SCHOOL OF SCIENCE & TECHNOLOGY

UNDERGRADUATE



2025 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 2025 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 2025

FIRST SEMESTER	:	06 January	2025	-	18 July 2025
AUTUMN Recess(for students)	:	31 March	2025	-	04 April 2025
WINTER Recess(for students)	:	09 July	2025	-	18 July 2025
SECOND SEMESTER	:	21 July	2025	-	15 Dec 2025
SUMMER Recess(University Recess)	:	19 Dec	2025	-	05 Jan 2026

School Correspondence

All School correspondence to be addressed to:

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1. UNDERGRADUATE PROGRAMMES						
	Undergraduate Degree Programme	ABBREVIATION	CODE	PAGE		
Bachelor of Science (Extended Curriculum Programme)						
	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			
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	Admission Criteria					
	Bachelor of Science – Biotechnology	BSc	BSCG01	-		
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	Bachelor of Science – Environmental	BSc	BSCG01			
	Management & Toxicology					
	Bachelor of Science – Life Sciences	BSc	BSCG01			
	Bachelor of Science – Mathematical Sciences	BSc	BSCH01			
	Bachelor of Science – Physical Sciences	BSc	BSCI01			
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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, Chemistry, Biology, Biotechnology, ICT).

- <u>Research Institutes</u> 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, Environmental Biology, Biochemistry, Chemistry, Statistics, Mathematics, Physics, Computer Science, ICT, Biotechnology, Environmental Management and Toxicology*).
- 3. <u>Government Departments</u>: Departments of Health, Environmental Affairs, Trade and Industry, Science and Technology, Communications, Public Enterprises, Transport, Education, Statistics South Africa. (*Mathematics, Biochemistry, Chemistry, Biotechnology, Biology, Statistics, Physics, ICT*).
- 4. <u>Financial Institutions</u>: Banks, Insurance Companies, Stock exchange, Business Analyst. (ICT, Computer Science, Statistics, Mathematics).
- 5. <u>Telecommunications</u>: Vodacom, Cell C, MTN. (ICT, Computer Science, Physics, Mathematics, Statistics, Biotechnology).

6. <u>Mining</u>:

(Chemistry, Biochemistry, Physics, ICT, Computer Science, Biology, Biochemistry, Environmental Biology, Statistics, Environmental Management and Toxicology, Biotechnology).

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.

<u>Prof CL Obi</u> 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)

2

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)

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Members

All Heads of Academic Departments in the School

Community Engagement and Marketing Committee

Chairperson : Ms M Masethe

Members

Departmental representatives Science outreach co-ordinator Marketing Department Student Representative

2

Examinations Committee

Chairperson : Prof CL Obi (Dean)

Members

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

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School Research and Innovation Committee

Chairperson : Prof SS. Gololo

Vice-Chairperson(s): Prof M. Aphane Dr EBE. Moema

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

2

Chairperson : Ms N Ntsoka

Members

Departmental Representatives

2

Risk Management Committee

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Chairperson : Dr T Ramarumo

Members

Departmental Representatives Marketing & Communications Chairperson

Marketing and Communication Committee

Chairperson : Mr J Fatlane

Members

Departmental Representatives

2

Work Integrated Committee

Chairperson : Prof L.L Mugivhisa

Members

Departmental Representatives

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DATES FOR SCHOOL BOARD MEETINGS = 2025

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

Wednesday March 2025

Wednesday May 2025

Tuesday July 2025

MEMBERS OF STAFF

Office of the Dean

Dean

Secretary School Operations Manager Principal Admin.Officer (Postgrads) Principal Admin.Officer (Undergrads) Mobile Science Bus **Obi CL**, Prof Zulu P, Ms Moema EBE, Dr Nkobeni ML, Ms Mashilwane RE, Ms Seseng FC, Ms

Academic Departments

Academic Literacy and Science Communication

Head of Department

Senior Lecturer Senior Lecturer Senior Lecturer Lecturer Lecturer Seleka ME, PhD (UNW) Nair P, PhD (Univ of Kerala, India) Hungwe V, PhD (UL) Marutla GB, PhD(UNW) Nkgadima GM, MA (UL) Mamabolo JT MA (UL)

Biochemistry and Biotechnology

Assoc. Prof /Acting HoD

Senior Lecturer Lecturer Lecturer Lecturer Lecturer Laboratory Assistant Natural Scientist Gololo SS, PhD (SMU) Kgopa AH, PhD (SMU) Thibane, V, PhD (UKZN) Makhubela SD, MSc (WITS) Mathe EH, PhD (SMU) Nemukula, M, MSc (SMU) Vacant Shikwambana MH, BSc (Hons) (SMU) Nthai, D, MSc (SMU)

Biology and Environmental Sciences

Professor & HoD Professor Associate Professor Associate Professor Associate Professor Senior Lecturer Senior Lecturer Senior Lecturer Senior Lecturer Senior Lecturer Senior Lecturer Lecturer Lecturer Lecturer Lecturer Lecturer Lecturer Lecturer Senior Laboratory Assistant **Technical Officer** Senior Technical Officer Natural Scientist

King PH, PhD (UFS) Vacant Vacant Mugivhisa L, PhD(SMU) Mkolo M, PhD (UP) Lebepe J, PhD(UL) Buthelezi NMD, PhD(UKZN & SMU) Manganyi MC, PhD (NWU) Vacant Vacant Vacant Lion GN, PhD (SMU) Mavimbela C,MSc (UL) Modise EM, MSc (UL) Modise T, MSc (SMU) Aina OE, MSc (SMU) Mnisi NML, BSc (Hons) (UL) Matodzi N, MSc (SMU) Mooki KS,BSc (Hons) (UL) Mathole MC, MSc (SMU) Vacant Vacant

Chemistry and Chemical Technology

Acting HoD

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

Computer Science and Information Technology

Acting HoD

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

Mathematics and Applied Mathematics

Assos. Prof /HoD

Senior Lecturer Senior Lecturer(Part time) Senior Lecturer Senior Lecturer Lecturer Lecturer Lecturer Lecturer Lecturer Junior Lecturer Lecturer (Part time) Lecturer(Part time) Junior Lecturer (Part time) Junior Lecturer (Part time) Junior Lecturer (Part time) Junior Lecturer(Part time)

