring techniques.</p>				
<p>Research biological diversity with an evolutionary framework and a special focus on Southern African plants.</p>	<p>Discuss the evolution of plant diversity with reference to Algae, Lichens, Liverworts & mosses, Lower vascular plants and seed plants. Identify important South African plant species and explain the vegetation types and characteristics of each species. Describe the origin and affinity, biomes, veld types, rare and threatened species, plant endemism, and plant conservation of South African vegetation.</p>				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)	ITS Course Level	CESM Code (3rd Order) (Six Numbers)		
	20	N/A	130301		
Delivery Information:	Campus	Full/Part Time	Period (Year 2/1 st Sem)		
	SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY	Full/Part-time	FULL TIME		
Periods per week:	Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
	4	One three hour session	1	0	6
Pre-requisite modules for this module:	BOTY101 & BOTY102				
Co-requisites modules for module:	NONE				
Assessment strategy	Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports.				

		Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Summative Assessment Methods: Main exam at the end of the module.			
Internal Moderation		Prof. PH King			
External Moderation		Prof CL Obi			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Continuous Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	2015		First Year Offered (New):	2024	
Replace this Module existing module(s)?	Yes		If YES, give the module codes:	BOTY202 REPLACES MBOA022 (IN PART)	
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	No (If YES, Section G must also be completed)				
Module Code (4 alphabetic & 3 numeric)					
BOTY202					
Module Name					
Plant Ecophysiology and Biotechnology					
NQF Level of this module					
NQF 6					
Purpose of the module					
To provide a basic knowledge of the major physiological processes of plants and their relevance, in relation to environmental fluctuations. To introduce students to the basic concepts of genetic engineering and biotechnology and their applications to the fields of agriculture, forestry, medicine, and forensics.					
Content (list topics):					
Plants: plant growth regulation; photosynthesis; plant metabolism; mineral nitrogen-fixing; water relations; stomatal physiology; physical environmental responses; developing abiotic stress tolerant and disease resistant plants; applications in solar energy. Application of key concepts to society. Ancient, classical, and modern biotechnology. Classical studies on cloning. Basic principles of recombinant DNA technology. Gene transfer methods in plants. Topics plant biotechnology, forensics, Regulations, patents and society.					
Exit Level Outcomes addressed by this					
ELO4					

module			
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc. Indicate the proportion of each in a table format by using percentages	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).		
Work integrated Learning/clinical practice	N/A		
Total credits for WIL	N/A		
Level at which WIL commences and tabulate the programme/blocks	N/A		
Prescribed/recommended texts	1. Plant Physiology. Taiz, L., Zeiger, E (2010). 5th Ed. Sinauer Associates, Sunderland. 2. Introduction to plant biotechnology. H.S Chawla. Science Publishers, 2002 - Genetic engineering.		
Learning outcomes	Assessment Criteria		
<ul style="list-style-type: none"> Critically evaluate the importance of water and mineral nutrients for plant growth and development. 	<p>Define the various concepts In Plant Ecophysiology and Biotechnology.</p> <p>Explain the role of water at the cellular level and water balance of the whole plant and the principles and mechanisms of transportation of water and solutes in plants.</p> <p>Describe the importance of essential mineral nutrients for plants growth and productivity.</p>		
<ul style="list-style-type: none"> Demonstrate knowledge of major metabolic processes (photosynthesis, respiration, lipid metabolism, nitrogen fixation and nutrient assimilation) that take place in plants. 	<p>Explain the role of sunlight as an energy source and its conversion to the chemical energy of organic compounds. Discuss the photosynthetic carbon metabolism (C₃, C₄ and CAM plants, photorespiration).</p> <p>Illustrate and explain the mechanisms of metabolic pathways involved in the release of energy stored in carbon compounds, with emphasis on special features of respiration that are specific to plants.</p> <p>Discuss the role of lipids in plants and the major metabolic pathways involved in their biosynthesis, storage and conversion into carbohydrates in germinating seeds.</p> <p>Discuss the principles and importance of assimilation of mineral nutrients by plants.</p>		
<ul style="list-style-type: none"> Demonstrate an understanding of the basis of plant responses to different abiotic and biotic constraints that induce stress in plants. 	<p>Describe the basic concept of biological stress and physiological processes associated with stress injury, acclimation, and adaptation.</p> <p>Discuss plant responses to various environmental stresses at Botanical, structural and metabolic levels.</p> <p>Explain the links between different environmental stresses and the integrated plant responses to multiple stresses.</p>		
<ul style="list-style-type: none"> Basic knowledge of Plant biotechnology and its applications in practice to produce plants with improved characteristics (disease-free, stress-resistant, etc.). 	<p>Explain the use of molecular and biotechnology approaches in understanding the basis of plant tolerance to different environmental constraints.</p> <p>Discuss the impact of herbivores and pathogens on plants and the role of secondary metabolites and plant engineering in defence systems.</p> <p>Summarize examples and illustrate some approaches for the development of plants via genetic engineering with improved productivity and tolerance to biotic and abiotic constraints.</p>		
Module Information:	SAQA Credits	ITS Course Level	CESM Code (3rd)

	(4; 8; 12; 16; 20; 24; 28;32)		Order) (Six Numbers)		
	20	N/A	130301		
Delivery Information:	Campus	Full/Part Time	Period (Year 2/ 2 nd Sem)		
	SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY	Full/Part-time	FULL TIME		
Periods per week:	Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
	4	One three hour session	1	0	6
Pre-requisite modules for this module:	BOTY101 & BOTY102				
Co-requisites modules for module:	None				
Assessment strategy	Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, and practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Summative Assessment Methods: Main exam at the end of the module.				
Internal Moderation	Prof. PH King				
External Moderation	Prof CL Obi				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Continuous Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

MODULAR INFORMATION						
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology	
Last Revision date:	2016		First Year Offered (New):	2024		
Replace this Module existing module(s)?			If YES, give the module codes:	BOT301 REPLACES BLGY301 (IN PART)		
Module linked to Qualification/s:	BSCG01					

Migration Strategy:	NO	(If YES, Section G must also be completed)
Module Code (4 alphabetic & 3 numeric)	BOTY301	
Module Name	Plant EthnoBotany	
NQF Level of this module	NQF 7	
Purpose of the module	To provide an overview of the discovery and use of plant medicine and therapeutically relevant compounds and molecules derived from plants, with the incorporation of plant nanotechnology and drug and development. Biochemistry will further students' knowledge of the location and metabolism of plant compounds using plant cell biology which will provide an overview of the structure, function and coordination at various cellular and tissue levels in plants.	
Content (list topics):	Introduction to Ethnobotany, data collection, and hypothesis, Collecting and identifying plants, herbarium specimens, phytochemical extraction techniques, plant screening, separation of plant compounds, Main classes of secondary metabolites, introduction to metabolomics, drug discovery, nanotechnology, testing of plant compounds for biological assays, participant observation, surveys and analytical tools, qualitative and quantitative approaches of plant compounds, ethnobotanical research and community development. Cell biology will cover Membrane structure and function. Intracellular spatial organization. The cytoskeleton. The endomembrane system. Intra- and extracellular coordination. Plant metabolism. Theory of light and electron microscopy and preparation techniques.	
Exit Level Outcomes addressed by this module	ELO 5	
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc. Indicate the proportion of each in a table format by using percentages	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).	
Work integrated Learning/clinical practice	N/A	
Total credits for WIL	N/A	
Level at which WIL commences and tabulate the programme/blocks	N/A	
Prescribed/recommended texts	<ol style="list-style-type: none"> 1st Edition Ethnobotany From the Traditional to Ethnopharmacology. Edited by José L. Martinez, Alfred Maroyi, Marcelo L. Wagner Copyright 2023. Plant Cell Biology From Astronomy to Zoology 1st Edition - September 8, 2009 Author: Randy Wayne. Journal articles will also be used for sections pertaining to biochemistry and cell biology. 	
Learning outcomes		Assessment Criteria
•Demonstrate knowledge of the history and development of Ethnobotany and know the different fields involved in Ethnobotany.		Define the various concept of plant Ethnobotany, biochemistry, and cell biology. Describe the origin of Ethnobotany by discussing the history and origins of Ethnobotany on an international and national scale. Implement Ethnobotany data and how it is gathered and stored in various fields.
•Recognize the various fields, techniques and approaches involved with Ethnobotany		Formulate a hypothesis. Identification of a suitable location and which plant parts to collect. Explain the preparation of an Ethnobotanical reference collection.

	Describe the functions of herbaria and the curation of plant specimens. Collect plants for an ethnopharmacological study.				
•Identify and classify major secondary compounds in plants using biochemical techniques.	Describe phytochemical extraction, analysis, and screening, and nanotechnology. Identify principles and application of metabolomics and drug discovery Apply chromatographic methods for phytochemical analysis of secondary metabolites. Develop different approaches to obtain information from local residents. Differentiate between qualitative and quantitative approaches to study Ethnobotany.				
•Describe the importance and relationships between plant membrane structure and function.	Identify different types of plant secretory structures. Describe the morphology, anatomy, and function of plant secretory structures. Examine the mechanisms and processes related to the metabolism and storage of chemical compounds within secretory structures.				
Apply microscopy techniques.	Explain microscopy terms and definitions. Classify different types of microscopy and discuss the applications of each technique. Discuss sample preparation techniques for various sample types and microscopes. Analyze the data obtained from micrographs. Compare and contrast the various types of plant secretory structures. Assess the relevance of the plant secretory structures and its method of metabolic processes.				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	16		N/A		130301
Delivery Information:	Campus		Full/Part Time		Period (Year 3 /1st Sem)
	SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY		Full/Part-time		FULL TIME
Periods per week:	Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
	4	One three hour session	1	0	6
Pre-requisite modules for this module:	BOTY201 & BOTY202				
Co-requisites modules for module:	NONE				
Assessment strategy	Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Summative Assessment Methods: Main exam at the end of the module.				
Internal Moderation	Prof. PH King				
External Moderation	Prof CL Obi				

Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%			
		% Continuous Assessment Mark	60%			
		% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)		50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/practical	Theory				
	Duration	3 hours				
	% contribution to Summative Assessment Mark	100%				
	Sub minimum	40%				

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	2016	First Year Offered (New):	2024		
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	BOTY302 REPLACES MBOA032 (IN PART)		
Module linked to Qualification/s:					
Migration Strategy:	(If YES, Section G must also be completed)				
Module Code (4 alphabetic & 3 numeric)	BOTY302				
Module Name	Applied Plant Physiology				
NQF Level of this module	NQF 7				
Purpose of the module	To illustrate the importance of whole-plant physiology in the growth and performance of plants in natural and managed ecosystems.				
Content (list topics):	Basic aspects of plant growth, differentiation, and development: Plant life cycle (sexual and asexual reproduction); senescence and programmed cell death. Different levels of control of plant growth and development: Intracellular (genetic control) - plant genome, changes in gene expression and protein synthesis; Intercellular (hormonal regulation) - plant growth hormones and their applications. Advanced plant water relations: pressure-volume curves; transpiration; modelling of evapotranspiration; hydraulic characteristics. Photosynthesis: response of assimilation to intercellular CO ₂ ; stomatal limitations; water-use efficiency; introduction to chlorophyll fluorescence. Stress physiology: responses of plants to environmental stresses; stress resistance; determinants of plant growth & productivity.				
Exit Level Outcomes addressed by this module	ELO 6				
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc.	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).				

Indicate the proportion of each in a table format by using percentages					
Work integrated Learning/clinical practice	N/A				
Total credits for WIL	N/A				
Level at which WIL commences and tabulate the programme/blocks	N/A				
Prescribed/recommended texts	Plant Physiology. Taiz, L., Zeiger, E (2010): 5th Ed. Sinauer Associates, Sunderland.				
Learning outcomes	Assessment Criteria				
<ul style="list-style-type: none"> Evaluate the aspects and plant growth, including asexual and sexual reproduction as well as the genetic basis of inheritance, also the senescence mechanisms and cell death in plants. 	Define the various concepts in applied plant physiology. Solve problems/exercises based on Mendel's Laws of inheritance and the deviations from these laws. Explain Mendelian principles on the bases of DNA, genes and gene products. Illustrate how genetic changes (mutations) in individuals lead to changes in population genetic pools and speciation. Assess the major factors contributing to senescence in plants and its physiological changes. Assess, examine and explain programmed cell death as a special type of senescence.				
<ul style="list-style-type: none"> Assess the relationships between flower structure and pollinator shape and habit as well as between fruit structure and seed dispersal. 	Predict the type of pollinators from characteristics of flowers according to pollination syndromes. Explain the processes of fertilisation and embryogenesis. Evaluate the effects of pollinators and seed dispersal agents on the reproductive proficiency of plant species.				
Determine plant-water relations using pressure-volume curves.	Distinguish between growth, differentiation and development. Integrate different parameters used for the evaluation of plant growth. Compare the basis of inter- intra- and extra-cellular regulation of plant growth and development.				
Compare and contrast photosynthesis with reference to intercellular CO ₂ and stomatal limitations	Construct diagrams to represent the interactions/effects of intercellular CO ₂ and the influence of stomata. Predict the effects of CO ₂ and stomata on the processes of photosynthesis				
<ul style="list-style-type: none"> Compare the stress physiology of plants to various environmental stresses. 	Identify and explain the physiological effects of various hormones on plants and give examples of their application in the horticulture and plant tissue culture industry. Explain and discuss mechanisms of hormonal control of plant growth and development.				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
	16		N/A		130301
Delivery Information:	Campus		Full/Part Time		Period (Year 3/ 2ndSem)
	SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY		Full/Part-time		FULL TIME
Periods per week:	Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
	4	One three hour session	1	0	6

Pre-requisite modules for this module:		BOTY201 & BOTY202			
Co-requisites modules for module:		N/A			
Assessment strategy		Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Summative Assessment Methods: Main exam at the end of the module.			
Internal Moderation		Prof. PH King			
External Moderation		Prof CL Obi			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Continuous Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	2016	First Year Offered (New):	2024		
Replace this Module existing module(s)?	NO		If YES, give the module codes:		
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	No (If YES, Section G must also be completed)				
Module Code (4 alphabetic & 3 numeric)	Plant Ecology				
Module Name	BOTY303				
NQF Level of this module	NQF 7				
Purpose of the module	To introduce principles and concepts of plant population and community ecology, and their application, in relation to ecological succession such as single-species populations, metapopulations, and communities, and provide grounding in applied rangeland ecology & objective-based management.				
Content (list topics):	Determinants of plant community concepts, floristic and structural composition, plant diversity, ecological succession, landscape ecology. Data processing techniques. Species interactions and an evaluation of their effects on interacting species. Fundamentals of plant population biology: life tables; plant breeding systems and pollination; population dynamics; life history strategies; intraspecific competition; interspecific competition and co-existence. Productivity, carrying capacity, stocking				

	rates, and secondary productivity in complex, dynamic interactive systems. Management & rehabilitation of vegetation types to achieve outcomes. Historical & contemporary theories of rangeland function.		
Exit Level Outcomes addressed by this module	ELO 6		
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc. Indicate the proportion of each in a table format by using percentages	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).		
Work integrated Learning/clinical practice	N/A		
Total credits for WIL	N/A		
Level at which WIL commences and tabulate the programme/blocks	N/A		
Prescribed/recommended texts	Applied Ecology and Natural Resource Management Publisher: Cambridge University Press; 2002 and Journal articles will be used.		
Learning outcomes	Assessment Criteria		
<ul style="list-style-type: none"> State the concepts relating to population and community ecology and their application. This LO can be written on NQF level 6. The students should be able to do more than just know. Assess plant community concepts, floristic and structural composition. 	Define the various concepts in plant ecology. Implementing the various applications of population and community ecology is demonstrated. Compare plant community concepts, floristic and structural composition.		
<ul style="list-style-type: none"> Demonstrate key skills in applied rangeland ecology & objective-based management. 	Compare and contrast the Productivity, carrying capacity, stocking rates, and secondary productivity in complex, dynamic interactive systems. Recommend the ideal management & rehabilitation of vegetation types to achieve desirable outcomes. Debate the historical & contemporary theories of rangeland function.		
<ul style="list-style-type: none"> Integrate the types and characteristics of the species interactions, population dynamics of competition among species and environmental complex units. 	Determine the various species interactions and an evaluation of their effects on interacting species. Distinguish between the population dynamics; life history strategies; intraspecific competition; interspecific competition and co-existence of species. Examine the species as an environmental complex unit.		
<ul style="list-style-type: none"> Access, evaluate, and synthesise types of vegetation demographic dynamics, population biology, and various plant breeding system including pollination. 	Assess the various factors associated with plant demographics. Evaluate the dynamics of plant population biology: life tables; plant breeding systems and pollination.		
<ul style="list-style-type: none"> Compare and contrast the various cycles present in an ecosystem and the abiotic environmental factors that influence the composition, physiognomy and richness of vegetations. 	Compare the types and characteristics of the species interactions. Justify the relevance of biochemical and nutrient cycling in an ecosystem. Recommend the abiotic environmental factors that influence the composition, physiognomy and richness of vegetations.		
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)	ITS Course Level	CESM Code (3rd Order) (Six Numbers)
	16	N/A	130301
Delivery Information:	Campus	Full/Part Time	Period (Year 3/1st Sem)

		SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY	Full/Part-time		FULL TIME
Periods per week:	Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
	4	One three hour session	1	0	6
Pre-requisite modules for this module:		BOTY 201 & BOTY202			
Co-requisites modules for module:		NONE			
Assessment strategy		Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Summative Assessment Methods: Main exam at the end of the module.			
Internal Moderation		Prof. PH King			
External Moderation		Prof CL Obi			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Continuous Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

MODULAR INFORMATION					
Department:	Department of Biology and Environmental Sciences			School:	Science and Technology
Last Revision date:	New		First Year Offered (New):	2024	
Replace this Module existing module(s)?	NO		If YES, give the module codes:	None	
Module linked to Qualification/s:	BSCG01				
Migration Strategy:	None (If YES, Section G must also be completed)				
Module Code (4 alphabetic & 3 numeric)	BOTY304				
Module Name	Plant Pathology				
NQF Level of this module	NQF 7				

Purpose of the module	To introduce students to a basic understanding of fungi, bacteria, viruses and nematodes causing plant diseases.		
Content (list topics):	An introduction to the structure, function and diversity of plant pathogenic organisms, epidemiology, diseases symptom Principles and examples of plant diseases and their socio-economic importance particularly in the context of Africa and South Africa. Pathogens causing disease of seeds, seedlings, foliage, roots, stems, grains and fruit. Diagnosis, symptom expression and selected disease cycle examples caused by fungi, bacteria, viruses and nematodes. Fundamental principles of plant pathology. The concept of disease in plants. Causes of plant diseases. Stages in development of plant diseases. Disease cycles and selected examples relevant to Africa. Diagnosis of plant diseases and the sustainable development goals that articulate with plant pathology.		
Exit Level Outcomes addressed by this module	ELO 6		
Teaching and Learning Activities (contact lecture; remote lecture; practical demonstration; synchronous/semi-synchronous/asynchronous e-learning activities; online discussion forum; group work; self study; etc. Indicate the proportion of each in a table format by using percentages	Contact lecture (60%); remote lecture (5%); practical demonstration (10%); semi-synchronous (5%); e-learning activities (5%); online discussion forum (5%); group work (5%); self-study (5%).		
Work integrated Learning/clinical practice	N/A		
Total credits for WIL	N/A		
Level at which WIL commences and tabulate the programme/blocks	N/A		
Prescribed/recommended texts	Plant pathology and plant diseases; 2020 Anne Marte Tronsmo, David B. Collinge, Annika Djurle, Lisa Munk,Jonathan Yuen,Arne Tronsmo		
Learning outcomes	Assessment Criteria		
•Describe and classify different plant diseases and identify causative organisms of plant diseases and their control measures/methods.	Define the various concepts in plant pathology. Differentiate among terms used in the module. Discuss plant diseases and preventative measures.		
•Differentiate between pathogenic and non-pathogenic plant diseases.	Distinguish the classes of plant diseases. Compare and contrast plant diseases. Illustrate the pathogenic and nonpathogenic effects on plants.		
•Demonstrate knowledge on pre-harvest and post-harvest plant diseases and differentiate between life cycle of plant diseases caused by e.g., virus, bacteria, fungi and nematodes.	Analyze the types of harvest plant diseases. Illustrate the life cycles of viruses, bacteria, fungi and nematodes. Explain and examine the life cycles of plant diseases.		
•Apply different control techniques of plant diseases	Describe diseases of fruit, vegetables, seeds, and grains. Identify and explain different control techniques of plant diseases. Describe the importance of disease-resistant plant varieties. Recognize the different types of structures and tissues of fruit, vegetables, seeds, and grains that are often attacked by diseases. Identify and describe the control techniques used to mitigate these diseases.		
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)	ITS Course Level	CESM Code (3rd Order) (Six Numbers)
	16	none	130301
Delivery Information:	Campus	Full/Part Time	Period (Year/1 st /2 nd Sem)

		SEFAKO MAKGATHO HEALTH SCIENCES UNIVERSITY	Full/Part-time		FULL TIME
Periods per week:	Classes Contact & Remote/online	Practicals	Tutorial	Seminars	Independent Learning (including e-learning)
	4				
Pre-requisite modules for this module:		BOTY201 & BOTY202			
Co-requisites modules for module:		NONE			
Assessment strategy		Formative Assessment Methods: Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Continuous Assessment Methods (for year mark): Combination of class tests/quizzes, formative theory assessments, short formative practical assessments, practical reports. Summative Assessment Methods: Main exam at the end of the module.			
Internal Moderation		Prof. PH King			
External Moderation		Prof CL Obi			
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)	40%			
	% Continuous Assessment Mark	60%			
	% Summative Assessment Mark	40%			
	Minimum final mark to pass (%)	50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/practical	Theory			
	Duration	3 hours			
	% contribution to Summative Assessment Mark	100%			
	Sub minimum	40%			

DEPARTMENT: CHEMISTRY & CHEMICAL TECHNOLOGY

CURRICULUM INFORMATION	
Department: Chemistry & Chemical Technology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: FCH010M
Module Code:	MCHM000
Module Name:	Introduction to General Chemistry 1A
Module Content:	Introduction to chemical terminology, A modern view of the periodic table, Quantitative chemical relationships, An overview of thermo-chemistry, Introduction to gases, An Introduction to thermodynamics, Introduction to the rates of reactions. Introduction to solutions, acids and bases. Colligative properties of solutions. Concepts of chemical equilibria. Equilibria in acid/base systems. Solubility and equilibrium. Electrochemistry

Learning Outcomes::	<p>At the end of this course students should:</p> <ul style="list-style-type: none"> • Know the concept of significant figures and the use thereof in chemical calculations • Know the importance of accuracy in recording measurements • Know chemical symbols, formulae and equations • Have a clear idea of the atomic structure of atoms • Have a basic picture of the layout of the periodic table and be able to use the periodic table and to extract the information summarized therein • Know how to use a balanced equations in stoichiometric calculations • Understand the basic concept of kinetic and potential energy • Know the energy changes involved during chemical reactions and be able to calculate heat of reactions occurring under constant pressure • Have a clear idea of Hess's law and heats of formation • Understand the basic properties of gasses, the kinetic theory of gasses as well as pressure, volume and temperature relationships. Must be able to use Dalton's law of partial pressure • Understand the importance of Gibbs free energy and its relation to the spontaneity of reactions • Know the worth of reaction rates • know the factors that influence the rate of chemical reactions • Have sound knowledge concerning all concepts about acids and bases. They will have the skills to balance these reactions • Know the different expressions for the concentration of solutions • Be able to calculate how the addition of a solute will influence the colligative properties of solutions • Understand the concept of reaction reversibility • Understand the basic concepts about chemical equilibrium and to implement the equilibrium law and have an understanding of the importance of K • Know how equilibrium influence the pH of aqueous solutions and how this knowledge is used in laboratories • Know the basic concepts concerning electrochemistry and how electricity is related to chemical equation • Understand cell potentials and be able to use reduction potentials in calculations 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
Periods per Week:	24		3		130101
	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	2 x 1 hrs	0	1.25 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and summative theory assessment at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50

		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment Paper:	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Chemistry & Chemical Technology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: FCHM010
Module Code:	MCHB000
Module Name:	Introduction to General Chemistry 1B
Module Content:	The Atomic and Electronic Structure; Chemical Bonding (Lewis structures, Valence shell electron pair repulsion (VSEPR), Valence Bond, and Molecular Orbital (MO) theories); Intermolecular Attractions and the Properties of Liquids and Solids; Alkanes, Alkenes, Alkynes; Alkyl Halides; Alcohols; Ethers; Aldehydes and Ketones; Acids and Derivatives; Aromatics; Amines; Conformational Analysis.
Learning Outcomes:	<p>After completion of this module, students should:</p> <ul style="list-style-type: none"> Understand the basic ideas on studying the electronic structure of atoms using electromagnetic radiation Understand the principles of electron configurations and how it explains the arrangement of atoms in the periodic table Have a picture of how electronic structure explains atomic properties Understand the concepts of ionic as well as covalent bonds and how Lewis dot notations help scientists to explain these interactions Know the influence of polarity on the properties of molecules Be able to use the Lewis dot structures to predict the shape of molecules Know the basics on hybridization as well as the formation of double and triple bonds Know the different intermolecular attractions found in liquids and how these attractions influence the physical properties of them Be able to explain the concept of vapor pressure and know its importance Understand a basic phase diagram and the energy changes that accompany state changes Have a basic understanding of the solid state of matter Draw skeletal, positional, geometric and functional isomers of organic compounds with various functional groups, and use IUPAC system of nomenclature to name them. Know the names of the first ten alkanes Relate molecular structure to physical properties of alkanes and other organic compounds with various functional groups. Describe hydrogen bonding and predict its effect on the physical properties of organic compounds Draw conformational isomers using sawhorse diagrams and Newman projections. Know the meaning of the terms eclipsed, staggered, anti and gauche conformations. Draw the boat and chair conformations of cyclohexane and distinguish between axial and equatorial positions in the chair. Know the meaning of the terms angle, torsional and van der Waals strain Define reaction mechanisms and explain what is meant by homolytic and heterolytic bond cleavage. Describe and identify in molecules: multiple bonds, polar bonds, electrophiles, nucleophiles, Lewis acids, and Lewis bases as reaction sites in organic molecules. Know how to write mechanisms for all reactions discussed where necessary Write general equations and specific examples of dehydrohalogenation reactions to form alkenes and alkynes, and dehydration reactions to form alkenes, and the use of Zaitsev's rule to predict the predominant product when more than one is possible. Predict the products of the addition of hydrogen halides and water to unsymmetrical alkenes and alkynes by applying Markovnikov's rule Describe, by writing appropriate chemical equations, how to convert alkynes to aldehydes or ketones with the regioselectivity of hydration. Show how to convert an alkyne to either a <i>cis</i> or <i>trans</i> alkene without formation of a mixture of the two Contrast the acidity of acetylene and terminal alkynes with other hydrocarbons, and describe reaction conditions suitable for converting these alkynes to their corresponding carbanions. Design syntheses of simple organic compounds starting from acetylene and another simple organic reagent Describe the characteristics that influence reactivity of the carbonyl group and illustrate the general reactions and mechanisms for nucleophilic addition. Write reaction equations and mechanisms for

	<p>the formation of cyanohydrin, hemiacetal and acetal from aldehydes and ketones. Write an equation for the hydration of an aldehyde or a ketone, and write mechanisms for the process under acid- and base-catalyzed conditions. Show how aldehydes and ketones can be prepared by oxidation of</p> <ul style="list-style-type: none"> primary or secondary alcohols 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		03		140401
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 h	2 x 1 hrs	0	1.25 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 x 3 hrs written examination				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Chemistry & Chemical Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	
Module Code:	MCHM011		
Module Name:	General Chemistry 1A		
Module Content:	Introduction to chemical terminology; A modern view of the periodic table; Quantitative chemical relationships; An overview of thermochemistry; Introduction to gases; An introduction to thermodynamics; Introduction to the rates of reactions; Introduction to solutions, acids and bases; Colligative properties of solutions; Concepts of chemical equilibria; Equilibria in acid/base systems; Solubility and equilibrium; Electrochemistry.		

Learning Outcomes:	Students should <ul style="list-style-type: none"> • Understand the concept of significant figures and the use thereof in chemical calculations • Understand the importance of accuracy in recording measurements • Be able to understand chemical symbols, formulae and equations • Have a clear idea of the atomic structure of atoms • Have a basic picture of the layout of the periodic table and be able to use the periodic table and to extract the information summarized therein • Know how to use a balanced equations in stoichiometric calculations • Understand the basic concept of kinetic and potential energy • Know the energy changes involved during chemical reactions and be able to calculate heat of reactions occurring under constant pressure • Have a clear idea of Hess's law and heats of formation • Understand the basic properties of gasses, the kinetic theory of gasses as well as pressure, volume and temperature relationships. Must be able to use Dalton's law of partial pressure • Understand the importance of Gibbs free energy and its relation to the spontaneity of reactions • Know the worth of reaction rates • Understand the factors that influence the rate of chemical reactions • Have sound knowledge concerning all concepts about acids and bases. They will have the skills to balance these reactions • Understand the different expressions for the concentration of solutions • Be able to calculate how the addition of a solute will influence the colligative properties of solutions • Understand the concept of reaction reversibility • Understand the basic concepts about chemical equilibrium and to implement the equilibrium law and have an understanding of the importance of K • Understand how equilibrium influence the pH of aqueous solutions and how this knowledge is used in laboratories • Know the basic concepts concerning electrochemistry and how electricity is related to chemical equation • Understand cell potentials and be able to use reduction potentials in calculations 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		140401
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	1 x 90 min		1.9 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	MMTH011 and MMTH012				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 x 3 hrs written examination				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Chemistry & Chemical Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module Code:	MCHM012
Module Name:	General Chemistry 1B

Module Content:	The Atomic and Electronic Structure; Chemical Bonding (Lewis structures, Valence shell electron pair repulsion (VSEPR), Valence Bond, and Molecular Orbital (MO) theories); Intermolecular Attractions and the Properties of Liquids and Solids; Alkanes, Alkenes, Alkynes; Alkyl Halides; Alcohols; Ethers; Aldehydes and Ketones; Acids and Derivatives; Aromatics; Amines; Conformational Analysis
Learning Outcomes:	<p>After completion of this module, students should:</p> <ul style="list-style-type: none"> • Understand the basic ideas on studying the electronic structure of atoms using electromagnetic radiation • Understand the principles of electron configurations and how it explains the arrangement of atoms in the periodic table • Have a picture of how electronic structure explains atomic properties • Understand the concepts of ionic as well as covalent bonds and how Lewis dot notations help scientists to explain these interactions • Know the influence of polarity on the properties of molecules • Be able to use the Lewis dot structures to predict the shape of molecules • Know the basics on hybridization as well as the formation of double and triple bonds • Know the different intermolecular attractions found in liquids and how these attractions influence the physical properties of them • Be able to explain the concept of vapour pressure and know its importance • Understand a basic phase diagram and the energy changes that accompany state changes • Have a basic understanding of the solid state of matter • Draw skeletal, positional, geometric and functional isomers of organic compounds with various functional groups, and use IUPAC system of nomenclature to name them. Know the names of the first ten alkanes • Relate molecular structure to physical properties of alkanes and other organic compounds with various functional groups. Describe hydrogen bonding and predict its effect on the physical properties of organic compounds • Draw conformational isomers using sawhorse diagrams and Newman projections. Know the meaning of the terms eclipsed, staggered, anti and gauche conformations. Draw the boat and chair conformations of cyclohexane and distinguish between axial and equatorial positions in the chair. Know the meaning of the terms angle, torsional and van der Waals strain

Learning Outcomes:	<ul style="list-style-type: none"> Define reaction mechanisms and explain what is meant by homolytic and heterolytic bond cleavage. Describe and identify in molecules: multiple bonds, polar bonds, electrophiles, nucleophiles, Lewis acids, and Lewis bases as reaction sites in organic molecules. Know how to write mechanisms for all reactions discussed where necessary Write general equations and specific examples of dehydrohalogenation reactions to form alkenes and alkynes, and dehydration reactions to form alkenes, and the use of Zaitseff's rule to predict the predominant product when more than one is possible. Predict the products of the addition of hydrogen halides and water to unsymmetrical alkenes and alkynes by applying Markovnikov's rule Describe, by writing appropriate chemical equations, how to convert alkynes to aldehydes or ketones with the regioselectivity of hydration. Show how to convert an alkyne to either a <i>cis</i> or <i>trans</i> alkene without formation of a mixture of the two Contrast the acidity of acetylene and terminal alkynes with other hydrocarbons, and describe reaction conditions suitable for converting these alkynes to their corresponding carbanions. Design syntheses of simple organic compounds starting from acetylene and another simple organic reagent Describe the characteristics that influence reactivity of the carbonyl group and illustrate the general reactions and mechanisms for nucleophilic addition. Write reaction equations and mechanisms for the formation of cyanohydrin, hemi-acetal and acetal from aldehydes and ketones. Write an equation for the hydration of an aldehyde or a ketone, and write mechanisms for the process under acid- and base-catalyzed conditions. Show how aldehydes and ketones can be prepared by oxidation of primary or secondary alcohols 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		140401
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 3 hrs	1 × 90 min	N/A	1.9 hrs
Pre-requisite module/s :	None				
Co-requisites module/s :	MMTH011/MMTH012				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Chemistry & Chemical Technology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: CHM201M