Physics

Assos. Prof/Acting HoD

Associate Professor Senior Lecturer Lecturer Junior Lecturer Natural Scientist Natural Scientist Technical Officer Aphane M, PhD (UNISA) Adem K, PhD (North West Univ.) Aremu K O, PhD (UKZN) Vacant Vacant Bambe Moutsing CB, MSc (UP) Vijayasenan D, MSc (MAHATMA GANDHI) Fatlane MJ, MSc (SMU) Nkwanazana M, MSc (North West Univ) Bokodisa AT, MSc (SMU) Ndlovu PV, BSc (Hons)(SMU) Kanyane MLS, BSc (Hons) (SMU) Maluleka R, MSc (SMU) Medupe K, BSc (Hons) (SMU) Ngwepe M.D ,BSc (Hons) (SMU) Mlotshwa S,BSc (Hons) (SMU) Abubakar S.M MSc (SMU)

Mhlongo MR, PhD (SMU)

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

Statistical Sciences

Professor & Head of Department

Senior Lecturer/Biostatistician Lecturer Lecturer Lecturer Junior Lecturer Junior Lecturer Junior Lecturer Junior Lecturer SeeletseSM, PhD (OR) (PU for CHO) Ntuli TS, PhD (UL) Ramarumo T, PhD(SMU) Lekganyane MM, MSc (UL) Miyambu GR, MSc (UL) Mokoena OP,MSc (Stellenbosh) Rakale G, BSc (Hons) (SMU) Tshabalala KD, BSc (Hons)(UL) Molaba MM, BSc (Hons)(UL)

SCHOOL VISION AND MISSION

<u>Vision</u>

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 it 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 a number of 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
BSCL01	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
Any two other NSC subjects w	ith a minimum NSC score of 4

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	С	24	MMTB000	С	24		
MHEL000	С	24	MHEB000	С	24		
MAPA000	С	24	MAPB000	С	24		
MCHM000	С	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 main stream 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		quisites	Co-requisites
BSc(ECP) Level 1		To be presented from 2013			
MBIO000	Introd	uction to Life Science Studies I			
MAPA000	A000 Elementary Applied Mathematics				
MCHM000	Introd	Introduction to General Chemistry 1A		eria	un n
MCSC000	Introd	Introduction to Computing Concepts and Algorithms		Crit	ricu
MHEL000	Health	Health Education and Life Competencies I		tion	Cur
MMTH000	Linea	r and Introductory Abstract Algebra		Selec	Tixed

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) Lev	rel 2 To be presented from 2014		
MBIB000	Introduction to Life Science Studies II	MBIO000	
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
MAPB000	Computational Mathematics	MAPA000	ММТВ000
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:	ichool: School of Science & Technology					
Qualification	Name:	Bachelor of Science	ce (Life Sciences)	Qualification Code:	BSCK0	1
Campus:	SMU Camp	Jus		Last Revision date:	2012	
Total SAQA	Credits for (Qualification:	488	Is this a fixed Curricu	ılum:	No

PERIOD OF STUDY / YEAR LEVEL 1							
Year	,						
Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴			
The following 5 m	The following 5 module/s are COMPULSORY						
MMTH000	Year	Y	24	0.1			
MHEL000	Year	Ν	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 major³	SAQA Credit	Hemis Credit⁴	
	The following 5 mo	odule/s are C	OMPULSO	RY		
	MMTB000	Year	Y	24	0.1	
	MHEB000	Year	Ν	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:	chool: School of Science & Technology						
Qualification Name: Bachelor of Science (Life Sciences)		Qualification Code:	BSCK0	1			
Campus:	Campus: SMU Campus		Last Revision date:	2012			
Total SAQA	Credits for	Qualification:	488		Is this a fixed Curricu	lum:	No

PERIOD OF STUDY / Y	PERIOD OF STUDY / YEAR LEVEL 3					
1 st Semester / 1 st & 2 nd	Quarter Mo	odules				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴		
Choose 3 of the fo	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	120	1				

PERIOD OF STUDY / YEAR LEVEL 3						
2nd Semester / 3rd & 4th	Quarter Mo	dules				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴		
Choose 3 of the	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 Sem	60	0.5				
TOTAL CREDITS FOR	120	1				

PE	PERIOD OF STUDY / YEAR LEVEL 4						
1 st (Semester / 1 st & 2 nd	Quarter Mo	odules				
Р	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴		
	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		
Tot	Total credits for Semester 1 modules				0.5		
TOTAL CREDITS FOR YEAR LEVEL 4				128	1		

PER	PERIOD OF STUDY / YEAR LEVEL 4						
2 nd 3	Semester / 3 rd & ^{4th} (Quarter Mod	lules				
Ρ	Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴		
	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	Qualification Code:	BSCL01			
Campus: SMU Campus		Last Revision date:	2012		
Total SAQA Credits for Qualification: 4	88	Is this a fixed Curricu	lum: No		

PEI	PERIOD OF STUDY / YEAR LEVEL 1						
	Yea	ar					
Р	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴		
	The following 5 module/s are COMPULSORY						
	MMTH000	Year	Y	24	0.1		
	MAPA000	Year	Y	24	0.1		
	MHEL000	Year	Ν	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					0.5		

PEF	PERIOD OF STUDY / YEAR LEVEL 3					
1 st S	emester / 1 st & 2 nd	Quarter Mod	dules			
Ρ	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴	
	The following mo	dules are CO I	MPULSORY	,		
	MMTA021	S1	Y	20	0.167	
	MAPA021	S1	Y	20	0.167	
	Choose 1 of the	following ELE	CTIVE			
	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	
Tota	Total credits for Semester 1				0.5	
TOT	TOTAL CREDITS FOR YEAR LEVEL 3				1	

PERIOD OF STUDY / YEAR LEVEL 2						
	Year					
Р	Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴	
	The following 5 module/s are COMPULSORY					
	MMTB000	Year	Y	24	0.1	
	MAPB000	Year	Y	24	0.1	
	MHEB000	Year	Ν	24	0.1	
	MCOB000	Year	Y	24	0.1	
	MPHB000	Year	Y	24	0.1	
	MSTB000	Year	Y	24	0.1	
FOTAL CREDITS FOR YEAR LEVEL 1				120	0.5	

PEF	RIOD OF STUDY / Y	EAR LEVE	L 3		
2 nd \$	Semester / 3rd & 4th	Quarter Mo	dules		
Ρ	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴
	The following mod	dules are CC	MPULSOR	(
	MMTA022	S2	Y	20	0.167
	MAPA022	S2	Y	20	0.167
	Choose 1 of the	following EL	ECTIVE		
	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
Tot	Total credits for Semester 2				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: 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 4	PERIOD OF STUDY / YEAR LEVEL 4					
Ast Comparter / Ast 9, and Overter	and Semester / and 8. Ath Occurter Medules					

1.0	1° Semester / 1° & 2° Quarter					
Ρ	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴	
	Choose 2	of the fo	llowing ELE	CTIVE/S		
	MMTA031 and	Q1	Y	16	0.125	
	MMTB031	Q2	Y	16	0.125	
	MAPA031 and	Q1	Y	16	0.125	
	MAPB033	Q2	Y	16	0.125	
	MCOA031 and	Q1	Y	16	0.125	
	MCOB031	Q2	Y	16	0.125	
	MSTA031 and	Q1	Y	16	0.125	
	MSTB031	Q2	Y	16	0.125	
	MPHA031and	Q1	Y	16	0.125	
	MPHB031	Q2	Y	16	0.125	
Tot	Total credits for Semester 1 Year level 4				0.500	
TO	TOTAL CREDITS FOR YEAR LEVEL 4				1.000	
TO	TOTAL CREDITS FOR QUALIFICATION				3.000	

2 nd Semester / 3 rd & 4 th Quarter Modules					
Р	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴
	Choose 2	of the fo	llowing ELEC	TIVE/S	
	MMTA032 and	Q3	Y	16	0.125
	MMTB032	Q4	Y	16	0.125
	MAPA032 and	Q3	Y	16	0.125
	MAPB034	Q4	Y	16	0.125
	MCOA032and	Q3	Y	16	0.125
	MCOB032	Q4	Y	16	0.125
	MSTB032	Q3	Y	16	0.125
	Sg MSTC032	Q4	Y	16	0.125
	MPHA032 and	Q3	Y	16	0.125
	MPHB032	Q4	Y	16	0.125
Total credits for Semester 2 Year level 4				64	0.500
TOTAL CREDITS FOR YEAR LEVEL 4				128	1.000
TOTA	L CREDITS FOR	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	Year					
Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴		
The following 5 m	The following 5 modules are COMPULSORY					
MMTH000	Year	Y	24	0.1		
MHEL000	Year	Ν	24	0.1		
MCHM000	Year	Y	24	0.1		
MPHS000	24	0.1				
MBIO000	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 Credit⁴	
The following 5 modules are COMPULSORY					
MMTB000	Year	Y	24	0.1	
MHEB000	Year	Ν	24	0.1	
MCHB000	Year	Y	24	0.1	
MPHB000	24	0.1			
MBIB000	Year	Y	24	0.1	
TOTAL CREDITS FOR YEAR LEVEL 1 120 0.5					

CURRICULUM INFORMATION					
Scho School of Science & Technology ol:					
Qualification Bachelor of Science Name:	ence (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 major³	SAQA Credit	Hemis Credit⁴		
The following	modules are		ORY			
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 t	he following	ELECTIVES	5			
MMTA021	S1	Y	20	0.167		
MBIA021	S1	Y	20	0.167		
Total credits for	0.50					
TOTAL CREDITS	FOR YEAR	R LEVEL 3	120	1.00		

PERIOD OF STUDY / YEAR LEVEL 3					
2 nd Semester / 3 rd & 4	Ith Quarter				
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴	
The following mod	ules are CO	MPULSORY			
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 fo	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 FC	TOTAL CREDITS FOR YEAR LEVEL 3 120 1.00				

PERIOD OF STUDY / YEAR LEVEL 4					
1 st Semester / 1 st	& 2 nd Quart	er			
Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴	
Choose 2 or 3	3 of the follow	wing ELECT	IVES		
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	
Physics and Biochemistry cannot be paired					
Total credits for Semester 1 64 0.50					
TOTAL CREDITS	FOR YEAR	R 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 Credit⁴
Choose 2 or 3 fr	om the follo	wing ELECT	IVES	
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
Physics and Biochemistry cannot be paired				
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 Environmental Biology, Environmental Management and Toxicology, Microbiology
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 each	a minimum NSC score of 4

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
Α		7
В	А	6
C	В	5
D	С	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
Mathematical Sciences	BSCH01	Mathematics	5
Physical Sciences	BSCI01	Physical Science	5
Occupational and Environmental Sciences	BSCJ01	Life Science	5

BSC CURRICULUM – INFORMATION

BIOTECHNOLOGY – BSCG01

SECTION E: CURRICULUM INFORMATION					
School:	School of S	cience and Technology			
Qualification Name:		Bachelor of Science (Biotechnology)	Qualification Code:	BSCG01	
Campus: SMU Campus		JS	Last Revision date:	2019	

	PROPOSED NEW PROGRAMME				
	PERIC	DD OF STUL)Y / YEAR LE	EVEL 1	
		Year N	lodules		
X 1	Module Code	Offerin g Period²	Possible major ³	SAQA Credit	Hemis Credit ^e
	The following	module/s a	re COMPULS	ORY	<u> </u>
	MBIO011	S1	Ν	12	0.1
	MZOO012	S2	Ν	12	0.1
	MCHM011	S1	Ν	12	0.1
	MCHM102	S2	Ν	12	0.1
	MPHS011	S1	Y	12	0.1
	MPHS012	S2	Ν	12	0.1
	MMTH011	S1	Ν	12	0.1
	MMTH022	S2	Ν	12	0.1
	MHEL011	S1	Ν	12	0.1
	MHEL012	S2	Ν	12	0.1
	TOTAL CRE	DITS FOR Y	EAR 1	120	1

	PERIOD OF STUDY / YEAR LEVEL 2					
		Yea	r Modules			
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴	
	The following n	nodule/s are	COMPULSOR	RY		
	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	
Т	OTAL CREDITS	FOR YEAR	LEVEL 2	120		

	PERIOD OF STUDY / YEAR LEVEL 3						
		Year	lodules				
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴		
	The following	module/s are	COMPULSO	RY			
	BTEC301	S1	Y	30	0.25		
	BTEC302	S1	Y	30	0.25		
	BTEC303	S2	Y	30	0.25		
	BTEC304	S2	Y	30	0.25		
٦	TOTAL CREDITS FOR YEAR LEVEL 3			120	1		

ENVIRONMENTAL MANAGEMENT & TOXICOLOGY - BSCG01

Bachelor of Science (Environmental Management and

SECTION E: CURRICULUM INFORMATION REQUIRED					
Science & Technology					

Campus: SMU Campus

Qualification Name:

School:

	PROPOSED NEW PROGRAMME					
	PERI	OD OF STU	DY / YEAR LE	VEL 1		
		Year l	Vodules			
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴	
	The following n	nodule/s are	COMPULSOF	RY		
	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	
	MHEL011	S1	Y	12	0.1	

Toxicology)

PROPOSED NEW PROGRAMME					
	PER	IOD OF STU	DY / YEAR LE	EVEL 2	
		Year	Modules		
X ¹	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴
	The following	module/s are		RY	
	EMT 201	S1		20	0.17
	EMT 202	S2		20	0.17
	EHS 201	S1		20	0.16
	EHS 202	S2		20	0.17
	MICB 201	S1		20	0.16
	MICB 202	S2		20	0.17