Module Code:	MCHA021				
Module Name:	Organic Chemistry 2				
Module Content:	Stereochemistry; Conjugation and Aromaticity; Substitution reactions of Aromatic compounds; Carboxylic acids and their derivatives; Amines: Preparation and their reactions. Epoxides:				
Learning Outcomes	<p>After completion of this module, students should be able to:</p> <ul style="list-style-type: none"> • Define chiral carbons and identify them in molecules • Define enantiomers and racemic mixtures and recognize compounds capable of exhibiting these structures • Define and draw enantiomers, diastereomers and meso compounds with two chiral carbons • Assign <i>R</i> and <i>S</i> configurations to stereoisomers and draw compounds with these configurations • Draw pairs of enantiomers with one chiral center, using wedges/dashes and Fischer projections • Give the number of stereoisomers possible for a molecule having more than one stereogenic center • Describe how a plane of symmetry relates to whether or not a molecule is chiral • Explain optical activity as a property of chiral molecules, and calculate specific rotation and optical purity • Give an acceptable IUPAC names for aromatic compounds • Describe the structure of benzene using resonance. Name and draw aromatic compounds • Write chemical equations describing the electrophilic aromatic substitution reactions (halogenation, Friedel-Crafts alkylation and Friedel-Crafts acylation, nitration, and sulfonation), showing orientation of substitution • Write the mechanism for electrophilic aromatic substitution in general and then specifically for halogenation, Friedel-Crafts alkylation and Friedel-Crafts acylation, nitration, and sulfonation • Explain the mechanistic basis for the action of activating ortho, para-directing groups and deactivating meta-directing groups • Explain why the halogens are deactivating ortho, para-directing groups • Predict whether a substance is aromatic based on its structure and Huckel's rule. Synthesize substituted benzenes using the reactions in this chapter. Write reaction equations showing the preparation of aromatic diazonium salts, the replacement reactions of these salts, and the synthetic utility in conjunction with electrophilic aromatic substitution reactions • Write coupling reactions of diazonium salts • Give an acceptable IUPAC names for alkyl and arylamines • Describe the influence of hydrogen bonding on the physical properties of amines • Write equations showing the reaction of amines with acids to form ammonium salts • Explain what is meant by <i>K_b</i> and <i>pK_b</i> for an amine • Explain why arylamines are weaker bases than alkylamines • Write equations showing the reactions of amines with acids to form ammonium salts • Write reaction equations and describe the mechanism for alkylation of amines • Write reaction equations illustrating synthesis of amines by reduction of nitro compounds, nitriles, amides, ketones and aldehydes • Write chemical equations describing the preparation of alkenes from amines using the Hofmann elimination • Explain how you can distinguish primary, secondary and tertiary amines using Hinsberg test. • Write the structures of epoxides and equations, illustrating their ring-opening reactions 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		3		140404
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min		6.1 hrs
Pre-requisite module/s :	MCHM012				
Co-requisites module/s :	N/A				

Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination.			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final Mark =		% Summative Assessment Mark	60
			% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory/Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION					
Department:	Chemistry & Chemical Technology			School: Science & Technology	
Last Revision date:	2011			First Year Offered (New): 2013	
Replace this Module existing module(s)?	Yes			If YES, give the module codes: CHM201M	
Module Code:	MCHB021				
Module Name:	Inorganic Chemistry 2				
Module Content:	Atomic structure; General Bonding; Main Group chemistry: s- & p-block elements; Acids and bases; Introduction to Coordination Chemistry of Transition Metals; Inorganic solids				
Learning Outcomes:	<p>After completing this module, students should be able to:</p> <ul style="list-style-type: none"> • Define valence bond theory using homo and heteronuclear molecules • Understand molecular orbital theory and the bonding orbitals of H₂, the description of orbital overlap, bond strength, bond order and length, covalent radii as well as polarity in homo and heteronuclear molecules • Know the properties and structure of ionic substances • Discuss the lattice structures of a few typical examples • Show the application of lattice energy and Born-Haber cycle • Define ionic radius • Introduce the transition metals and the electronic surtaxes of transition metals • Understand the variable oxidation states of transition metals • Look at coordination number and geometry isomerism • Discuss the occurrence, physical and chemical properties of the s- block elements • Understand the reactivity of, and the typical compounds of s- block elements 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		3		140403
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	6.1 hrs
Pre-requisite module/s :	MCHM012				
Co-requisites module/s :	N/A				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40	
	Final Mark =		% Summative Assessment Mark	60	
			% Summative Assessment Mark	40	
	Min Final Assessment mark to pass (%)			50	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION					
Department: Chemistry & Chemical Technology			School: Science & Technology		
Last Revision date: 2011			First Year Offered (New): 2013		
Replace this Module existing module(s)? Yes			If YES, give the module codes: CHEM202		
Module Code:	MCHA022				
Module Name:	Analytical Chemistry 2				
Module Content:	Introduction to Analytical Chemistry: sampling, sample preparation, systematic and random errors; Application of statistics to data treatment and evaluation; Stoichiometric calculations; Aqueous solution chemistry (including chemical equilibria); Gravimetric methods of analysis; Titrimetric analysis; Advanced neutralization titrations; Precipitation titrimetry; Complexometric titrations; Oxidation-reduction titrimetry. Introduction to electrochemistry; Potentiometry				
Learning Outcomes:	After completion of the module, students should be able to: <ul style="list-style-type: none"> • Explain the theory of sampling and sample preparation • Handle and evaluate statistical data • Handle stoichiometric and equilibrium calculations • Understand and apply the basic theory of gravimetry • Understand and apply the basics of titrimetry 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	10		3		140402
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	6.1 hrs
Pre-requisite module/s:	MCHM011				
Co-requisite module/s:	None				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			
CURRICULUM INFORMATION					
Department: Chemistry & Chemical Technology			School: Science & Technology		
Last Revision date: 2011			First Year Offered (New): 2013		
Replace this Module existing module(s)? Yes			If YES, give the module codes: CHEM202		
Module Code:	MCHB022				
Module Name:	Physical Chemistry 2				
Module Content:	The laws of thermodynamics. Application to energy changes which govern the physical and chemical equilibria. Physical properties of pure matter and mixtures with more emphasis on the liquid phase. Phase diagrams. Properties of colloids and surface films				

Learning Outcomes:	Students should be able to demonstrate knowledge of the laws of thermodynamics, energy changes which govern the physical and chemical equilibria, physical properties of pure matter and mixtures, properties of colloids and surface films				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		3		140405
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	6.1 hrs
Pre-requisite module/s :	MCHM011 & MMTH011				
Co-requisites module/s:	None				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Chemistry & Chemical Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	

Module Code:	MCHA031
Module Name:	Physical Chemistry 3
Module Content:	<ul style="list-style-type: none"> • Transport phenomena in gases and liquids. • Chemical kinetics/theories of chemical collisions. • Chemical bonding. • Quantum mechanics (properties of light, photoelectric effect), wave-particle nature of matter. • Molecular structure and symmetry. • Vibrational and rotational spectra.
Module Code:	MCHA031
Module Name:	Physical Chemistry 3
Module Content:	<ul style="list-style-type: none"> ▪ Electronic transitions and magnetic resonance. ▪ Miscellaneous Topics: Molecules in motion: viscosity, diffusion, mobility. Surface chemistry: Processes at solid surfaces (Physisorption and chemisorption, adsorption isotherms, surface tension), Heterogeneous catalytic rate reactions, capillarity
Learning Outcomes:	Students should be able to demonstrate knowledge of electro-analytical methods, spectrometric methods and separation methods
Module Information:	SAQA Credits
	16
Module Information:	ITS Course Level Code
	3
Module Information:	CESM Code (3rd Order)
	140405

Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	11.8 hrs
Pre-requisite module/s:	MCHAB022				
Co-requisite module/s:	None				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Chemistry & Chemical Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	
Module Code:	MCHB031		
Module Name:	Inorganic Chemistry 3		
Module Content:	<ul style="list-style-type: none"> • Coordination chemistry and stereochemistry. • Redox reactions. • Bonding theories: • Valence bond theory (VBT), Crystal field theory (CFT), Ligand field theory (LFT) and Molecular orbital theory (MOT). • Inorganic reactions and mechanisms. • Introduction to f-block elements (lanthanides and actinides). • Organometallic chemistry and Isolobal analogies. • Organometallic complexes in action: Homogeneous catalysis 		
Learning Outcomes:	Students should be able to demonstrate knowledge of co-ordination chemistry and stereochemistry, redox reactions, valence bond theory, crystal field theory, molecular orbital theory, inorganic reactions and mechanisms, introduction to f-block elements (lanthanides and actinides), isolobal analogy and organometallic chemistry (with application to homogeneous catalysis)		
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3rd Order)
	16	3	140403

Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	11.8 hrs
Pre-requisite module/s:	MCHB021				
Co-requisite module/s:	None				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assess Mark	60
				% Summative Assess Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40			

CURRICULUM INFORMATION					
Department:	Chemistry & Chemical Technology			School: Science & Technology	
Last Revision date:	2011			First Year Offered (New):	2013
Replace this Module existing module(s)?	No			If YES, give the module codes:	
Module Code:	MCHA032				
Module Name:	Analytical Chemistry 3				
Module Content:	Electro-Analytical methods: Potentiometry. Spectrometric methods: Ultra-violet/Visible (UV/VIS), Atomic absorption spectrometry (AAS). Separation methods: Solvent extraction, High Performance Liquid Chromatography (HPLC) and Gas chromatography (GC). Miscellaneous Topic(s): Surface analysis techniques				
Learning Outcomes:	Students should be able to demonstrate knowledge of electro-analytical methods, spectrometric methods and separation methods				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		140402
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	11.8 hrs
Pre-requisite module/s :	MCHA022				
Co-requisites module/s :	None				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Chemistry & Chemical Technology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MCHB032					
Module Name:	Organic Chemistry 3					
Module Content:	<ul style="list-style-type: none"> Substitution and elimination reactions: SN1, SN2, E1, E2. Carbonyl chemistry: reactions at the α position (Aldol condensation and related reactions). Carboxylic acids and their derivatives: acyl compounds, enolate chemistry of esters. Organic spectroscopy: systematic identification of organic compounds (mass spectrometry, infrared and UV/VIS spectroscopy, nuclear magnetic resonance). Organometallics: Introduction to organometallic compounds. 					
Learning Outcomes:	A successful student in this module will gain proficiency in: <ul style="list-style-type: none"> Reactions and mechanisms of organic molecules Identification of organic substances using spectroscopic techniques Solving problems that involve organic molecules, their reactions, mechanisms and identification Laboratory techniques used to synthesize, purify, and identify organic substances 					
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)	
	16		3		140404	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning	
	4 × 45 min	1 × 6 hrs	1 × 45 min	N/A	11.8 hrs	
Pre-requisite module/s:	MCHA021					
Co-requisite module/s:	None					
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination					
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40	
	Final Mark =			% Summative Assessment Mark		60
				% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory / Practical	Theory				
	Duration	3 hrs				
	Sub minimum	40%				

DEPARTMENT: COMPUTER SCIENCE & INFORMATION TECHNOLOGY

CURRICULUM INFORMATION

Department: Computer Science & Information Technology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MCSC000				
Module Name:	Introduction to Computing concepts and algorithms				
Module Content:	<p>COMPUTING CONCEPTS:</p> <ul style="list-style-type: none"> • Basic concepts in ICT • Concepts of operating systems and networks • Data storage and binary number system • Microsoft Office Software Applications <p>ALGORITHMS</p> <ul style="list-style-type: none"> • Fundamental Algorithmic concepts and problem solving • Concepts of Programming languages • Basic Logic gates and Karnaugh maps <p>FUNDAMENTALS OF C++ PROGRAMMING</p> <ul style="list-style-type: none"> • Introduction to Programming • Program components in C++ • Data types, Declarations, and Displays • Assignment and Interactive input • Control Structures (if, if/else, while, do/while, switch, for) 				
Learning Outcomes:	<ul style="list-style-type: none"> • The learner at this level should be able to: • Demonstrate a basic understanding of broad fundamental concepts and trends of computing. • Demonstrate a basic understanding of the modern computer-based problem solving paradigm. • Understand algorithms and how they are developed • Develop logical constructs for solving problems • Demonstrate problem solving capability • Understand and use information and communication technology (ICT) tools appropriately • Effectively use software productivity tools • Understand the basics of a C++ Integrated Development Environment (IDE) • Construct basic C++ statements a given simple problem specification • Write simple decision-making statements • Apply multiple selection using the switch, while and do while statements • Use if, if/else, for loops when necessary to perform repetition routines in a program • Implement counter-controlled repetition and sentinel-control repetition 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		3		060601
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 45 min	2 x 45 min	0	4 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be derived from a three-hour written examination and the module mark in the ratio 2:3				

Module Code:	MCSC000			
Module Name:	Introduction to Computing concepts and algorithms			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final Mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module Code:	MCOB000
Module Name:	Introduction to data organization and artificial Intelligence (AI)
Module Content:	<p>DATA ORGANIZATION</p> <ul style="list-style-type: none"> • Files and Data Structures; • Introduction to Database concepts • Advanced algorithm development and problem solving • Concepts of software development • Intermediate Object Oriented Programming using C++ compiler <p>ARTIFICIAL INTELLIGENCE</p> <ul style="list-style-type: none"> • Fundamentals of Artificial Neural Networks(ANN) • Expert Systems • Introduction to Theory of computations • Introduction to Web development <p>PROCEDURAL AND OBJECT ORIENTED PROGRAMMING</p> <ul style="list-style-type: none"> • Introduction to modularity using functions • Math Library Functions • C++ Standard Library Header Files • Basic arrays and pointers • Introduction to Object Oriented Programming –Classes
Learning Outcomes:	<p>After successful completion of the module, the student should be able to:</p> <ul style="list-style-type: none"> • Apply different search strategies in computer processing; • Explain how the Turing test works; • Interpret how Artificial Neural Networks are applied in general ; • Analyse Robotics and Expert Systems; • Understand fundamental concepts of web design • Design and write structured, efficient programs using C++ • Conduct basic program analysis and construct programs modularly from functions • Implement modularity using functions, pointers and classes • Apply various basic problem-solving techniques • Create functions with multiple parameters • Use common mathematical functions available in the C++ Standard Library

Module Code:	MCOB000				
Module Name:	Introduction to data organization and artificial Intelligence (AI)				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		3		060601
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 45 min	2 x 45 min	0	4 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be derived from a three-hour written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	COSC101

Module Code:	MCOA011		
Module Name:	Computing Concepts and Algorithms		
Module Content:	Fundamental concepts of computing, data storage and binary number system, concepts of operating systems and networks, fundamental algorithmic concepts, problem solving, programming concepts, basic logic gates and functions, karnaugh maps.		
Learning Outcomes:	<p>The learner at this level should be able to:</p> <ul style="list-style-type: none"> • Demonstrate a thorough understanding of broad fundamental concepts and trends of computing. • Demonstrate a thorough understanding of the modern computer-based problem solving paradigm. • Understand algorithms and how they are developed • Develop logical constructs for solving problems • Demonstrate problem solving capability • Understand and use information and communication technology (ICT) tools appropriately • Effectively use software productivity tools • Understand the basics of a specific object-oriented computer programming language for application development 		
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3rd Order)
	12	3	060601

Module Code:	MCOA011				
Module Name:	Computing Concepts and Algorithms				
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1.5	2	0	4
Pre-requisite module/s:	None				
Co-requisite module/s:	MMTH011, MST011				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be derived from a three-hour written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	No	If YES, give the module codes:	

Module Code:	MCOA012		
Module Name:	Data Organization and Artificial Intelligence		
Module Content:	<p>DATA ORGANIZATION</p> <ul style="list-style-type: none"> • Files and Data Structures; • Introduction to Database concepts • Advanced algorithm development • Intermediate Object Oriented Programming using C++ compiler <p>ARTIFICIAL INTELLIGENCE</p> <ul style="list-style-type: none"> • Fundamentals of Artificial Neural Networks (ANN) • Expert Systems • Introduction to Theory of computations • Introduction to Web development 		
Learning Outcomes:	<p>After successful completion of the module, the student should be able to:</p> <ul style="list-style-type: none"> • Apply different search strategies in computer processing; • Explain how the Turing test works; • Interpret how Artificial Neural Networks is applied in general ; • Analyse Robotics and Expert Systems; • Design and write structured, efficient programs using C++ • Conduct basic program analysis and write medium size programs. • Be familiar with functions, pointers and classes 		
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3rd Order)
	12	3	060601

Module Code:	MCOA012				
Module Name:	Data Organization and Artificial Intelligence				
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1.5	2	0	4
Pre-requisite module/s:	None				
Co-requisite module/s:	MMTH012 ; MSTSO12				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be derived from a three-hour written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	COSC201

Module Code:	MC0A021				
Module Name:	Data Structures				
Module Content:	<ul style="list-style-type: none"> • Modularization, data encapsulation, information hiding, data abstraction, functional decomposition. • Structure, Array, Queue, Stack, List, Linked list, Binary Search Tree and Files creation • Compiler theory. 				
Learning Outcomes:	<p>After successful completion of the module, the student should be able to</p> <ul style="list-style-type: none"> • Apply advanced concepts of structured programming, debugging and error handling. • Identify and differentiate between a Stack and a Queue; Linear Linked list and a doubly Linked list • Understand basic operations of data structures eg create, store, search, replace, delete, insert and sort. • Creation and manipulation of electronic files processing • Implement data structures in object oriented programming • Acquired skills at using a variety of programming languages • Apply evaluation criteria for choosing an appropriate programming language in a given scenario. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		060702
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1.5	0	0	6