Qualification Code:

Last Revision date:

BSCG01

2019

MHEL012	S2	Y	12	0.1
TOTAL CREDI	TS FOR YE	AR 1	120	1

TOTAL CRE	DITS FOR Y	EAR 2	120	1

	PROPOSED NEW PROGRAMME					
	PERI	OD OF STUI	DY / YEAR LE	VEL 3		
	Year Modules					
X ¹	Module Offering Possible SAQA Hemis Code Period ² major ³ Credit 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				1	

ENVIRONMENTAL BIOLOGY – BSCG01

SECTION E: CURRICULUM INFORMATION REQUIRED

School:	Science & Technology			
Qualification	on Name:	Bachelor of Science (Biology)	Qualification Code:	BSCG01
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 Credit⁴					
	The following m	odule/s are C	OMPULSORY							
	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					
	MHEL011	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 Credit⁴				
	The following m	nodule/s are (COMPULSORY	,					
	EMT 201	S1		20	0.17				
	EMT 202	S2		20	0.17				
	EHS 201	S1		20	0.16				
	EHS 202	S2		20	0.17				
	MICB 201	S1		20	0.16				
	MICB 202	S2		20	0.17				

MHEL012	S2	Y	12	0.1
TOTAL CRED	ITS FOR YEAF	R 1	120	1

TOTAL CRE	DITS FOR Y	EAR 2	120	1

	PROPOSED NEW PROGRAMME								
	PERIOD OF STUDY / YEAR LEVEL 3								
	Year Modules								
X ¹	(1 Module Offering Possible SAQA Hemis Code Period ² major ³ Credit 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		Y	30	0.25				
	EPS 302 S2 Y 30 0.25								
	TOTAL CRED	ITS FOR Y	EAR 3	120	1				

LIFE SCIENCES - BSCG01

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

Ρ	PERIOD OF STUDY / YEAR LEVEL 1								
	1 st S	Semester							
Ρ	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴				
	The following 5	modules are	e COMPULS	ORY					
	MBIO011	S1	Y	12	0.1				
	MCHM011	S1	Y	12	0.1				
	MHEL011	S1	Ν	12	0.1				
	MMTH011	S1	Y	12	0.1				
	MPHS011	S1	Y	12	0.1				
Т	otal credits for	Semeste	60	0.5					
Т	OTAL CREDIT	S FOR YEAI	120	1					

PEI	PERIOD OF STUDY / YEAR LEVEL 2								
1 st S	1 st Semester / 1 st & 2 nd Quarter Modules								
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴				
	Choose at least 3 or 4 of the following ELECTIVES								

PE	PERIOD OF STUDY / YEAR LEVEL 1								
	2 nd Semester								
Ρ	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴				
	The following 5 m	odules are C	OMPULSO	RY					
	MCHM012	S2	Y	12	0.1				
	MHEL012	S2	Ν	12	0.1				
	MZOO012	S2	Y	12	0.1				
	MMTH012	S2	Y	12	0.1				
	MPHS012	S2	Ν	12	0.1				
То	Total credits for Semester 2 modules 60 0.5								
тс	OTAL CREDITS FO	OR YEAR LE	120	1					

PE	PERIOD OF STUDY / YEAR LEVEL 2								
2 nd	2 nd Semester / 3 rd & 4 th Quarter Modules								
	Module Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴				
	Choose at least 3 or 4 of the following ELECTIVES								

MBIA021	S1	Y	20	0.167
MCHA021 and MCHB021	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	60	0.5	
TOTAL CREDITS	120	1		

	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
То	tal credits for S	emester 2 n	60	0.5	
то	TAL CREDITS FO	or year le	120	1	

PERIOD OF STUDY / YEAR LEVEL 3								
1 st Semester / 1 st	& 2 nd Quarte	r Modules						
Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴				
Choose at lea	Choose at least 2 of the following ELECTIVES							
MBIA031	S1	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	64	0.5					
TOTAL CREDITS	FOR YEAR	128	1					

PERIOD OF STUDY / YEAR LEVEL 3									
2 nd Semester / 1 ^s	2 nd Semester / 1 st & 2 nd Quarter Modules								
Module Cod	e Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴					
Choose at le	east 2 of the fo	ollowing ELI	ECTIVES						
MBIA032	S2	Y	32	0.25					
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	64	0.5						
TOTAL CREDITS	FOR YEAR L	128	1						

MATHEMATICAL SCIENCES - BSCH01

CURRICULUM INFORMATION						
School: Science &	Technology					
Qualification Bachelor of Science (Mathematical Sciences) Qualification Code: BSCH01 Name:						
Camp SMU Campu us:	S		Last Revision date:	2012		
Total SAQA Credits Qualification:	for	368	Is this a fixed Curricu	ılum:	No	

PERI	PERIOD OF STUDY / YEAR LEVEL 1							
	1 st Semester							
	Module Code	Offering Period	Possible major	SAQA Credit	Hemis Credit			
	The followi	ing 2 module	s are COMPU	ILSORY				
	MMTH011	S1	Y	12	0.1			
	MHEL011	S1	Y	12	0.1			
	Choose 3	of the followi	ng ELECTIVE	S				
	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	Total credits for Semester 1				0.5			
TOTA	L CREDIT	S FOR YEA	120	1				

PERIOD OF STUDY / YEAR LEVEL 1								
2 nd Semester								
Module Code	Offering Period	Possible major	SAQA Credit	Hemis Credit				
The following	g 2 modules	are COMPUL	SORY					
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	r Semeste	60	0.5					
TOTAL CREDIT	S FOR YEA	120	1					

PERIOD OF STUDY / YEAR LEVEL 2

1st Semester / 1st & 2nd Quarter						
Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴		
The followi	ing 1 module	s is COMPUL	SORY			
MMTA021	S1	Y	20	0.167		
Choose 2	of the followi	ng ELECTIVE	S			
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	Semeste	r 1	60	0.5		
TOTAL CREDIT	S FOR YEA	120	1			

PERIOD OF STUDY / YEAR LEVEL 2 Semester / 1st & 2nd Quarter

Sei								
	Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴			
	The following 1	l modules is	COMPULSO	۲Y				
	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	Q3	Y	10	0.083			
	MPHB022	Q4	Y	10	0.083			
Tot	al credits for	Semester	60	0.5				
TO	TAL CREDITS	FOR YEAR	120	1				

PERIOD OF STUD	Y / YEAR L	EVEL 3			PERIC	DD OF STUD	OY / YEAR LEV	EL 3		
1 st Semester / 1 st &	& 2 nd Quarte	er			2 nd Se	mester / 3rd	& 4th Quarter			
Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴	Мо	dule Code	Offering Period ²	Possible major ³	SAQA Credit	Hemis Credit⁴
Choose 2 of th	e following l	ELECTIVES			Ch	oose 2 of th	e following ELE	CTIVES		
MAPA031	Q1	Y	16	0.125	MA	PA032	Q3	Y	16	0.125
and MAPA033	Q2	Y	16	0.125	ano MA	d PA034	Q4	Y	16	0.125
MMTA031 and	Q1	Y	16	0.125	MM and	1TA032	Q3	Y	16	0.125
MMTB031	Q2	Y	16	0.125	MM	ITB032	Q4	Y	16	0.125
MCOA031 and	Q1	Y	16 16	0.125 0.125	MC and	OA032	Q3	Y	16	0.125
MCOB031	Q2	Y			MC	OB032	Q4	Y	16	0.125
MSTA031 and	Q1	Y	16	0.125	MP and	HA032 1	Q3	Y	16	0.125
MSTB031	Q2	Y	16	0.125	MP	HB032	Q4	Y	16	0.125
MPHA031and MPHB031	Q1	Y	16 16	0.125 0.125	Two	MSTB032 and MSTC032	Q3 Q4	Y Y	16	0.125
	Q2	Y				1000Z	<u> </u>		16	0.125
Total credits for	Total credits for Semester 1 0.5		Total	credits for	Semester 2			0.5		
TOTAL CREDITS	FOR YEAR	LEVEL 3		1	TOTA	L CREDITS	FOR YEAR LE	VEL 3		1
TOTAL CREDITS	FOR QUAL	IFICATION		3	ΤΟΤΑ	L CREDITS	FOR QUALIFIC	CATION		3

PHYSICAL SCIENCES - BSCI01

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School: Science & Technology Qualification Name: Bachelor of Science (Physical Sciences)

Total SAQA Credits for Qualification: 368

Is this a fixed Curriculum: No

Qualification Code: BSCI01

PEF	PERIOD OF STUDY / YEAR LEVEL 1								
1 st S	6emester / 1 st & 2	2nd Quarter							
Р	Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴				
	The following 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	Ν	12	0.100				
	Choose 1 of th	e following E	LECTIVES						
	MSTS011	S1	Ν	12	0.100				
	MAPM011	S1	Ν	12	0.100				
	MCOA011	S1	N	12	0.100				
	MBIO011	S1	Ν	12	0.100				
Tota	Total credits for Semester 1 60 0.5								
TOT	AL CREDITS FO	OR YEAR LE	VEL 1	120	1.00				

PERIOD OF STUDY / YEAR LEVEL 2					
1 st Semester / 1 st & 2 ⁿ	d Quarter				
Module	Offering	Possible	SAQA	Hemis	
Code	Period ²	major ³	Credit	Credit ^₄	
The following 4 r	nodules are	COMPULSO	RY		
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 EL	ECTIVES			
MMTA021	S1	Y	20	0.167	
MBIA021	S1	Y	20	0.167	
Total credits for Se	60	0.50			
TOTAL CREDITS FOR YEAR LEVEL 2 1.00					

PERIOD OF STUDY / YEAR LEVEL 3						
1 st Semester / 1 st & 2 nd Q	uarter					
Module Code	Offering Period²	Possibl e major³	SAQA Credit	Hemis Credit⁴		
Choose 2 or 3 of the	e following	ELECTIVES				
MCHA031 and MCHB031	Q1 Q2	Y Y	16 16	0.125 0.125		
MPHA031and 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	Ý	32	0.25		
Physics and Biochemistry cannot be paired						
Total credits for Semester 1 64 0.50						
TOTAL CREDITS FOR Y	TOTAL CREDITS FOR YEAR LEVEL 3 128 1.00					
TOTAL CREDITS FOR QUALIFICATION 368 3						

PERIOD	OF STUD	/ / YEAR L	EVEL 1

2 nd \$	2 nd Semester /3 rd & 4 th Quarter							
Р	Module Code	Offering F Period ² n	ossible naior ³	SAQA Credit	Hemis Credit⁴			
	The following 4	modules are	COMPULSO	RY				
	MCHM012	S2	Y	12	0.100			
	MPHS012	S2	Y	12	0.100			
	MMTH012	S2	Y	12	0.100			
	MHEL012	S2	Ν	12	0.100			
	Choose 1 of the	following ELE	CTIVES					
	MSTS012	S2	Ν	12	0.100			
	MAPM012	S2	Ν	12	0.100			
	MCOA012	S2	Ν	12	0.100			
	MZOO012	S2	Ν	12	0.100			
Tota	al credits for Se	emester 2		60	0.50			
T01	AL CREDITS FO	EL 1	120	1.00				

PERIOD OF STUDY / YE	PERIOD OF STUDY / YEAR LEVEL 2					
2nd Semester / 3rd & 4th	Quarter					
Module Code	Offering Period ²	Possibl e major³	SAQA Credit	Hemis Credit⁴		
The following 4 m	odules are C	OMPULSO	RY			
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 f	ollowing ELE	CTIVES				
MMTA022	S2	Y	20	0.167		
MBIA022	S2	Y	20	0.167		
Total credits for Semester 2			60	0.50		
TOTAL CREDITS FOR	YEAR LEVE	L 2		1.00		

PERIOD OF STUDY / Y	PERIOD OF STUDY / YEAR LEVEL 3					
2nd Semester / 3rd & 4th	Quarter					
Module Code	Offering Period²	Possibl e major³	SAQA Credit	Hemis Credit⁴		
Choose 2 or 3 of t	he following	ELECTIVES	5			
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		
Physics and Bioch	emistry can	not be paire	d			
Total credits for Semester 2 64 0.50						
TOTAL CREDITS FOR	TOTAL CREDITS FOR YEAR LEVEL 3			1.00		
TOTAL CREDITS FOR QUALIFICATION			368	3		

OCCUPATIONAL AND ENVIRONMENTAL SCIENCES - BSCJ01

CURRICULUM INFORMATION

School:	Science & Technology F		Faculty: Faculty of Health Sciences		iences			
Qualificatio	on Name:	Bachelor of Science	же		Qualificatio	on Code:	BSCJ)1
Campus:	SMU Campu	S			Last Revisi	ion date:	2012	
Total SAQA	Credits for	Qualification:	368		ls this a fix	ed Curricul	um:	Y

PERIOD OF STUDY / YEAR LEVEL 1							
1 st Seme	ester						
Module C Code F)ffering Period ² r	Possible najor³	SAQA Credit	Hemis Credit⁴			
The following 5 modules are COMPULSORY							
MBIO011	S1	Y	12	0.1			
MCHM011	S1	Y	12	0.1			
MHEL011	S1	Ν	12	0.1			
MPCL011	S1	Y	12	0.1			
MMTH011	S1	Y	12	0.1			
Total credits for Ser	Total credits for Semester 1 modules 60 0.5						
TOTAL CREDITS FOR	120	1					