Module Code:	MCOA021			
Module Name:	Data Structures			
Pre-requisite module/s:	MMTH011, MMTH012, MCOA011, MCOB011			
Co-requisite module/s:	MMTA021			
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be obtained from a three-hour written examination and the module mark in the ratio 2:3.			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final mark =	% Summative Assess Mark		60
		% Summative Assess Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	COSC202

Module Code:	MCOA022			
Module Name:	Computer Organization & Architecture			
Module Content:	<ul style="list-style-type: none"> • Basic Concepts: IA – 32 Processor Architecture • Assembly language fundamentals • Data transfers, Addressing and Integer Arithmetic • Procedures, Advance procedures and conditional processing • Structures and Macros • 32 – Bit Windows Programming • High Level language Interface • 16 – Bit MS-DOS Programming • Disk Fundamentals • BIOS – Level and Expert MS-DOS programming 			
Learning Outcomes:	<ul style="list-style-type: none"> • Understanding of the design and operations of the Assembly language. • Interface Assembly language to high level languages. • Write programs in Assembly language. 			
Module Information:	SAQA Credits		ITS Course Level Code	
	20		3	
Periods per Week:	Classes		Practicals	
	5		1.5	
Pre-requisite module/s:	Tutorial		Seminars	
	0		0	
Co-requisite module/s:	Independent Learning		6	
Pre-requisite module/s:	MMTH011, MCOA011, MCOB011			
Co-requisite module/s:	MMTA022			

Module Code:	MCOA022			
Module Name	Computer Organization & Architecture			
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	COSC351

Module Code:	MCOA031			
Module Name	Database Systems			
Content:	Database Systems; Data Models; Relational Database Model; Relational Algebra; Entity-Relationship Modelling; Advanced Data Modelling; Normalization of Database Tables; SQL; Database Design and Implementation.			
Learning Outcomes:	<p>Knowledge of the following:</p> <ul style="list-style-type: none"> • Different types of databases, importance of Database design and evolution of Database from file systems • Functions of DBMS and Database components • Building Data models, Evolution of Data models and their classification by level of abstraction, characteristics of good primary keys, flexible solutions and issues to consider when developing models based on EER diagrams • Basic concepts and development of relational models • Manipulation of Tables using relational operators • Incorporation of Entity-Relationship modelling into the Database design process • The normalization process • Using both basic and advanced SQL commands for manipulation of tables. • System Development and Database Life Cycles, The role of DBA and navigating through the three stages of Database design 			
Module Information:	SAQA Credits		ITS Course Level Code	
	16		3	
Periods per week:			CESM Code (3rd Order)	
			060601	
Periods per week:	Classes	Practicals	Tutorial	Seminars
	2	1.5	0	0
				Independent Learning
				8

Module Code:	MCOA031				
Module Name	Database Systems				
Pre-requisite module/s:	MCOA021, MCOA022, MMTH011, MMTH012				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, tests and practicals. The final mark will be obtained from the average of a three-hour written examination and the module mark				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =	% Summative Assessment Mark			60
		% Summative Assessment Mark			40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	COSC361

Module Code:	MCOB031				
Module Name:	Operating Systems				
Module Content:	Overview of Operating and Computer Systems, Process Concept, Concurrent Processing, Processor Scheduling, Input/output and Files, Embedded Systems, Computer Security Issues, Distributed Systems, Cloud Computing				
Learning Outcomes:	<ul style="list-style-type: none"> • Understanding of the concept of a process • Understanding and appreciation of concurrent processing • Knowledge of virtual memory techniques • Understanding of processor scheduling techniques • Appreciation of I/O and File handling strategies • Knowledge and appreciation of embedded systems • Understanding of computer security issues • Knowledge of distributed systems • Appreciation of cloud computing paradigm 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		060999
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	2	1.5		0	8
Pre-requisite module/s:	MCOA021, MCOA022, MMTH011, MMTH012				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The final mark will be obtained from a two-hour written examination and the module mark in the ratio 2:3.				

Module Code:	MCOB031			
Module Name:	Operating Systems			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	2 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department:	Computer Science & Information Technology	School:	Science & Technology
Last Revision date:	2011	First Year Offered (New):	2013
Replace this Module existing module(s)?	Yes	If YES, give the module codes:	COSC372

Module Code:	MCOA032			
Module Name:	Artificial Intelligence			
Module Content:	Predicate Calculus Representation, State Space Search Strategies, Heuristic Search, Stochastic Methods, Knowledge Representation, Expert Systems, Probabilistic Reasoning, Machine Learning, Natural Language Understanding and Processing..			
Learning Outcomes:	<ul style="list-style-type: none"> • Knowledge of predicate calculus representation • Understanding of general state space search techniques • Appreciation and use of stochastic methods • Understanding of knowledge representations schemes • Understanding of structure and role of expert systems • Knowledge of automated and probabilistic reasoning techniques • Knowledge of machine learning strategies and approaches • Knowledge of natural language understanding processes. 			
Module Information:	SAQA Credits		ITS Course Level Code	CESM Code (3rd Order)
	16		3	060102
Periods per Week:	Classes	Practicals	Tutorial	Seminars
	2	1.5		0
Pre-requisite module/s:	MCOA021, MCOA022, MMTH011, MMTH012			
Co-requisite module/s:	None			
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The final mark will be obtained from a two-hour written examination and the module mark in the ratio 2:3.			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50

Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Computer Science & Information Technology	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: COSC382

Module Code:	MCOB032				
Module Name:	Computer Networks				
Content:	Networking Basics; Physical Layer Technologies; Local Area Networks; TCP/IP Internet-Working; Wide Area Networks.				
Learning Outcomes:	<p>At the end of this course students are expected to have mastered the following:</p> <ul style="list-style-type: none"> General principle of network design and switching process Packet and circuit switching Network Architecture, standardization and classification Network characteristics and QoS Data encoding and multiplexing Ethernet and wireless transmission TCP/IP Addressing and internet protocol IP WANS 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		060902
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	2	1.5		0	8
Pre-requisite module/s:	MCOA021, MCOA022, MMTH011, MMTH012				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, and tests. The final mark will be obtained from the average of a three-hour written examination and the module mark.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2hrs			
	Sub minimum	40%			

DEPARTMENT: MATHEMATICS & APPLIED MATHEMATICS

CURRICULUM INFORMATION

Department:	Mathematics and Applied Mathematics	School:	Science & Technology
Last Revision date:		First Year Offered (New):	2023
Replace this Module existing module(s)?	NO	If YES, give the module codes:	
Module linked to Qualification/s:	BSc in Mathematical Science	BSc(ECP)	
Migration Strategy:	No (If YES, Section G must also be completed)		

Module Code: (4 alphabetic & 3 numeric)	MAPA000		
Module Name:	Elementary Applied Mathematics		
Content:	<p>Calculus of real function: Domain, range, limit, continuity of a function, The derivative of a function, The Definite and indefinite integral of a function, Fundamental Theorem of calculus. Complex numbers, the definition of complex number with its operations. The conjugates, modulus and division of complex numbers.</p> <p>Lines and planes in space and linear systems: Lines and planes, Systems of linear equations resulting from their equations, Gauss elimination, Matrix operations and properties, Inverses of square matrices and determinants, Properties and uses of these determinants.</p> <p>Further integration and its applications: The fundamental theorem of calculus, Integration techniques, Trigonometric substitutions, Integration by partial fractions, Area between two curves.</p> <p>Vectors with constant component: Definition, Magnitude, Position in space, Addition, Multiplication, Dot and cross product, Impotent vector properties.</p> <p>Vector function: Calculus such as; limits, Continuity and derivative at a point (product rule, chain rule and quotient rule), Integral on an interval.</p> <p>Application of vectors to moving particles: Connecting particles in plane surfaces, Work, energy and Power, Projectiles, Motion in a circle.</p>		
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Obtain limits of a function in single variable at any point • Identify continuous functions and differentiable functions • Evaluate definite and indefinite integral of a function between points under the curve • Know and represent vectors with constant components in space • Apply and solve problems in mechanics using various laws of motion in the following situations: <ul style="list-style-type: none"> ❖ Connecting particles in horizontal surface ❖ Connecting particles in incline plane ❖ Work, energy and power ❖ Projectiles ❖ Motion in a circle 		
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)	ITS Course Level	CESM Code (3rd Order) (Six Numbers)

		24	3	150201
Delivery Information:	Campus		Full/Part Time	Period (Year/1 st /2 nd Sem)
	SMU		Full	1 st Year
Periods per week:	Classes	Practicals	Tutorial	Seminars
	5 hours	0	3 hours	0
Independent Learning				
4				
Pre-requisite modules for this module: None				
Co-requisites modules for module: MMTH000				
Assessment criteria The theory of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 20% of the tutorial and 40% of the tests.				
Assessment method A module mark will be obtained from continuous assessment based on tutorials and tests. The final mark will be derived from a three-hour written examination and the continuous assessment mark.				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%	
		% Formative Assessment Mark	40%	
		% Summative Assessment Mark	60%	
	Minimum final mark to pass (%)		50%	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory/practical	Theory		
	Duration	3 hours		
	% contribution to Summative Assessment Mark	60%		
	Sub minimum	40%		
SECTION F: MODULAR INFORMATION REQUIRED				
Department:	Mathematics and Applied Mathematics			School: Science & Technology
Last Revision date:		First Year Offered (New):	2023	
Replace this Module existing module(s)?	NO	If YES, give the module codes:		
Module linked to Qualification/s:	BSc in Mathematics and Applied Mathematics	BSc(ECP)		
Migration Strategy:	(If YES, Section G must also be completed) NO			

CURRICULUM INFORMATION				
Department:	Mathematics and Applied Mathematics			School: Science & Technology
Last Revision date:		First Year Offered (New):	2023	
Replace this Module existing module(s)?	NO	If YES, give the module codes:		
Module linked to Qualification/s:	BSc in Mathematical Science	BSc(ECP)		
Migration Strategy:	No	(If YES, Section G must also be completed)		

Module Code: (4 alphabetic & 3 numeric)		MAPB000				
Module Name:		Introduction to Computational Mathematics				
Content:		<p>Numerical algorithm of functions in one variable: Review of calculus, Algorithm and convergence, The bisection method, Fixed point iteration, Newton's method and its extensions, Error analysis for iterative method, Muller's method.</p> <p>Using numerical method to determine: Lagrange polynomials, Divided differences, Hermite interpolation, and spline interpolation. Direct methods for solving linear system; elimination method, substitution method, Gauss elimination method and Gauss-Jordan elimination, Matrix operation, Inverse matrices, Properties of matrix Operation, Determinant, LU factorization. Iterative methods; The Jacobi and Gauss-Siedel iterative Techniques, relaxation techniques for solving linear systems.</p>				
Learning Outcomes:		<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Solve single variable equation using bisection method, fixed point method and Newton's method. • Determine the error on these iterations. • Solve systems of linear equations using direct. • Solve systems of linear equations using iterative method. • Solve system of nonlinear equations. 				
Module Information:		SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)		ITS Course Level		CESM Code (3rd Order) (Six Numbers)
		24		3		150201
Delivery Information:		Campus		Full/Part Time		Period (Year/1st/2ndSem)
		SMU		Full-time		2 nd Year
Periods per week:		Classes	Practicals	Tutorial	Seminars	Independent Learning
		5 hours	0	3 hours	0	4
Pre-requisite modules for this module:		MAPA000				
Co-requisites modules for module:		MMTB000				
Assessment criteria		The theory of 40% is mandatory for a student to qualify for the final examination. The module mark is calculated at 20% of the tutorial and 40% of the tests.				
Assessment method		A module mark will be obtained from continuous assessment based on tutorials and tests. The final mark will be derived from a three-hour written examination and the continuous assessment mark.				
Mark Structure:	Minimum Form Assessment Mark for exam admission (%)		40%			
		% Formative Assessment Mark	40%			
		% Summative Assessment Mark	60%			
	Minimum final mark to pass (%)		50%			
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/practical		Theory			
	Duration		3 hours			
	% contribution to Summative Assessment Mark		60%			
	Sub minimum		40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: AMAT101

Module Code:	MAPA011				
Module Name:	Introduction to Applied Mathematics				
Module Content:	<p>Calculus of real function: Domain, range, limit, continuity of a function, The derivative of a function, The Definite and indefinite integral of a function, Fundamental Theorem of calculus. Complex numbers, the definition of complex number with its operations. The conjugates, modulus and division of complex numbers.</p> <p>Lines and planes in space and linear systems: Lines and planes, Systems of linear equations resulting from their equations, Gauss elimination, Matrix operations and properties, Inverses of square matrices and determinants, Properties and uses of these determinants.</p> <p>Further integration and its applications: The fundamental theorem of calculus, Integration techniques, Trigonometric substitutions, Integration by partial fractions, Area between two curves.</p> <p>Vectors with constant component: Definition, Magnitude, Position in space, Addition, Multiplication, Dot and cross product, Impotent vector properties.</p> <p>Vector function: Calculus such as; limits, Continuity and derivative at a point (product rule, chain rule and quotient rule), Integral on an interval.</p> <p>Application of vectors to moving particles: Connecting particles in plane surfaces, Work, energy and Power, Projectiles, Motion in a circle.</p>				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> ▪ Obtain limits of a function in single variable at any point ▪ Identify continuous functions and differentiable functions ▪ Evaluate definite and indefinite integral of a function between points under the curve ▪ Know and represent vectors with constant components in space ▪ Apply and solve problems in mechanics using various laws of motion in the following situations: <ul style="list-style-type: none"> ❖ Connecting particles in horizontal surface ❖ Connecting particles in incline plane ❖ Work, energy and power ❖ Projectiles ❖ Motion in a circle 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0	2	0	4
Pre-requisite module/s:	Admission criteria				
Co-requisites module/s:	MMTH011 and MMTH012				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative theory assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: AMAT102

Module Code:	MAPM012				
Module Name:	Computational Mathematics				
Module Content:	<p>Numerical algorithm of functions in one variable: Review of calculus, Algorithm and convergence, The bisection method, Fixed point iteration, Newton's method and its extensions, Error analysis for iterative method, Muller's method.</p> <p>Using numerical method to determine: Lagrange polynomials, Divided differences, Hermite interpolation, and spline interpolation. Direct methods for solving linear system; elimination method, substitution method, Gauss elimination method and Gauss-Jordan elimination, Matrix operation, Inverse matrices, Properties of matrix Operation, Determinant, LU factorization. Iterative methods; The Jacobi and Gauss-Siedel iterative Techniques, relaxation techniques for solving linear systems.</p>				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> • Solve single variable equation using bisection method, fixed point method and Newton's method. • Determine the error on these iterations. • Solve systems of linear equations using direct. • Solve systems of linear equations using iterative method. • Solve system of nonlinear equations. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1	2	0	4
Pre-requisite module/s:	Admission criteria				
Co-requisite module/s:	MMTH011 and MMTH012				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: AMAT201

Module Code:	MAPA021				
Module Name:	Ordinary and Partial Differential Equations				
Model Content:	Introduction to differential equations; Classification of ODE's: first order linear homogeneous and nonhomogeneous ODE's: Integrating factor, constant variation method, separation of variable method; solutions of exact Differential equations; Higher order ODEs: undetermined coefficient method, Power series method; Laplace transforms and applications; Linear Systems of Ordinary Differential Equations: Resolvent				

	matrix, Eigenvalue method and fundamental system; Introduction to PDEs				
Learning Outcomes:	<p>At the end of the module students should be able to:</p> <ul style="list-style-type: none"> • Distinguish between linear and non-linear ODEs. • Understand the difference between the order and the degree of ODEs and PDEs. • Solve first order ODEs using the following methods/techniques: separation of variables, integrating factor, Bernoulli, exact. • Solve second order ODEs using the following methods: undetermined coefficients and variation of parameters. • Define a Laplace Transform and derive elementary Laplace transforms formulas. • Use Laplace transforms to solve boundary value problems. • Use the properties of Laplace transforms to solve first and higher order ODEs. • Solve systems of Differential equations. • Recognise the difference between parabolic, hyperbolic and elliptic PDEs. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		150201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0	2	0	6
Pre-requisite module/s:	MAPM011, MAPM012, MMTH011 and MMTH012				
Co-requisites module/s:	MMTA021				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New):	2013
Replace this Module existing module(s)? Yes		If YES, give the module codes:	AMAT202

Module Code:	MAPA022
Module Name:	Numerical Analysis II
Model Content:	Interpolation: Lagrange, Newton interpolation, splines; Limitation of polynomial interpolation; Numerical differentiation; Numerical integration: Trapezium, mid-points and Simpson rules, Gaussian quadrature's; Numerical solution of Initial Value Problems for ODEs: Euler method, Range Kutta methods, Extrapolation methods

Learning Outcomes:	At the end of the module, a learner will be able to: <ul style="list-style-type: none"> Apply interpolation of various type to approximate functions on a given interval, Approximate derivative using forward, backward and central difference method; Evaluate integrals numerically by means of trapezium rules, Simpson rule as well as quadrature rules. Apply various techniques to solve Initial Value Problems for Ordinary Differential Equations including Euler method, Range Kutta order 2 and 4, and method of extrapolation 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		150201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1	2	0	6
Pre-requisite module/s:	MMTH011, MMTH012, MAPM011 and MAPM012				
Co-requisites module/s:	MMTA022				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: AMAT301

Module Code:	MAPA031
Module Name:	Fluid Mechanics
Model Content:	Fluid motion description; Streaklines; Eulerian and Lagrangian descriptions; Hydrodynamic and Euler's equations; Bernoulli's equations and their application; Stream function; some elementary flows; Potential flows; Vortex dynamics; Kelvin theorem. Constitutive equations; Continuity equations; Navier-Stokes equations; Vorticity Transport equations; Energy equation; Boundary layer equations; Von-Karman equations; Couette flow; Poiseuille flow; Flow between two rotating cylinders.
Learning Outcomes:	<p>At the end of the module a student should be able to:</p> <ul style="list-style-type: none"> Demonstrate knowledge of the Lagrangian and Eulerian approaches to describing fluid. Distinguish and define, the terms: inviscid, irrotational, incompressible, vorticity, and circulation. Derive the equation of conservation of mass (equation of continuity), and, for incompressible fluids and Euler's equation of motion, given standard assumptions. State and apply Bernoulli's equation for steady incompressible flow. Understand stream function, some elementary flows; Potential flows; Vortex dynamics; Kelvin theorem and related theorems. Distinguish between Constitutive equations; Continuity equations; Navier-Stokes equations; Vorticity Transport equations; Energy equations, Boundary layer equations; Von-Karman equations and related equations. Distinguish and define between Couette flow, Poiseuille flow, flow between two rotating cylinders, and related flows.

Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)	
	16		3		150201	
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning	
	3	0	2	0	8	
Pre-requisite module/s:	MMTA021, MMTA022, MAPA021 and MAPA022					
Co-requisite module/s:	MAPA032					
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative assessment will be done at the end of the module.					
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)					40
	Final mark =			% Summative Assessment Mark		60
				% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)					50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory / Practical	Theory				
	Duration	2 hrs				
	Sub minimum	40%				

CURRICULUM INFORMATION	
Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: New	First Year Offered (New): 2019 (First Semester)
Replace this Module existing module(s)?	If YES, give the module codes:

Module Code:	MAPA032				
Module Name:	Numerical Methods				
Content:	Revision of some important concepts continuous functions and interpolation; Taylor's expansion and difference quotients; numerical approximation of derivatives using difference quotients; numerical integration; Taylor's integral Theorem; Error bounds and iterative refinements; the conjugate gradient method; fixed points and stability ; application of these approximations to the solution of first and second order differential equations (i.e. parabolic, elliptic and hyperbolic equations); application also to systems of ordinary differential equations.				
Learning Outcomes:	<p>At the end of this module, students will be able to</p> <ul style="list-style-type: none"> Understand Taylor's expansion and its use in derivation of the various difference quotients (i.e. forward, backward and central difference quotients) Used difference quotients to approximate derivatives Evaluate integrals numerically Conduct error analysis to determine bounds over approximate solutions Understand how to determine the fixed points using an iterative process Determine the stability criterion associated with numerical solutions Estimate numerical solution of ordinary differential equation Estimate numerical solutions of systems of ordinary differential equations. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150201
Delivery Information:	SMU		Full		Period (1Sem)
	SMU		Contact-Full Time		1 st Semester
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0	2	0	8
Pre-requisite modules for this module:	MMTA021, MMTA022, MAPA021 and MAPA022				
Co-requisites modules for module:	MAPA031				
ASSESSMENT:					
Assessment Criteria:	Continuous formative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests.				

	Summative assessment will be done at the end of the module.				
Assessment Methods:	A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 3:2 respectively, to get the final mark. There will be a supplementary assessment.				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)			40%	
	Final mark =	% Formative Assess Mark		60%	
		% Summative Assess Mark		40%	
Min Final Assessment mark to pass (%)			50%		
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 Hours			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: AMAT302	

Module Code:	MAPA033				
Module Name:	Mathematical Theory of Electromagnetism				
Module Content:	<p>Mathematical Theory of Electromagnetism: Newton's laws of motion; Lorentz transformation; Minkowski space-time, Length contraction, Time dilatation; Spacelike and timelike intervals; Light cones, Velocity, acceleration and momentum; Minkowski law of force; Energy and mass; Momentum and energy.</p> <p>Special Relativity: Classical electrodynamics; Maxwell's equations; Continuity equations; Gauge invariance of electromagnetic field; Variation principles in field theory; Euler-Lagrange's equations; Maxwell's equation in 4-dimensional Minkowski space; Equations of motion; Lagrangian for a charged field and Equations of motion derived from variational methods.</p>				
Learning Outcomes:	<p>At the end of the module a student should be able to:</p> <ul style="list-style-type: none"> Understand and apply Newton's laws of motion, Lorentz transformation; Minkowski space-time, Length contraction, Time dilatation; Spacelike and timelike intervals; Light cones, Velocity, acceleration and momentum; Minkowski law of force; Energy and mass; Momentum and energy Understand and apply Classical electrodynamics; Maxwell's equations; Continuity equations; Gauge invariance of electromagnetic field; Variation principles in field theory; Euler-Lagrange's equations; Maxwell's equation in 4-dimensional Minkowski space; Equations of motion; Lagrangian for a charged field and Equations of motion derived from variational methods. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0	2	0	8
Pre-requisite module/s:	MMTA021, MMTA022, MAPA021 and MAPA022				
Co-requisites module/s:	MAPA034				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40	
	Final mark =	% Summative Assess Mark		60	
		% Summative Assess Mark		40	
	Min Final Assessment mark to pass (%)			50	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: New	First Year Offered (New): 2019 (Second Semester)
Replace this Module existing module(s)?	If YES, give the module codes:

Module Code:	MAPA034				
Module Name:	Introduction to Financial Mathematics				
Content:	Introduction to markets and instruments. Futures and options trading strategies, exotic options, arbitrage relationships, binomial option pricing method, Interest rates models, Mortgage backed securities				
Learning Outcomes:	At the end of the module a student should be able to: <ul style="list-style-type: none"> • Understand some dynamics of financial markets and financial instruments. • Understand interest rates and bond markets • Price simple financial instruments. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	16		3		150201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0	2	0	8
Pre-requisite modules for this module:	MMTA021, MMTA022, MAPA021 and MAPA022				
Co-requisites modules for module:	MAPA033				
ASSESSMENT:					
Assessment Criteria:	Continuous formative assessment based on Quizzes, Tutorials, Assignments, Practical and Tests. Summative assessment will be done at the end of the module.				
Assessment Methods:	A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 3:2 respectively, to get the final mark. There will be a supplementary assessment.				
Assessment Weighting:	Min Formative Assessment mark for exam admission (%)				40%
	Final mark =	% Formative Assess Mark			60%
		% Summative Assess Mark			40%
	Min Final Assessment mark to pass (%)				50%
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 Hours			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: MATH101, FMH010M

Module Code:	MMTH000
Module Name:	Pre-Calculus and Differential Calculus.
Module Content:	Laws of exponents, roots and radicals and logarithmic functions. Basic ideas concerning functions and their graphs, algebraic properties of functions including composite functions and different types of functions. Limits and their properties one sided limits, infinite limits and limits at infinity and asymptotes, continuity at a point and over an interval. Differential Calculus of a single variable function, rules of differentiation i.e. power, sum, product, quotient and the chain rule. The Mean Value Theorem, the rule of L'Hopital and indeterminate forms. Derivatives of exponential, logarithmic, hyperbolic, inverse trigonometric functions. Implicit differentiation. Higher order derivatives. Riemann Sums, definite and indefinite integrals, Mean Value Theorem for integrals,

	Fundamental Theorem of Calculus, techniques of integration by substitution, parts, partial fractions and trigonometric substitution				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Simplify expression containing exponents, roots and logarithmic functions • Define a function and determine domain and range • Sketch functions and understand the algebra and operations of functions, the composite and inverse trigonometric functions • Understand limit concept and representation of one sided limits and continuity of functions • Understand infinite limits, limits at infinity and asymptotes • Understand the derivative of a given function from first principles • Understand relationship between differentiability and continuity • Be able to apply the rules of differentiation including the chain rule • Prove the Mean Value theorem for differential calculus • Approximate a definite integral to within any desired degree of accuracy by a Riemann Sum • Recognise anti-differentiation (indefinite integral) as the reverse of differentiation • Evaluate integrals of some algebraic, exponential and trigonometric functions • Recognise the Fundamental Theorem of Calculus and use it for evaluating definite integrals • Prove the Mean Value Theorem for integrals • Be able to use different techniques of Integration 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		3		150101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	6	0	4	0	4
Pre-requisite module/s:	Admission criteria				
Co-requisite module/s:	None				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: MATH101, FMH010M	

Module Code:	MMTB000
Module Name:	Introductory Algebra

Module Content:	Principle of Mathematical Induction; Binomial Theorem and its application to expand powers of binomials and determine particular term of an indicated binomial expansion; Pascal Triangle arrangement of binomial coefficients. Systems of Linear Equations; Gaussian Elimination and the Gauss Jordan Elimination method to solve systems of linear equations; Operations with Matrices; properties of Matrix operations; matrix multiplication, matrix addition; the inverse of a matrix; adjoint method; Determinants and their properties; row reduction method and the Cramer's Rule. Complex numbers; operations of complex numbers; Complex conjugates; Polar form and DeMoivre's theorem Set Theory relationship in sets; set constructions; set algebra; Cartesian products; Power Sets.				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> Describe and construct (sets; relationships between sets; Cartesian products; power sets; set algebra; relations; relation types). Understand mathematical induction, proof and apply binomial theorem and binomial expansions, evaluate permutations and combinations. Deal with conjugates and division of complex numbers, polar form and De Moivre's Theorem, powers and roots, and polynomial equations. Evaluate (matrix operations; inverse matrices; properties of matrix operations; determinants) Solve linear equations using (elimination method; substitutions method; Gauss elimination method and Gauss-Jordan elimination method; Cramer's rule). Understand and evaluate logic operators, negations and methods of proof. Define and identify the examples of a vector space. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	24		3		150101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	6	0	4	0	4
Pre-requisite module/s:	Admission criteria				
Co-requisite module/s:	None				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes:	

Module Code:	MMTH011
Module Name:	Differential & Integral Calculus
Content:	Basic ideas concerning functions and their graphs, algebraic properties of functions including composite functions and different types of functions. Investigating limits and their properties, one sided limits, infinite limits and limits at infinity and asymptotes, continuity at a point and over an interval. Differential Calculus of a single variable function, rules of differentiation i.e. power, sum, product, quotient and the chain rule. The Mean Value Theorem, the rule of L'Hopital and indeterminate forms. Derivatives of exponential, logarithmic, hyperbolic, inverse trigonometric functions. Implicit differentiation. Higher order derivatives. Riemann Sums. Definite and indefinite integrals, Mean Value Theorem for integrals, Fundamental

	Theorem of Calculus, techniques of integration by substitution, parts, partial fractions and trigonometric substitution				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Define a function and determine domain and range • Sketch functions and understand the algebra and operations of functions, the composite and inverse trigonometric functions • Understand limit concept and representation of one sided limits and continuity of functions • Understand infinite limits, limits at infinity and asymptotes • Understand the derivative of a given function from first principles • Understand relationship between differentiability and continuity • Be able to apply the rules of differentiation including the chain rule • Prove the Mean Value theorem for differential calculus • Approximate a definite integral to within any desired degree of accuracy by a Riemann Sum • Recognise anti-differentiation (indefinite integral) as the reverse of differentiation • Evaluate integrals of some algebraic, exponential and trigonometric functions • Recognise the Fundamental Theorem of Calculus and use it for evaluating definite integrals • Prove the Mean Value Theorem for integrals • Use techniques of Integration 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4	0	4	0	4
Pre-requisite module/s:	Selection criteria				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 3:2 respectively, to get the final mark. There will be a supplementary assessment				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes:	

Module Code:	MMTH012
Module Name:	Linear and Introductory Abstract Algebra
Content:	Principle of Mathematical Induction, Binomial Theorem and its application to expand powers of binomials and determine particular term of an indicated binomial expansion, Pascal Triangle arrangement of binomial coefficients. Systems of Linear Equations, Gaussian Elimination and the Gauss Jordan Elimination method to solve systems of linear equations. Operations with Matrices, properties of Matrix operations, matrix multiplication, addition, the inverse of a matrix, adjoint method. Determinants and their properties, row

	reduction method and the Cramers' Rule. Set Theory ,relationship in sets, constructions, set algebra, Cartesian products, the Power Sets.				
Learning Outcomes:	<p>At the end of the module students should be able to:</p> <ul style="list-style-type: none"> • To use the principle of mathematical Induction as a method of proof and use it to prove mathematical statements • To be able to recognise, prove and apply the Binomial theorem to expand powers of binomials. • Solve a system of linear equations using different methods • Demonstrate when a system has no solution, unique and infinitely many solutions • have good knowledge of matrix algebra and theory related to matrices • find determinants of matrices and their properties • use the Cramers' Rule to solve a system of linear equations • Describe and construct (sets; relationships between sets; Cartesian products; power sets; set algebra; relations; relation types). 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4	0	4	0	4
Pre-requisite module/s:	Selection criteria				
Co-requisite module/s:	None				
Assessment Methods:	A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 3:2 respectively, to get the final mark. There will be a supplementary assessment				
Assessment Weighting:	Min Summative Assessments mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/ Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: MATH201	

Module Code:	MMTA021
Module Name:	Advanced Calculus
Module Content:	Infinite sequences and series of real numbers: limit of a sequence, bounded and monotonic sequences, theorems on convergence, Cauchy sequence and Cauchy criterion, tests for convergence and divergence for series, absolute convergence; Vectors in two dimensions: vector functions, arc length; Functions of Two variables: definition, domain and range, limits and continuity, partial derivatives, chain rule, gradient and directional derivative , transformations and Jacobian; Double integrals: Fubini's theorem, double integrals in polar coordinates; Line integrals: line integral with respect to arc length, Green's theorem; First order Differential Equations: separable equations, linear equations, exact equations.

Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Define convergent sequence and several other given definitions. • Test convergence of various sequences. • Apply various tests of convergence to a wide range of infinite series. • Understand the concept of vector function with one variable. • Differentiate, integrate, find limits of vector functions and determine the arc length. • Understand definitions of limits and continuity of functions of two variables. • Determine the limit of functions of two variables. • Determine directional derivative of a function with the aid of definition and in terms of gradient vector. • Evaluate double integrals for a wide range of functions. • Understand the concept of line integrals and evaluate line integrals. • Evaluating line integrals using Green's Theorem. • Understand the basic concepts and ideas of first order differential equations. • Solve separable, linear and exact equations. 				
Module Information:	ITS Course Level Code		ITS Course Level Code		CESM Code (3rd Order)
	20		3		150101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0	2	0	6
Pre-requisite module/s:	MMTH011 and MMTH012 OR MMTH000 and MMTB000				
Co-requisites module/s:	None				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department Mathematics and Applied Mathematics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: MATH212

Module Code:	MMTA022
Module Name:	Linear Algebra
Content:	Definition and examples of Vector spaces, Subspaces, Bases and dimension. Linear transformations, Rank-nullity theorem, Algebra of linear transformations, Isomorphism, Matrix representation, Linear functionals, Annihilator, Double dual, Transpose of a linear transformation. Eigen values and Eigen vectors of linear transformations, Diagonalizability, Cayley-Hamilton theorem, invariant subspaces, Cyclic subspaces and annihilators.

Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Understand bases for null space and range of a linear transformation. • Solve eigenvalue problems and diagonalize a given square matrix. • Handle the abstract concepts of vector space properties and linear transformations with confidence. • Find a matrix representing a linear transformation relative to any set of given bases. • Find Determine an orthogonal bases for an inner product space using the Gramm-Schmidt process. • Find the matrix representing a quadratic and bilinear form. • Find bases for dual spaces and annihilators of subspaces. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		150102
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0	2	0	6
Pre-requisite module/s:	MMTH011 and MMTH012 OR MMTH000 and MMTB000				
Co-requisite module/s:	None				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assess Mark	60
				% Summative Assess Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: MATH341	

Module Code:	MMTA031				
Module Name:	Mathematical Analysis I				
Content:	Sequence and series of functions: Pointwise and Uniform convergence of sequence and series of functions, term by term integration and term by term differentiation of sequence and series of functions, Power series, convergence of power series, Radius of convergence and Interval of convergence, Taylor and McLaurin series; Riemann Integrals: definition and existence of the Riemann integral, properties of the integral, Fundamental theorem of Calculus, Riemann Stieljes integral, existence and properties				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • Apply different convergent criteria to determine the convergence or divergence of sequence or series of functions. • Determine term by term differentiability and term by term integrability of sequence and series of functions. • Determine Radius of convergence and Interval of convergence of power series. • Determine Taylor and McLaurin series for given functions. • Define and understand Riemann integral and Riemann Stieljes integrals. • Understand and prove the properties of the integrals. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150103
	Classes	Practicals	Tutorial	Seminars	Independent Learning

Periods per week:	3	0	2	0	8
Pre-requisite module/s:	MMTA021 and MMTA022				
Co-requisites module/s:	MMTB031				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark	60	
			% Summative Assessment Mark	40	
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION					
Department: Mathematics and Applied Mathematics			School: Science & Technology		
Last Revision date: 2011			First Year Offered (New):		2013
Replace this Module existing module(s)? Yes			If YES, give the module codes:		MATH351
Module Code:	MMTB031				
Module Name:	Abstract Algebra				
Module Content:	<p>Groups: Definition and examples of groups including permutation groups and quaternion groups, elementary properties of groups. Subgroups and examples of subgroups, product of subgroups. Cyclic groups, permutation groups, normal groups and their properties. Cosets, Lagrange's theorem, quotient groups, group homomorphism, Cayley's theorem, Isomorphism theorems.</p> <p>Rings and Fields: Rings, integral domains, fields, subrings, ideals, quotient rings, ring homomorphisms, isomorphism theorems, ring of polynomials, polynomials over \mathbb{Z}, \mathbb{Q} and \mathbb{R}. Factoring polynomials and division algorithm, field extension, extension of \mathbb{Q}. Geometric Construction, constructible points and numbers, constructibility and extension of \mathbb{Q}.</p>				
Learning Outcomes:	<p>At the end of the module a student should be able to: rite down a clear and coherent proof of a mathematical statement.</p> <p>Identify various mathematical structures as various groups or rings.</p> <ul style="list-style-type: none"> • State and prove theorems and apply the concepts in problems • Understand the properties of various groups • Define homomorphism and isomorphism between groups • Apply homomorphism and isomorphism concepts in problems • Apply first, second and third isomorphism theorems in problems 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150102
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0	2	0	8
Pre-requisite module/s:	MMTA021 and MMTA022				
Co-requisite module/s:	MMTA031				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assess Mark	60	
			% Summative Assess Mark	40	
	Min Final Assessment mark to pass (%)				50
		Paper 1	Paper 2	Paper 3	Paper 4

Summative Assessment Paper:	Theory / Practical	Theory		
	Duration	2 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION			
Department: Mathematics and Applied Mathematics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New):	2013
Replace this Module existing module(s)? Yes		If YES, give the module codes:	MATH372

Module Code:	MMTA032				
Module Name:	Complex Analysis				
Module Content:	Complex numbers: Preliminaries and Algebraic properties, Polar representation, Powers, roots and the quadratic formula, Curves, regions and domains in the plane; Complex functions: limits and continuity; Analytic and harmonic functions: Cauchy- Riemann equations; Complex integrals: Curves and contours, Cauchy's theorem for a contour, Cauchy's Integral Formula, Cauchy's Integral Formula for Derivatives, Power series Taylor and Laurent's series, singularities.				
Learning Outcomes:	<p>After successfully completing the module, the student should be able to:</p> <ul style="list-style-type: none"> Deal confidently with problems involving complex numbers. Use Cauchy-Riemann equations to check the differentiability of complex functions. Determine analytic and entire functions. Find analytic function if the conjugate is given. Evaluate complex functions using Cauchy's integral formula and formula for derivatives. Locate singularities and determine their type. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	16		3		150101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0	2	0	8
Pre-requisite module/s:	MMTA021 and MMTA022				
Co-requisites module/s:	MMTB032				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:	Paper 1		Paper 2		Paper 3
	Paper 4				
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department:	Mathematics and Applied Mathematics		School: Science & Technology
Last Revision date:	2011		First Year Offered (New): 2013
Replace this Module existing module(s)?	Yes		If YES, give the module codes: MATH382

Module Code:	MMTB032				
Module Name:	Mathematical Analysis II				
Module Content:	Preliminary concepts of sets and functions. Definition and examples of Metric spaces. Open balls and open sets. Convergence, Convergent sequences, Limit and cluster points, Cauchy sequences and Completeness. Closed sets, Bounded set and dense sets, boundary of a set in Metric spaces. Continuity and continuous functions, Open and Closed maps, Homeomorphisms in Metric spaces. Connectedness and connected spaces, Path connected spaces, Compactness and Compact spaces, Continuous functions on compact spaces, Characterization of compact Metric spaces.				
Learning Outcomes:	After successfully completing the module, the student should be able to: <ul style="list-style-type: none"> • understand different operations of sets. • have clear idea on various functions, also their products and compositions. • define continuity and homeomorphisms on general Metric spaces. • define connectedness and provide examples. • state and prove results of continuity on connectedness in general Metric spaces. • define Compactness and provide examples. • state and prove results of continuity on Compactness in general Metric spaces. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150103
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0	2	0	8
Pre-requisite module/s:	MMTA021 and MMTA022				
Co-requisites module/s:	MMTA032				
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments and Tests. Summative assessment will be done at the end of the module.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

DEPARTMENT: PHYSICS

CURRICULUM INFORMATION

Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: FPHS010

Module Code:	MPHS000			
Module Name:	Introduction to General Physics 1A			
Module Content:	<p>Measurements – Physical quantities and vectors, scientific method, unit conversions, significant figures, measuring tools and uncertainty, operational definitions, proportional reasoning with mass and volume.</p> <p>Mechanics: Frame of reference, mathematical and graphical representation of motions. Impulse and momentum, types of forces, Newton's laws, induced forces, forces in 2 dimensions, adding and resolving forces, rotational Motion, work, kinetic and potential energy, conditions for equilibrium.</p> <p>Energy and temperature - Thermal interactions, mixing water, specific heat capacity, mixing other substances, phase transition, latent heat, proportional reasoning with energy and temperature, and energy transfer mechanisms.</p> <p>Properties of matter: Elasticity, fluid Mechanics and Thermal Physics</p> <p>Modern Physics: Atomic Structure and Nuclear Physics</p>			
Learning Outcomes:	<p>After successfully completing this module students should be able to:</p> <ul style="list-style-type: none"> • Transfer learning from one context to another • Understand when a certain formula can be applied and when it cannot be applied. • Demonstrate an understanding of underlying ideas and concepts (the basic principles of physics) • Understand operational definitions of physics concepts • Do unit conversions • Understand the concept of uncertainty in measurements • Demonstrate basic laboratory skills • Analyse forces acting on an object and predict their effects. • State, explain and apply the laws of Newton in solving problems. • Differentiate between work, energy and power and be able to apply the three concepts in real-life situations • Define and show understanding of vector and scalar quantities, and differentiate between them. • Differentiate between heat and temperature • Discuss the atomic nuclei structure, atomic forces and nuclear energy • Carry out calculations involving the relationship between energy and mass loss for fission and fusion reactions. 			
Module Information:	SAQA Credits		ITS Course Level Code	
	24		03	
Periods per Week:	Classes		Tutorial	Seminars
	4 x 45 min		2 x 1 hrs	0
Independent Learning	1.25 hour			
Pre-requisite module/s:	None			
Co-requisite module/s:	None			
Assessment Methods:	Continuous assessments: tests and assignments; Practical assessments. Summative assessment: one theory examination at the end of the year			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final Mark =		% Summative Assessment Mark	60
			% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION	
Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: FPHH010M

Module Code:	MPHB000				
Module Name:	Introduction to General Physics 1B				
Module Content:	Electricity and Magnetism – Electrostatics, charging process, charge distributions, potential difference, Ohm's law, resistors in parallel and series, internal resistance and Electromagnetism. Oscillations and Waves: Simple Harmonic Motion, Mechanical Waves, Acoustics, Electromagnetic Waves Optics: Nature and Propagation of Light and Geometrical Optics				
Learning Outcomes:	After taking this module students should be able to: <ul style="list-style-type: none"> • Demonstrate an understanding of underlying ideas and concepts of electricity • Define Coulomb's law and apply it for interaction of stationary charges • Know how to calculate work, energy and electric potential of a charge • Know how a capacitor works and solve circuits with capacitors connected in series and in parallel • Define correctly electric current and apply Ohm's law to emf and Kirchhoff circuits • Know the originality of magnetism and calculate current in different types of conductors • Understand the Hall Effect in metals and semiconductors • Understand Hooke's law and the oscillations in a simple pendulum • Differentiate between transverse and longitudinal waves • Understand the application of the Doppler Effect to sound • Understand the nature of light and know the difference between reflection and refraction • Understand how images are formed in mirrors, lenses and cameras 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	24		03		140701
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	2 x 1 hrs	0	1.25 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
Assessment Methods:	Continuous assessments: tests and assignments Summative assessment: one theory examination at the end of the year				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MPHS011				
Module Name:	General Physics 1A				
Module Content:	Mechanics: Units, Physical quantities and vectors, Kinematics, Dynamics, Statics, Work and Mechanical Energy, Impulse and momentum, and Rotational Motion Properties of matter: Elasticity, Fluid Mechanics and Thermal Physics Modern Physics: Atomic Structure and Nuclear Physics				
Learning Outcomes:	After successfully completing this module students should be able to: <ul style="list-style-type: none"> • Use SI units of all physical quantities • Distinguish between fundamental and derived physical quantities • Measure mass, time, length and temperature • Define and classify vector and scalar quantities • Carry out calculations involving work done, potential energy, kinetic energy and power • Analysis of falling objects, thrown objects, projected objects • Discuss energy conservation • Explain the impulse and relate it to momentum • Carry out calculations involving density, mass and volume • Describe the principles of a method for measuring the density of air • Carry out calculations involving pressure, force, density, depth and area • Explain hydrostatic and hydrodynamic principles and discuss their applications • Explain temperature, heat and heat capacity • Discuss applications of heat flow and heat transfer • Discuss the atomic nuclei structure, atomic forces and nuclear energy • Carry out calculations involving the relationship between energy and mass loss for fission and fusion reactions 				
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3rd Order)		
	12	3	140701		
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	1 x 3 hrs	1 x 45 min		2.4 hrs
Pre-requisite module/s:	None				
Co-requisites module/s :	MMTH011				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 x 3 hour written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/ Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MPHS012					
Module Name:	General Physics 1B					
Module Content:	Electricity and Magnetism: Electrostatics, Current electricity, Electromagnetism; Oscillations and Waves: Simple Harmonic Motion, Mechanical Waves, Acoustics, Electromagnetic Waves Optics: Nature and Propagation of Light and Geometrical Optics					
Learning Outcomes:	After taking this module student should be able to: <ul style="list-style-type: none"> • Define Coulomb's law and apply it for interaction of stationary charges • Know how to calculate work, energy and electric potential of a charge • Know how a capacitor works and solve circuits with capacitors connected in series and in parallel • Define correctly electric current and apply Ohm's law to emf and Kirchhoff circuits • Know the originality of magnetism and calculate current in different types of conductors • Understand the Hall Effect in metals and semiconductors • Understand Hooke's law and the oscillations in a simple pendulum • Differentiate between transverse and longitudinal waves • Understand the application of the Doppler Effect to sound • Understand the nature of light and know the difference between reflection and refraction • Understand how images are formed in mirrors, lenses and cameras 					
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)	
	12		3		140701	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning	
	4 x 45 min	1 x 3 hrs	1 x 45 min		2.4 hrs	
Pre-requisite module/s:	None					
Co-requisite module/s:	MMTH012					
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 x 3 Hours written examination					
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40	
	Final Mark =			% Summative Assessment Mark		60
				% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4	
	Theory/ Practical	Theory				
	Duration	3 hrs				
	Sub minimum	40%				

CURRICULUM INFORMATION

Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHS201M

Module Code:	MPHA021				
Module Name:	Classical Mechanics				
Module Content:	Vector Analysis, Kinematics, Lagrangian and Hamiltonian mechanics, Central force motion, Oscillations and Rigid bodies.				
Learning Outcomes:	After completion of this module students are expected to: <ul style="list-style-type: none"> • Use mathematical models to solve physical systems problems. • Solve real problems using ideal problems formulation. • Make a correlation between theoretical and practical nature of mechanics. • Solve and analyze rigid-body problems and problems in non-inertial frames. • Use Lagrangian and Hamiltonian mechanics to obtain the equations of motion for a variety of problems, including the use of generalized coordinates and cyclic coordinates. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		03		140799
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	2	1		2.6 hrs
Pre-requisite module/s:	MPHS011 and MPHS012				
Co-requisite module/s:	MPHB021,MMTA021				
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Vector Analysis, Kinematics, Lagrangian and Hamiltonian mechanics, Central force motion, Oscillations and Rigid bodies.				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 Hours written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHYS202

Module Code:	MPHB021				
Module Name:	Modern Physics				
Module Content:	Special and general relativity, Quantization of electromagnetic radiation, Wave-particle duality, Atomic Physics, Nuclear structure, Radioactivity, Nuclear reactions, Radiation and matter, and Elementary particles.				
Learning Outcomes:	After completing this module, students should be able to: <ul style="list-style-type: none"> • Differentiate between Galilean Relativity and Special Relativity • Correctly calculate time dilation and length contraction effects • Perform Lorentz Transformations between reference frames • Describe where classical physics fails to explain aspects of, Atomic Spectra, Photoelectric Effect, Blackbody Radiation, Heat Capacities of Solids, Atomic Theory and Electrical Conduction 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		03		140799
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	2	1		2.6 hrs
Pre-requisite module/s:	MPHS011 and MPHS012				
Co-requisite module/s:	MPHA021 and MMTA021				
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Special and general relativity, Quantization of electromagnetic radiation, Wave-particle duality, Atomic Physics, Nuclear structure, Radioactivity, Nuclear reactions, Radiation and matter, and Elementary particles.				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 Hours written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40 %			

CURRICULUM INFORMATION

Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHYS203

Module Code:	MPHA022				
Module Name:	Electrodynamics and Electronics				
Module Content:	Electrodynamics: Electrostatic fields in vacuum and in matter, Magnetostatic fields in vacuum and in matter. Electronics: Electronic Circuits, Semiconductors and Introduction to Solid State Physics.				
Learning Outcomes:	After completing this module, students should be able to: <ul style="list-style-type: none"> Solve problems in electrostatics and magnetostatics. Demonstrate the ability to use Gauss's law and Amperes law to find electric and magnetic fields in symmetric situations. Demonstrate the ability to calculate electric and magnetic fields in the presence of matter which can be electrically and magnetically polarized, Understand electronic circuits Identify the fundamental mechanisms and models of controlling the operation of semiconductor devices. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		03		140799
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	2	1		2.6 hrs
Pre-requisite module/s:	MPHS011 and MPHS012				
Co-requisite module/s:	MPHB022 and MMTA022				
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Electrodynamics: Electrostatic fields in vacuum and in matter, Magnetostatic fields in vacuum and in matter. Electronics: Electronic Circuits, Semiconductors and Introduction to Solid State Physics.				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 Hours written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department: Physics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: PHYS204	

Module Code:	MPHB022				
Module Name:	Waves and Physical Optics				
Module Content:	Waves: General wave properties; Simple, damped, forced and coupled oscillators; Transverse wave motion and Fourier methods. Physical Optics: Waves in optical systems, Interference and diffraction theory and Polarization.				
Learning Outcomes:	After taking this module students should be able to: <ul style="list-style-type: none"> Describe wave properties Describe oscillators and their behavior when an external force acts Understand wave phenomena such interference and diffraction. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	10		03		140799
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	2	1		2.6 hrs
Pre-requisite module/s:	MPHS011; MPHS012				
Co-requisite module/s:	MPHA022,MMTA022				
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Waves: General wave properties; Simple, damped, forced and coupled oscillators; Transverse wave motion and Fourier methods. Physical Optics: Waves in optical systems, Interference and diffraction theory and Polarization.				
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 hour written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION			
Department: Physics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: PHYS204	

Module Code:	MPHA031				
Module Name:	Quantum Mechanics				
Module Content:	Background to quantum mechanics, Schrödinger equation, Properties of Schrödinger equation, Application of quantum mechanics to one-dimensional systems, Quantum theory of the hydrogen atom.				
Learning Outcomes:	After completion of this course students are expected to: <ul style="list-style-type: none"> describe the wave nature and particle nature of particles and radiation. solve problems concerning particles in various potentials. make a connection between quantum mechanics and high energy physics experiments. 				

Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)	
	16		04		140799	
Periods per Week:	Classes		Practicals	Tutorial		Seminars
	5		2	1		
Independent Learning	10.2 hrs					
Pre-requisite module/s:	MPHA021; MPHB021, MPHA022, MPHB022, MMTA021 and MMTA022					
Co-requisite module/s:	MPHB031,					
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to quantum mechanics, Schrödinger equation, Properties of Schrödinger equation, Application of quantum mechanics to one-dimensional systems, Quantum theory of the hydrogen atom.					
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 h written examination.					
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)					40
	Final mark =			% Summative Assessment Mark		60
				% Summative Assessment Mark		40
	Min Final Assessment mark to pass(%)					50
Summative Assessment Paper:			Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical		Theory			
	Duration		3 hrs			
	Sub minimum		40%			

CURRICULUM INFORMATION

Department: Physics		School: Science & Technology	
Last Revision date: 2011		First Year Offered (New): 2013	
Replace this Module existing module(s)? Yes		If YES, give the module codes: PHYS302	

Module Code:	MPHB031					
Module Name:	Thermodynamics and Statistical Mechanics					
Module Content:	Thermodynamics: Fundamental concepts, Ideal and real gases, 1 st , 2 nd and 3 rd laws of thermodynamics and Thermodynamic potential. Statistical Mechanics: Classical statistical Physics and Quantum Statistics					
Learning Outcomes:	After taking this module student should be able to: <ul style="list-style-type: none"> • Coherent and critical understanding of the fundamental concepts of Thermodynamics • Explain the macroscopic properties of a gas, such as its pressure and its temperature, in terms of the behavior of the molecules that make it up. • Coherent and critical understanding of the laws of Thermodynamics • Apply statistical methods to particles. 					
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)	
	16		03		140799	
Periods per Week:	Classes		Practicals	Tutorial		
	5		2	1		
Independent Learning	10.2 hrs					
Pre-requisite module/s:	MPHA022, MPHB022, MPHA021, MPHB021, MMTA021 and MMTA022					
Co-requisite module/s:	MPHA031,					
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Fundamental concepts, Ideal and real gases, 1 st , 2 nd and 3 rd laws of thermodynamics and Thermodynamic potential. Classical statistical Physics and Quantum Statistics					
Assessment Methods:	Summative (60%): Tests, Practical, Tutorials and/or Assignments. Summative (40%): 1 × 3 h written examination.					
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40	
	Final mark =			% Summative Assessment Mark		60
				% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50	

		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment Paper:	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40 %			

CURRICULUM INFORMATION	
Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHYS303

Module Code:	MPHA032				
Module Name:	Solid State Physics				
Module Content:	Atomic structure of matter, Crystallography, X-ray diffraction theory, Thermal vibrations, Free electrons in crystals and the band theory.				
Learning Outcomes:	After taking this module students should be able to: <ul style="list-style-type: none"> Describe the crystal structure of solids. Determine the reciprocal lattice from the real space lattice for cubic structures and appreciate the importance of unit cells in each case. Coherent and critical understanding of the concept of translational invariance and point symmetry of crystals. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	16		04		140799
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	2	1		10.2 hrs
Pre-requisite module/s:	MPHA022, MPH022, MPHA021, MPH021, MMTA021, MMTA022				
Co-requisite module/s:	MPHB032				
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Atomic structure of matter, Crystallography, X-ray diffraction theory, Thermal vibrations, Free electrons in crystals and the band theory.				
Assessment Methods:	Summative: Tests, Practicals, Tutorials and/or Assignments. Summative: 1 × 3 hour written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Physics	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHYS304

Module Code:	MPHB032				
Module Name:	Electrodynamics and Electronics				
Module Content:	Electronics: Diodes, Transistors, Amplifiers and Oscillator circuits. Electrodynamics: Electromotive force, Faraday's law, Potential formulation of electrodynamics, Energy and momentum.				
Learning Outcomes:	After taking this module student should be able to: <ul style="list-style-type: none"> • Apply the techniques of AC theory in a complex representation; • Describe the operation of simple semiconductor devices: junction diode, bipolar transistor, field-effect transistor, etc.; • Analyse the operation of a range of basic analogue electronic circuits involving transistors and/or operational amplifiers; • Perform design calculations for such circuits; • Demonstrate an understanding of the basic principles and concepts related to electrodynamics 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		03		140799
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	2	1		10.2 hrs
Pre-requisite module/s:	MPHA021, MPHA022, MPHB021, MPHB022, MMTA021 and MMTA022				
Co-requisite module/s:	MPHA032				
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Diodes, Transistors, Amplifiers and Oscillator circuits. Electromotive force, Faraday's law, Potential formulation of electrodynamics, Energy and momentum.				
Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hour written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

DEPARTMENT: STATISTICAL SCIENCES

CURRICULUM INFORMATION

Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2012	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MSTS000				
Module Name:	Descriptive Statistics				
Module Content:	Definitions and concepts. Sources and types of data. Organizing and summarizing data; Descriptive statistics. Elementary probability theory. Counting techniques: Permutations and combinations. Random variables and probability distributions: Bernoulli, Binomial, Poisson and Normal distributions. Sampling distributions: t, F and Chi-square distributions. Central Limit Theorem. Estimation: point and interval; Confidence Interval for the mean, proportion and variance. Test of hypotheses: Tests for the mean, proportion and variance. Inferences about differences in two means and two proportions; One-way ANOVA. Chi-square tests. Simple linear regression and correlation. Time series analysis. Index numbers.				
Learning Outcomes:	<ul style="list-style-type: none"> Find point and interval estimates of the mean, proportion and variance; Test hypotheses on the mean, proportion and variance; Compare several means and proportions; Fit a simple linear regression model and calculate the correlation coefficient; Analyse a time series data. Calculate different indices. 				
Module Information:	SAQA Credits	ITS Course Level Code		CESM Code (3rd Order)	
	12	3		150301	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0.5	1	0	4
Pre-requisite module/s:	None				
Co-requisite module/s:	MMTH011				
Assessment Criteria:	A student should be able to demonstrate that s/he has the ability to organize and summarize data and have basic knowledge of probability.				
Assessment Methods:	A module mark will be obtained from continuous summative assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a 1 x 3 hour comprehensive written summative assessment and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2012	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MSTS011				
Module Name:	Introduction To Statistics				
Module Content:	Definitions and concepts. Sources and types of data. Organizing and summarizing data; Descriptive statistics. Elementary probability theory. Counting techniques: Permutations and combinations. Random variables and probability distributions: Bernoulli, Binomial, Poisson and Normal distributions.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> • Distinguish the different types of data; • Organize and summarize data by using tabular and graphical methods; • Compute values of different descriptive statistics; • Evaluate probabilities of events; • Use elementary probability distribution functions. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150301
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0.5	1	0	4
Pre-requisite module/s:	None				
Co-requisite module/s:	MMTH011				
Assessment Criteria:	A student should be able to demonstrate that s/he has the ability to organize and summarize data and have basic knowledge of probability.				
Assessment Methods:	A module mark will be obtained from continuous summative assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour written summative assessment and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2012	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MSTS012
Module Name:	Introduction To Statistical Inference

Module Content:	Sampling distributions: t, F and Chi-square distributions. Central Limit Theorem. Estimation: point and interval; Confidence Interval for the mean, proportion and variance. Test of hypotheses: Tests for the mean, proportion and variance. Inferences about differences in two means and two proportions; One-way ANOVA. Chi-square tests. Simple linear regression and correlation. Time series analysis. Index numbers.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> • Find point and interval estimates of the mean, proportion and variance • Test hypotheses on the mean, proportion and variance • Compare several means and proportions • Fit a simple linear regression model and calculate the correlation coefficient; Analyse a time series data • Calculate different indices. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150301
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0.5	1	0	4
Pre-requisite module/s:	None				
Co-requisite module/s:	MMTH012				
Assessment Criteria:	A student should be able to demonstrate that s/he has a basic knowledge of statistical inference, linear regression, time series analysis and index numbers.				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2012	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes:

Module Code:	MSTA021				
Module Name:	Theory of Distributions				
Module Content:	Basic probability concepts. Theory of discrete and continuous probability distributions. Expected values and MGF. Special discrete and continuous probability distributions: Bernoulli, Binomial, Hypergeometric, Geometric, Poisson and Negative Binomial, Uniform, Gamma, Exponential, Weibull, Pareto and Normal distributions. Theory of multivariate discrete and continuous distributions, marginal and conditional distributions. Covariance and correlation. Theory of conditional expectation and conditional variance. Distributions of random functions: distribution function, transformation and MGF techniques.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> • Know the basic concepts of probability. • Identify the important distribution functions. • Derive distributions of random functions. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		150302
	Classes	Practicals	Tutorial	Seminars	Independent Learning

Periods per Week:	6	0.5	2	0	8
Pre-requisite module/s:	MMTH011, MMTH012, MST011, MST012				
Co-requisite module/s:	MMTA021				
Assessment Criteria:	A student should be able to demonstrate that s/he has a satisfactory knowledge of the theory of statistical distributions.				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark	60	
			% Summative Assessment Mark	40	
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION						
Department:	Statistical Sciences			School:	Science and Technology	
Last Revision date:	2011			First Year Offered (New):	2013	
Replace this Module existing module(s)?	No			If YES, give the module codes:		

Module Code:	MSTA022				
Module Name:	Statistical Inference				
Module Content:	Sampling distributions: t, F and Chi-square distributions. Central Limit Theorem. Estimation: point and interval; Confidence Interval for the mean, proportion and variance. Test of hypotheses: Tests for the mean, proportion and variance. Inferences about differences in two means and two proportions; One-way ANOVA. Chi-square tests. Simple linear regression and correlation. Time series analysis. Index numbers.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> Know the important sampling distributions. Estimate parameters. Conduct statistical tests. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		150302
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	6	0.5	2	0	8
Pre-requisite module/s:	MMTH011, MMTH012, MST011, MST012				
Co-requisite module/s:	MMTA022				
Assessment Criteria:	A student should be able to demonstrate that s/he has a satisfactory knowledge of statistical inference.				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark	60	
			% Summative Assessment Mark	40	
	Min Final Assessment mark to pass(%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? No	If YES, give the module codes: STAT351

Module Code:	MSTB031
Module Name:	Applied Linear Regression
Module Content:	Simple Linear Regression: Fitting the model, Model assumptions, Estimation and tests, Regression through the origin. Review of Matrix Algebra: Matrices, Operations on matrices. Multiple Linear Regression: Fitting the model, Estimation and tests, Prediction, Multicollinearity. Model Adequacy
Module Content:	Checking: Residual analysis, Detecting unequal variances, Checking the normality assumption, Detecting

	outliers. Variable Selection and Model Building: Subset regression models, All possible regressions, Stepwise procedures.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> • Fit simple and multiple regression models. • Select appropriate models. • Test for adequacy of models. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150302
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0.5	1	0	7
Pre-requisite module/s:	MMTA022, MSTA021, MSTA022				
Co-requisite module/s:	None				
Assessment Criteria:	A student should be able to demonstrate that s/he has a good knowledge of linear regression and can apply the theory of linear regression to real life problems.				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assess Mark	60
				% Summative Assess Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: STAT342

Module Code:	MSTB032				
Module Name:	Multivariate Statistical Methods				
Module Content:	Review of matrix theory. Multivariate distributions: Multivariate normal distribution and its properties; Inference about multivariate means; Hotelling's T ² . Multivariate analysis of variance and regression. Introduction to data reduction.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> • Understand multivariate methods and what they do. • Know when to apply the different multivariate methods. • Analyze a multivariate data set and write a report. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150302
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0.3	1	0	7
Pre-requisite module/s:	MMTA022, MSTA021, MSTA022				
Co-requisite module/s:	None				
Assessment Criteria:	A student should be able to demonstrate that s/he has the ability to select an appropriate multivariate method, analyze a multivariate data and write a report.				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Statistical Sciences	School: Science & Technology
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: STAT392

Module Code:	MSTC032				
Module Name:	Sampling Theory				
Module Content:	Elements of Sampling, Questionnaire Design, Simple Random Sampling, Stratified Random Sampling, Ratio Estimation, Difference and Regression Estimators, Systematic Sampling.				
Learning Outcomes:	After successful completion of the module, the student should be able to <ul style="list-style-type: none"> Design a questionnaire Design a sample survey Estimate the parameters and standard errors Write a report. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	16		3		150302
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	3	0.3	1	0	7
Pre-requisite module/s:	MSTA021, MSTA022				
Co-requisite module/s:	None				
Assessment Criteria:	A student should be able to demonstrate that s/he has the ability to design a questionnaire, design a sample survey, estimate the parameters with their standard errors and write a report.				
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. Tutorials will be compulsory. The final mark will be obtained from a three-hour comprehensive written examination and the module mark in the ratio 2:3.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =			% Summative Assess Mark	60
				% Summative Assess Mark	40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	2 hrs			
	Sub minimum	40%			

DEPARTMENT: HUMAN PHYSIOLOGY

CURRICULUM INFORMATION

Department: Human Physiology	School: Medicine
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHY201M replaces PHYL200 (in part)

Module Code:	MPLA021				
Module Name:	Systems Physiology I				
Module Content:	<p>Introduction: Cell physiology and homeostasis Nerve & Muscle: Types, contraction of skeletal and smooth muscle Central nervous system: Spinal cord, motor functions, cortex, limbic system and hypothalamus, brain activity, autonomic nervous system, cerebral blood. Senses: Fundamentals and principles, olfaction, gustation, vision, equilibrium and hearing Transport systems: Red blood cells and their genesis, white blood cells, platelets and their function, the heart as a pump, cardiac cycle, cardiac output, blood vessels, blood flow and arterial pressure, lymphatics, pathophysiology</p>				
Learning Outcomes:	<ul style="list-style-type: none"> • Define Physiology and explain the concept of homeostasis and give a detailed description of cell membrane physiology • Demonstrate an understanding of neural and hormonal communication in the human body, including graded potentials, action potentials, synapses, neuronal integration, intercellular communication and the principles of hormonal action • Explain the physiology of the central and peripheral nervous systems in humans and display knowledge of receptor physiology, pain and the physiology of the special senses • Demonstrate an understanding of muscle physiology in humans, and know skeletal muscle mechanics, metabolism, fibre types and the control of motor movement. • Discuss cardiovascular physiology in humans, with regard to the physiology, functions, basic anatomy and histology of the heart, the structure and functions for the vascular tree and the physiology of blood vessels and the maintenance of blood pressure • Explain the physiology of the blood and body defences in humans, including the composition and functions of blood and its individual components and both innate and acquired immunity 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		130801
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 3 Hours	0	0	5 hrs
Pre-requisite module/s :	None				
Co-requisites module/s :	MBIA021				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and a summative theory assessment at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%).				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =			% Summative Assessment Mark	60
				% Summative Assessment Mark	40
	Min Final Assessment mark to pass (%)				50

Module Code:	MPLA021				
Module Name:	Systems Physiology I				
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Human Physiology	School: Medicine
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHY202M replaces PHYL200 (in part)

Module Code:	MPLA022				
Module Name:	Systems Physiology II				
Module Content:	<p>Respiration: Functional characteristics, volumes and capacities, gas exchange, transport of gasses, regulation, and pathophysiology</p> <p>Filtration: Formation of urine, regulation of body fluids, acid-base balance and micturition, clinical abnormalities and renal disease</p> <p>Digestive system: Structure and function, alimentary canal, accessory organs, movements, digestive juices, absorption</p> <p>Nutrition: Digestion and metabolism, fat and water soluble vitamins, minerals</p> <p>Exercise: Performance, energy, training and recovery, body systems, in exercise, drugs</p> <p>Endocrine system: Hormones, hypothalamus, pituitary, thyroid, parathyroid, pineal and adrenal glands, pancreas, endocrine kidney</p> <p>Male reproductive system: Testes, duct system, accessory glands, external genitalia, semen</p> <p>Female reproductive system: anatomy, menstrual, uterine, vaginal and ovarian cycle</p> <p>Sexual health: STD's and HIV, methods of contraception, pregnancy, sexual dysfunction</p>				
Learning Outcomes:	<ul style="list-style-type: none"> Understand the respiratory system physiology in humans, including respiratory mechanics, gas exchange, gas transport, the control of respiration and its role in homeostasis Know the urinary system physiology in humans, understand glomerular filtration, tubular reabsorption and tubular secretion and discuss urine excretion, plasma clearance and the role of the urinary system in the maintenance of homeostasis Demonstrate an understanding of the maintenance of fluid and acid-base balance in the human body and describe the role of fluid and acid-base balance in the maintenance of homeostasis. Know the physiology of the digestive system, energy balance and temperature regulation, describe the processes of digestion and absorption of different nutrients and understand the control of food intake in humans Understand endocrine physiology in humans, including the physiology of the pineal gland and circadian rhythms, and the hypothalamus and pituitary gland and their regulatory roles in the body Discuss reproductive physiology of males and females, know the physiology of sexual intercourse between males and females, and understand the basics regarding contraception, abortion, certain aspects of sexual health and the relationship between the reproductive system and homeostasis 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		130801
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 3 Hours	0	0	5 Hours
Pre-requisite module/s:	None				
Co-requisite module/s:	MBIA021				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and a summative theory assessment at the end of the module. The final				

	mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%)			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final Mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION			
Department: Human Physiology	School: Medicine		
Last Revision date: 2011	First Year Offered (New):	2013	
Replace this Module existing module(s)? Yes	If YES, give the module codes: replaces PHYL200 (in part)	PHY202M	