PERIOD OF STUDY / YEAR LEVEL 2						
1 st Ser	nester					
Module Code	Offering Period ²	Po m	ossible ajor³	SAQA Credit	Hemis Credit⁴	
The following 3	The following 3 module/s are COMPULSORY					
MBIA021	S1		Ν	20	0.167	
MPLA021	S1		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		

PERIC	PERIOD OF STUDY / YEAR LEVEL 3						
1 st Se	mester / 1 st & 2 ⁿ	d Quarter M	odules				
	Module Offering Possible Code Period ² major ³				Hemis Credit⁴		
	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 1

2 nd Semester						
Module Code	Offering F Period ² n	Possible najor³	SAQA Credit	Hemis Credit⁴		
The following 5 n	nodules are C	OMPULSOF	RY			
MCHM012	S2	Y	12	0.1		
MHEL012	S2	Ν	12	0.1		
MPCL012	S2	Y	12	0.1		
MMTH012	S2	Y	12	0.1		
MZOO012	S2	Y	12	0.1		
Total credits for Se	60	0.5				
TOTAL CREDITS FOR YEAR LEVEL 1			120	1		

PERI	PERIOD OF STUDY / YEAR LEVEL 2						
	2 nd Sen	nester					
	Module Code	Offering Period ²	Possible major³	SAQA Credit	Hemis Credit⁴		
	The following 3 modules are COMPULSORY						
	MPSB022	S2	Ν	20	0.167		
	MPLA022	S2	Y	20	0.167		
	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								
2 nd Semester / 1 st &	2 nd Semester / 1 st & 2 nd Quarter Modules							
Module Code	Offe Peri	Offering Possible Period ² major ³		SAQA Credit	Hemis Credit⁴			
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:	 List different life forms, list differences between numans 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:	 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 how to ensure safety at home, in the laboratory and in the future place of work Know how to plan for his/her future, including financial responsibilities Know how to take notes and studyeffectively Find good quality scientific information on a variety of topics Write short notes on scientifictopics 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 & organise information Communicate effectively using scientific language skills in written form and in presentations Know how to access good scientific information using the internet 							
Module Information:	SAQA Credits		ITS (Course Level Code		CESM C	ode (3 rd Order)	
Periods per Week:	12 Classes	Practicals		2 Tutorial	Semin	ars	01305 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 (%)							

	Final Mark -		% Summative As	% Summative Assessment Mark			
Assessment Weighting:	Final Wark -		% Summative As	% Summative Assessment Mark			
	Min Final Assessment ma	50					
		Paper 1	Paper 2	Paper 3	Paper 4		
Summative	Theory / Practical	Practical	Theory				
Assessment Paper:	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:	 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 Create slide shows using MS PowerPoint and be able to present such slide shows in class

Learning Outcomes:	 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	SAQA Credits ITS Course Level Code CESM Code (3rd Order)							
	12	1		2		09130	05		
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	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%)								
	Min Summative Asse	essment mark	for exar	n admission (%)			40		
A a a a a m a n t Mai wh tim m	Final Mark -			% Summative Ass	60				
Assessment weighting:				% Summative Assessment Mark			40		
	Min Final Assessme	nt mark to pass	s (%)				50		
		Paper 1		Paper 2	Paper	3	Paper 4		
Summative	Theory / Practical	Theory		Theory					
Assessment Paper:	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:	 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 isimportant Know the importance of family planning

Learning Outcomes:	 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 studyeffectively 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 							
 Identity & solve problems using crucial & creative trinking Work effectively as a member of a group Collect, analyse & organise information Communicate effectively using scientific language skills in written form and in presentation 							ations	
Module Information:	SAQA Credits		ITS Co	Course Level Code		CESM Code (3 rd Order)		
	12			2		0913	305	
Periods per Week:	Classes	Practicals		Tutorial	Semina	irs	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%)							
	Min Summative Assessment mark for exam admission (%) 40							
A	Final Mark -			% Summative Assessment Mark			60	
Assessment weighting:	Final Wark =			% Summative Assess	ark	40		
Min Final Assessment mark to pass (%) 50								
		Paper 1		Paper 2	Paper 3	}	Paper 4	
Summative	Theory / Practical	Practical		Theory				
Assessment Paper:	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:	 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 Write short notes on scientific topics Write short notes on scientific topics Work effectively as a member of a group Collect, analyse & organize information 							
Madula kafa maati awa	SAQA Credits ITS Course Level Code CESM Code (3rd Order)							
module information:	12			2		091305	,	
Periods per Week:	Classes Practicals		Tutorial		Seminars	Independent Learning		
	4 x 45 min	1 x 3 hrs		1	1		2 hrs	
Pre-requisite modules:	None							
Co-requisites modules :	None							
Assessment Methods:	Combination of clas assessments, praci final mark is calculated a summative theory a	ss tests/qu tical reports as follows: and practic	izzes, sumr s and a sun Average of al assessm	native theory ass nmative theory as summative theo ents (40%)	essmen ssessme ry and pi	ts, short summa ent at the end of ractical assessm	itive practical the module. The nents (60%) and	
	Min Summative Ass (%)	sessment r	mark for exa	am admission			40	
Assessment Weighting:	Final Mark =			% Summative /	Assessm Assessm	nent Mark nent Mark	60 40	
	Min Final Assessm	ent mark to	pass (%)				50	
		Paper 1	/	Paper 2	Paper 3	3	Paper 4	
A	Theory / Practical	Practical		Theory	1			
Assessment Paper:	Duration	3 hrs	S	3 hrs				
	Sub minimum	40%	0	40%				
Module Information:	SAQ	A Credits		ITS Course	ITS Course Level		CESM Code (3 rd Order) (Six Numbers)	
	20			2	2		131205	
Delivery Information:	С	ampus		Full/Part	Full/Part Time		Period /2 nd Semester	
		SMU		Conta	Contact		Year	

Periods per week:		Classes	Practicals	Tutorial	Seminar s	Independent Learning		
		5	3 hours	1		30 hours		
Pre-requis module:	site modules for this	MZOO011, MZOO012, MC	HM011, MCHI	M012				
Co-requis module:	ites modules for	No						
Assessme	ssment Formative assessment: • Theoretical and Practical Assessment Summative assessment: Test, Quiz and Practicals.							
Assessme Annex 1 fo grid)	e nt criteria (see or assessment criteria	 Specific educational outcome 1: Understand and describe ecological aspects of biodegradation Understand and describe the role of microorganisms in water pollution and treatment. Specific educational outcome 2: Understand and describe water quality testing and purification technology 						
Assessment methods Formative assessment: Theoretical and Practical Assessment For the practicals students will write a practical exam and submit a report on research of out during the course. Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programming portfolio contains completed pre- and post-module questionnaires, Blackboard assessment 						it a report on research carried ssed at end of programme. Final Blackboard assessment results,		
	Minimum Form Assessment Mark for exam admission (%)	40%						
Mark	% Formative Assessment Mark			60%				
Structure:	% 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	Duration	3hrs		N/A	N/A	N/A		
Paper:	% 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	School: Science & Technology			
Last Revision date: 2011			First Year Offere	First Year Offered (New): 2013			
Replace this Module existing r		If YES, give the	module codes:				
Module Code: MBIA021							
Module Name:	Essential biomolecules, functions and signal transduction						
Module Content:	pH, water and buffers; lonization 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:	 After successfully completing the module, the student should be able to: 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 						
Module Information:	SAQA Credits	ľ	TS Course Level Code	CESM Code	CESM Code (3 rd Order)		
	20		3	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 Asses	% Summative Assessment Mark 60			
	% Summative Assessment Mark 40				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:	MBIA022									
Module Name:	Bioenergetics and intermediary metabolisms									
Module Content:	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 After successfully completing the module, the student should be able to:									
Learning Outcomes:	 After successfully completing the module, the student should be able to: 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 nurine and pyrimidine ribonucleotides 									
	SAQA Credits		ITS C	ourse Level Code		CESM Code	e (3 rd Order)			
Module Information:	20			3		1302	01			
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 & MCHM0	12								
Co-requisite module:	MBIA021									
Assessment Methods:	Combination of clas assessments, practica	s tests/quizzes al reports and su	, surr mmati	mative theory asse ve theory assessmen	ssmer t at the	nts, short si e end of the r	ummative practical nodule			
	Min Summative Assessment mark for exam admission (%) 40									
Assessment Weighting:	Final Mark =			% Summative Asses	sment	Mark	60			
Assessment Weighting.				% Summative Asses	sment	Mark	40			
	Min Final Assessment	t mark to pass (%	6)	1			50			
		Paper 1		Paper 2	Pape	r 3	Paper 4			
Summative Assessment	Theory / Practical	Theory								
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:	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 characterisation techniques; Overview of modern protein structure determination techniques							
Learning Outcomes:	 After successfully completing the module, the student should be able to: 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 characterisation techniques 							
Module Information:	SAQA Credits		ITS C	ourse 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 test practical assessments, p	ts/quizzes, su ractical repor	ummati ts and	ve theory assessmer summative theory as	nts, assię sessme	gnments, sho nt at the end	ort summative of the module	
	Min Summative Assessm	nent mark for	exam	admission (%)			40	
Accoccmont Woighting:	Final Mark =			% Summative Asses	sment N	/lark	60	
Assessment weighting.				% Summative Assessment Mark 40			40	
	Min Final Assessment mark to pass (%) 50						50	
		Paper 1		Paper 2	Paper	3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
	Sub minimum	40%						

CURRICULUM INFORMATION						
Department: Biochemistry & Biotechnology School: Science & Technology						
Last Revision date: 2011	First Year Offered (New): 201	13				
Replace this Module existing module(s)? No	If YES, give the module codes: Bl	OC302				

Module Code:	MBIA032							
Module Name:	Gene structure, function	on and molecula	r biolo	ду				
Module Content:	DNA Metabolism; Gen Regulation of Eukary Molecular Biology Tec Techniques	e Expression ar otic Cell Cycle hniques; Recon	nd Reg Contr nbinant	ulation; Biochemistry ols; Genetic Basis DNA Technology; P	of Viru of Can CR and	ises – Structu icer – An In d Applications	ure & function; troduction; Basic ;; Sequencing	
Learning Outcomes:	 Techniques After successfully completing the module, the student should be able to: 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 andgenomes 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 Understand all concepts regarding recombinant DNA technology i.e., gene cloning, cloning vectors, gene libraries and associated screening techniques 							
Learning Outcomes:	 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 							
Module Information:	SAQA Credits		ITS C	ourse Level Code		CESM Code	(3 rd Order)	
	32			3		13020)3 Independent	
Periods per Week:	Classes	Practicals		Tutorial	Semir	nars	Learning	
Pro-requisite modules	4 X 45 IIIII MBIA021 and MBIA02	2 2 2 3 11 5		Per arrangement 0 10 hrs				
Co-requisite modules for	None	2						
Assessment Methods:	Combination of class practical assessments	tests/quizzes, , practical repor	summ ts and	ative theoryassessm summative theory as	ients, a sessmi	assignments, ent at the end	short summative I of the module	
Assessment Weighting:	Min Summative Assessment mark for exam admission (%) 40 It Weighting: Final Mark = % Summative Assessment Mark 60 % Summative Assessment Mark 40						40 60 40 50	
	MILLI II. 11 101 7335331116111	Danar 1	•)	Paper 2	Paner	• 3	Paner <i>1</i>	
Summative Assessment	Theory / Practical	Theory		1 UPEI 2		•		
raper:	Duration Sub minimum	3 hrs 40%						

Department: Biochemistry & Biotechnology					School: Sciences & Technolog		
Last Revision of	date: 2019		First Ye (New):	ear Offered 2020			
Replace this M	odule existing module(s)?	No	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 medaen cell and melacular biology research.					
Learning Outcomes:		 Understand he accurately cop Appreciate tha science. Distinguish be separate, and Identify limitati Compare and 	w molecular w, repair, and the molecular b tween different probe for spe ons of these contrast the r	machines are cons l interpret genomic iology is a dynamic nt molecular biology cific proteins, nucle techniques. nechanisms of bac	structed and r information. c and ever-ch y techniques eic acids, and terial and eul	egulated so that they can anging experimental that are used to isolate, I their interactions. karvotic 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 DNA can be damaged and describe the molecular mechanisms by which DNA can be damaged and describe the molecular mechanisms by which DNA can be damaged and describe the molecular mechanisms by which DNA can be damaged and describe the molecular mechanisms by which DNA can be damaged and describe the molecular mechanisms by which DNA can be damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular different forms of DNA damaged and describe the molecular damaged and damaged and describe the molecular damaged and					
		 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. 					
Madula lafama	-41	SAQA Crec	lits	ITS Course	Level	CESM Code (3 rd Order) (Six Numbers)	
	ation:	20		2		130401	
Delivery Inform	nation:	Campus	6	Full/Part T	Time	Period Year/1 st /2 nd Semester	
		SMU		Full		2/1 ^{s⊤} Sem	
Periods per week:		Classes	Practicals	Tutorial	Seminar	s Independent Learning	
		5 3 hours 1			40 hours		
Pre-requisite m	nodules for this module:						
Co-requisites r	modules for module:	BTEC202. BTEC 203 and BTEC 204					
Assessment Formative assessment: Theoretical and Practical testing at end of Module Draft Portfolio of Cellular Biology Theory and Practice Summative assessment:			ule with feedba Practice assess	ack. sed mid-year.			