Module Code:	MPLC031		
Module Name:	Pathophysiology		
Module Content:	<p>Chronic diseases of lifestyle: Mortality patterns, hypertension, smoking, drugs and alcohol, dyslipidemia, obesity, diabetes mellitus, lifestyle induced cancers, stroke, exercise, diet</p> <p>Sexual health: PCOS, endometriosis, contraception; risk behaviour; PID and sexual dysfunction</p> <p>Introduction to occupational health and hygiene</p> <p>Anthropometry</p> <p>Ergonomics</p>		
Learning Outcomes:	<ul style="list-style-type: none"> List and describe various chronic diseases of lifestyle in terms of risk factors, aetiology, prevalence and complications Discuss the mortality patterns in South Africa, especially with regard to chronic diseases of lifestyle. Demonstrate an understanding of the role of smoking, diet, obesity, early life origins and physical inactivity in the development of chronic diseases of lifestyle Explain the basic concepts of occupational health and hygiene, as well as the types of factors that can affect workers in an occupational setting Demonstrate an understanding of anthropometry and its applications in various fields Describe anthropometric evaluation, annual monitoring indicators, collection of anthropometric data through surveys, and the selection of samples Be able to take some basic anthropometric measurements accurately Demonstrate an understanding of the basic concepts of ergonomics Explain designing principles for design for various working positions, human strength, vision and for designing of handtools Students can also be expected to do theory assignments on any of the above topics. At least one theory assignment will be included in the assessment criteria every year 		
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3rd Order)
	32	3	130801

Module Code:	MPLC031				
Module Name:	Pathophysiology				
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 3 hrs	0	0	10hrs
Pre-requisite module/s:	MBIA021				
Co-requisite module/s:	MPLC032				
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and a summative theory assessment at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%)				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Human Physiology	School: Medicine
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PHY202M replaces PHYL200 (in part)

Module Code:	MPLC032				
Module Name:	Environmental and Occupational Physiology				
Module Content:	Occupational toxicology: introduction to occupational toxicology, toxicokinetics, toxicodynamics, toxicity testing and risk assessments Environmental toxicology: radiation pollution, water pollution, air pollution				
Learning Outcomes:	<ul style="list-style-type: none"> • Demonstrate an understanding of the basic concepts of occupational toxicology • Describe toxicity testing and risk assessment and understand the action and effects of certain toxic agents • Explain the basic principles of environmental toxicology • Demonstrate an understanding of radiation as well as the types, sources and effects of radiation. • Define air pollution and discuss the basic principles of air pollution • Discuss the atmosphere and distinguish between and discuss climate, global warming and ozone loss • List and shortly discuss non-renewable and renewable energy sources • Demonstrate an understanding of the basic principles of water pollution and know basic hydrological principles and water management aspects 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	32		3		130906
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min	2 x 3 hrs	0	0	10 hrs

Module Code:	MPLC032			
Module Name:	Environmental and Occupational Physiology			
Pre-requisite module/s:	MBIA021			
Co-requisite module/s:	MPLC031			
Assessment Methods:	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and a summative theory assessment at the end of the module. The final mark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%)			
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)			40
	Final Mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

DEPARTMENT: PSYCHOLOGY

CURRICULUM INFORMATION			
Department: Psychology	School: Medicine		
Last Revision date: 2011	First Year Offered (New):	2013	
Replace this Module existing module(s)? Yes	If YES, give the module codes:	PSYC100	

Module Code:	MPCL011		
Module Name:	Introduction to Psychology		
Module Content:	Foundations of Psychology Learning Theories Developmental Psychology Personality, Emotions, Motivation & Stress Psychophysiology		
Learning Outcomes	<ul style="list-style-type: none"> • Students must know and understand the basic principles and perspectives in psychology • Students must be able to understand and apply all the knowledge gathered in psychology I course and link theories in their specific discipline and their studies • Students must have a basic understanding of human development; personality; emotion; motivation and stress • Students must know and understand the link between mind and body interaction 		
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3rd Order)
	12	3	180101

Module Code:	MPCL011				
Module Name:	Introduction to Psychology				
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0	2	0	1 hour
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
ASSESSMENT	Assessment will comply in all respects with the University of Limpopo Assessment Policy and the NQF guidelines for validity, reliability, fairness and practicability				
Assessment Criteria:	Students must be able to name, describe, explain, apply, compare, and differentiate all the knowledge gathered in psychology I and link theories in their specific discipline and their studies. Students must be able to apply a basic understanding of human development; personality; emotion; motivation and stress Students must be able to explain the link between mind and body interaction				
Assessment Methods:	Examinations, Tests and Assignments				
Assessment Weighting:	Minimum Form Assessment Mark for exam admission (%)				40
	Final Mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION

Department: Psychology	School: Medicine
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PSYC100

Module Code:	MPCL012				
Module Name:	Research, Interpersonal Skills and Social Psychology				
Content:	Interpersonal Skills Social Psychology Introduction to Research Cognitive Processes (Human memory, perception & Sensation)				
Learning Outcomes	<ul style="list-style-type: none"> • Students must have a basic understanding of cognitive processes. • Students must understand the role of social interaction and link it to their specific field. • Students must know and understand the basic principles of interpersonal skills and research. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	12		3		180101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	0	2	0	1 Hour
Pre-requisite module/s:	None				
Co-requisite module/s:	None				
ASSESSMENT	Assessment will comply in all respects with the University of Limpopo Assessment Policy and the NQF guidelines for validity, reliability, fairness and practicability				

Module Code:	MPCL012			
Module Name:	Research, Interpersonal Skills and Social Psychology			
Assessment Criteria	Students must be able to apply a basic understanding of cognitive processes Students must be able to explain the role of social interaction and apply it to their specific field. Students must be able to describe and explain the basic principles of interpersonal skills as well as research and be able to apply it to their specific field			
Assessment Methods	Examinations, Tests and Assignments			
Assessment Weighting:	Minimum Form Assessment Mark for exam admission (%)			40
	Final Mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Min Final Assessment mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department: Psychology	School: Medicine
Last Revision date: 2011	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: PSYC100

Module Code:	MPSA021				
Module Name:	Research, Assessment and Developmental Psychology				
Content:	Research Methods Psychological Assessment Developmental Psychology (Child)				
Learning outcomes	At the end of the module the student will: <ul style="list-style-type: none"> Know, understand and apply the basic principles in social research Know and understand the basic aspects of assessment across cultures and the different steps in social research Know, understand and integrate the basic concepts and theories in child development Know and integrate the ethical principles applicable in research, assessment, child development. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		180101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1	2	0	2 hrs
Pre-requisite module/s:	MPCL011, MPCL012				
Co-requisite module/s:	None				
Assessment criteria	At the end of the module you will: <ul style="list-style-type: none"> Name, describe and apply the basic principles in social research State and explain the basic aspects of assessment across cultures and the different steps in social research List, describe and apply the basic concepts and theories in child development List, describe and integrate the ethical principles applicable in research, assessment, child development. 				
Assessment methods	Comprehensive, summative (includes group and individual assignments, and tests) and summative (examination) assessment will be used. Practical work seminars, as well as the presentation of specific allocated case studies relevant to the thrust of the degree will also be used.				

Module Code:	MPSA021			
Module Name:	Research, Assessment and Developmental Psychology			
Assessment Weighting:	Minimum Form Assessment Mark for exam admission (%)			40
	Final mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Minimum final mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department: Psychology	School: Medicine		
Last Revision date: 2011	First Year Offered (New):	2013	
Replace this Module existing module(s)? Yes	If YES, give the module codes:	PSYC200	

Module Code:	MPSA022				
Module Name:	Personality, Medical and Social Psychology				
Model Content:	Social Psychology Personality Theories Medical Psychology				
Learning outcomes	At the end of the module the student will: <ul style="list-style-type: none"> Understand and apply the concepts applicable in social psychology. Know and understand the different personality theories Know and comprehend the position of medical psychology in within the discipline of psychology Know and integrate the ethical principles applicable in social psychology, medical psychology and personality theories. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		180101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1	2	0	2 hour
Pre-requisite module/s:	MPCL011,MPCL012				
Co-requisite module/s:	None				
Assessment criteria	At the end of the module you will: <ul style="list-style-type: none"> Name, describe and apply the basic principles in social research State and explain the basic aspects of assessment across cultures and the different steps in social research List, describe and apply the basic concepts and theories in child development Explain and apply different concepts applicable in social psychology. Name and describe the different personality theories Recognize and explain the position of medical psychology in within the discipline of psychology List, describe and integrate the ethical principles applicable in social psychology, medical psychology and personality theories. 				
Assessment methods	Comprehensive, summative (includes group and individual assignments, and tests) and summative (examination) assessment will be used. Practical work seminars, as well as the presentation of specific allocated case studies relevant to the thrust of the degree will also be used.				

Module Code:	MPSA022			
Module Name:	Personality, Medical and Social Psychology			
Assessment Weighting:	Minimum Form Assessment Mark for exam admission (%)			40
	Final mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Minimum final mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory / Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department: Psychology	School: Medicine		
Last Revision date: 2012	First Year Offered (New):	2013	
Replace this Module existing module(s)? Yes	If YES, give the module codes:	N/A	

Module Code:	MPSB022				
Module Name:	Environmental Psychology and Management skills				
Model Content:	<p>The origins and nature of environmental Psychology, ecological psychology, personal space, privacy and territoriality, place attachment, crime, and the environment. The environmental psychologist as facilitator of the design, Poverty, and the environment. Mental health and the built environment. Occupational health and safety.</p> <ul style="list-style-type: none"> • Explore management principals • Planning, setting objectives and the benefits of good organizational skills • Organizing resources to match the task objectives • Maintaining control – monitoring and assessing • Developing your leadership style • Empowering yourself by perfecting your management skills • Improving problem solving and decision-making skills • Developing people skills – maximizing effective communication • Leading successful teams – motivation and the importance of trust • Implementing skills and strategies to manage and resolve conflict 				
	Learning outcomes	<ul style="list-style-type: none"> • The student must be able to define the basic concepts of Environmental Psychology. • The student must be able to describe and apply the basic concepts of Environmental Psychology in the work environment. • The student must be able to describe the role of mental health in the work environment. • The student must be able to define all principles of management • The student must be able to determine and evaluate his/her own management style • The student must be able to describe and apply the principles of management skills in a work setting 			
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)
	20		3		130201
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	4 x 45 min.	1 x 3 Hour	Per arrangement	0	8 h
Pre-requisite module/s:	MPCL011, MPCL012				
Co-requisite module/s:	None				

Module Code:	MPSB022			
Module Name:	Environmental Psychology and Management skills			
Assessment criteria	Define the basic concepts of Environmental Psychology. Describe and apply the basic concepts of Environmental Psychology in the work environment. Describe the role of mental health in the work environment. Define all principles of management Determine and evaluate his/her own management style Describe and apply the principles of management skills in a work setting			
Assessment methods	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and summative theory assessment at the end of the module			
Assessment Weighting:	Minimum Form Assessment Mark for exam admission (%)			40
	Final mark =	% Summative Assessment Mark		60
		% Summative Assessment Mark		40
	Minimum final mark to pass (%)			50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3
	Theory/Practical	Theory		
	Duration	3 hrs		
	Sub minimum	40%		

CURRICULUM INFORMATION

Department: Psychology	School: Medicine		
Last Revision date: 2011	First Year Offered (New):	2013	
Replace this Module existing module(s)? Yes	If YES, give the module codes:	PSYC300	

Module Code:	MPSA031			
Module Name:	Psychopathology, Research and Community Psychology			
Content:	Research Methodology 2; Community Psychology; Psychopathology			
Learning Outcomes	<ul style="list-style-type: none"> Students should have knowledge of/and understanding of survey research, sampling, data collection (scales of measurement and techniques of data collection), questionnaire design and community-centred research. They must further understand how to interpret results and write report. Students must have knowledge and understanding of the following aspects of community psychology: the emergence and relevance of community psychology internationally and in developing societies and the South African context, The conceptual orientation of community psychology and the multidisciplinary knowledge base & planned community change. They must further have the ability to critically analyse perspectives of different paradigms. Students must have knowledge and understanding of abnormal behaviour in historical context, clinical assessment and diagnosis, anxiety disorders, somatoform and dissociative disorders, as well as mood disorders and suicide. They must understand and insight to apply and critically analyse personality disorders, schizophrenia and other psychotic disorders, as well as developmental disorders. Students must have knowledge and understating of legal and ethical issues relating to research, community psychology and psychopathology. 			
Module Information:	SAQA Credits		ITS Course Level Code	
	32		3	
Periods per week:	Classes		Tutorial	Seminars
	5		2	0
Pre-requisite modules:	Practicals		Independent Learning	
	1		3 hour	
Pre-requisite modules:	MPSA021,MPSA022			

Module Code:	MPSA031				
Module Name:	Psychopathology, Research and Community Psychology				
Co-requisite modules:	None				
Assessment criteria	<ul style="list-style-type: none"> Students should be able to describe, explain, discuss, analyse and evaluate concepts such as survey research, sampling, data collection (scales of measurement and techniques of data collection), questionnaire design and community-centred research. They must further be able to interpret results of reportwriting. Students must be able to define, describe, discuss, criticise, assess as well as differentiate between the following aspects of community psychology: the emergence and relevant of community psychology internationally and in developing societies and the South African context, the conceptual orientation of community psychology and the multidisciplinary knowledge base & planned community change. They must further have the ability to demonstrate, explain critically analyse and differentiate perspectives of paradigms. Students must be able to name, describe, demonstrate, define, differentiate, evaluate concepts of psychopathology such as abnormal behaviour in historical context, clinical assessment and 				
Assessment criteria	<ul style="list-style-type: none"> diagnosis, anxiety disorders, somatoform and dissociative disorders, as well mood disorders and suicide. They must further be able to apply, differentiate, explain and critically analyse personality disorders, schizophrenia and other psychotic disorders, as well as developmental disorders. Students must be able to describe, demonstrate responsible legal and ethical values relating to research, community psychology and psychopathology. 				
Assessment methods	Comprehensive, summative (includes group and individual assignments, and tests) and summative (examination) assessment will be used. Practical work seminars, as well as the presentation of specific allocated case studies relevant to the thrust of the degree will also be used.				
Assessment Weighting	Minimum Form Assessment Mark for exam admission (%)			40	
	Final mark =	% Summative Assessment Mark		60	
		% Summative Assessment Mark		40	
	Minimum final mark to pass (%)			50	
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			

CURRICULUM INFORMATION	
Department: Psychology	School: Medicine
Last Revision date: 2012	First Year Offered (New): 2013
Replace this Module existing module(s)? Yes	If YES, give the module codes: N/A

Module Code:	MPSA032				
Module Name:	Statistics, Therapeutic and Development Psychology				
Content:	Behavioural Statistics; Therapeutic Psychology; Developmental Psychology (Adolescence and Adulthood)				
Learning Outcomes	<ul style="list-style-type: none"> Students should have knowledge and understanding of introduction to behavioural statistics, variables and levels of measurement, dealing with data, basic descriptive statistics, tables, measures of central tendency, measures of dispersion and the normal curve. 				
Learning Outcomes	<ul style="list-style-type: none"> Students must have knowledge and understanding, as well as apply and critically analyse the following concepts of therapeutic psychology: counseling, common themes, characteristics of the counseling relationship, characteristics of a successful counselor, and stages of the counseling process. They must further have the ability to apply and evaluate helping skills, probing skills, discovering skills and possible problems in the counseling relationship. Students must have knowledge and understanding research methods in developmental psychology. They must also apply and critically analyse theories of development. They must further have knowledge and understating of middle childhood, adolescence and social development. 				
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	32		3		180101
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	5	1	2	0	3 Hour
Pre-requisite module/s:	MPSA021, MPSA022				
Co-requisite module/s:	None				
Assessment methods	Comprehensive, summative (includes group and individual assignments, and tests) and summative (examination) assessment will be used. Practical work seminars, as well as the presentation of specific allocated case studies relevant to the thrust of the degree will also be used.				
Assessment Weighting:	Minimum Form Assessment Mark for exam admission (%)				40
	Final mark =		% Summative Assessment Mark		60
			% Summative Assessment Mark		40
	Minimum final mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory/Practical	Theory			
	Duration	3 hrs			
	Sub minimum	40%			
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)
	20		06		140403
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning
	2 × 90 min	None	None	None	12.9 hrs
Pre-requisite module/s:	None				
Co-requisite module/s:	None				

Assessment Criteria:	Demonstrate proficiency in applying in a logical manner the principles, concepts and facts related to aqueous and non-aqueous solutions, key reactions in catalysis; electronic structure, electronic spectra, and magnetic properties of d-metal complexes, organometallic chemistry and industrially- important reactions, inorganic chains, cages and clusters; nanomaterials, nanoscience and nanotechnology.				
Assessment Methods:	Summative (60%): Tests, Tutorials and/or Assignments. Summative (40%): 1 × 3 h written examination.				
Assessment Weighting:	Min Summative Assessment mark for exam admission (%)				40
	Final mark =	% Summative Assessment Mark			60
		% Summative Assessment Mark			40
	Min Final Assessment mark to pass (%)				50
Summative Assessment Paper:		Paper 1	Paper 2	Paper 3	Paper 4
	Theory / Practical	Theory			
	Duration	3 h			
	Sub minimum	40			