				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: Understand how molecular machines are constructed and regulated so that they can accurately copy, repair, and interpret genomic information . Specific educational outcome 2: 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: Theoretical and Practical Assessment. During the programme students to develop a Portfolio of Cellularr 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. 					
	Mini for e	Minimum Form Assessment Mark for exam admission (%)		40%					
Mark			% Formative Assessment Mark	60%					
Structure:		-	% Summative Assessment Mark	40%					
	Min	Minimum final mark to pass (%)		50%					
				Paper 1	Paper 2	Paper 3	Paper 4		
Current of its	_ [Theo	ry/Practical	Theory	N/A	N/A	N/A		
Assessme	e ent	Dura	tion	3hrs	N/A	N/A	N/A		
Paper:		% co Asse	ntribution to Summative ssment Mark	100%	N/A	N/A	N/A		
		Sub minimum		40%	N/A	N/A	N/A		

	-					1
Department:	Bioch	emistry & Biotechnolog	ЭУ		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:	 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

			 Understand and explain the use of and recombinant DNA methods to genetically alter plants, animals and microbes 						
Module Information:			SAQA C	redits	ITS Course	e Level	CESM Code (3 rd Order) (Six Numbers)		
		20		2		131101			
Delivery Information:		Cam	pus	Full/Part	Time	Period Year/1 st /2 nd Semester			
Derivery mormation:			SM	IU	Contact/Fi	ull Time	2/2 nd Sem		
Periods per week:			Classes	Practicals	Tutorial	Seminars	Independent Learning		
			5	3 hours	1		40 hours		
Pre-requis	ite m	nodules for this module:	MBIO011, MZOO0	12, MCHM011, I	ICHM012				
Co-requisi	ites r	nodules for module:	BTEC201. BTEC	203 and BTE	204				
Assessme	ent		 Formative as Theoretical a Draft Portfolio Summative a Final Portfolio 	sessment: nd Practical As o of Biotechno ssessment: o of Biotechnol	sessment. ogy Theory and Pra ogy Theory and Pra	actice assesse ctice assessed	d mid-year. I at end of programme.		
Assessment criteria (see Annex 1 for assessment criteria grid)			 Specific educational outcome 1: 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 						
Assessme	ent m	ethods	 Formative assessment: 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. 						
	Min	imum Form Assessment Mark			40%				
Mark Structure:		% Formative Assessment Mark % Summative Assessment Mark			60% 40%				
	Min	imum final mark to pass (%)		50%					
			Paper 1		Paper 2	Paper 3	Paper 4		
		Theory/Practical	Theoryal		N/A	N/A	N/A		
Assessme	e ent	Duration	3hrs		N/A	N/A	N/A		
Paper:		% 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								
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 M	icrobiology				
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:	 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 C	redits	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		2/1st Sem	
Periods per week:	Classes	Practicals	Tutorial	Seminar	s	Independent Learning
	5	3 hours	1			40 hours
Pre-requisite modules for this module:	MBIO011, MZOO0	12, MCHM011, MC	CHM012			
Co-requisites modules for module:	BTEC202. BTEC	202 and BTEC 2	204			
Assessment	Formative asses Theoretical a Draft Portfolio Summative asses	ssment: nd Practical Asse o of introduction t essment: Test,	essment o microbiology Th Quiz and Practic a	eory and Prac als	ctice a	issessed mid-year.
Assessment criteria (see Annex 1 for assessment criteria grid)	Summative assessment: Test, Quiz and Practicals Specific educational outcome 1: • Classify and characterize different types of microorganisms • Differentiate between prokaryotic and eukaryotic cells Specific educational outcome 2: • 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, ce wall and bacterial components • Understand and describe different methods for identification of bacteria					edia nes , cytoplasm, cell teria

Assessment methods			 Formative assessment: 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. 				
	Minimur for exan	m Form Assessment Mark n admission (%)		40%			
Mark Structure:		% Formative Assessment Mark	60%				
		% Summative Assessment Mark	40%				
	Minimur	n final mark to pass (%)	50%				
			Paper 1	Paper 2	Paper 3	Paper 4	
0	The	ory/Practical	Theory	N/A	N/A	N/A	
Assessme	e ent Dura	ation	3hrs	N/A	N/A	N/A	
Paper:	% c Ass	contribution to Summative essment Mark	100%	N/A	N/A	N/A	
	Sub	minimum	40%	N/A	N/A	N/A	

CURRICULUM INFORMATION								
Department:	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:	 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 gov 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 (3 rd Order) (Six Numbers)			
	20	2	130505			
Delivery Information:	Campus	Period Year/1 st /2 nd Semester				

				SM	1U	Co	ontact	Year
Pariada na		k		Classes	Practicals	Tutorial	Seminars	Independent Learning
renous pe	ei wee	'n.		5	3 hours	1		40 hours
Pre-requis	ite mo	odules	for this module:	MBIO011, MZOO0	012, MCHM011, M	CHM012		
Co-requisi	ites m	odule	s for module:	BTEC201. BTEC	202 and BTEC	203		
Assessme	ent			Formative asses Theoretical a Summative asse Theoretical a	sment: nd Practical Ass ssment: nd Practical Ass	essment. essment		
Assessme assessmer	e nt cı It critei	riteria ria gric	(see Annex 1 for I)	 Specific educational outcome 1: 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: 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 BiotechnologyUnderstand and describe ecological aspects of biodegradation 				
Assessme	nt me	thods		Formative assessment: 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				
	Minir for e	mum F xam a	Form Assessment Mark			40%		
Mark			% Formative			60%		
Structure:			% Summative Assessment Mark			40%		
	Minir	mum fi	nal mark to pass (%)			50%		
				Paper 1		Paper 2	Paper 3	Paper 4
Summativ	e 🗖	Theory	/Practical	Theory		N/A	N/A	N/A
Assessme	nt [Duratio	on	3hrs		N/A	N/A	N/A
Paper:	Å	% con Assess	tribution to Summative sment Mark	100%		N/A	N/A	N/A
	5	Sub mi	inimum	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 301					
Module Name:	Industrial and	Environmental	Biotechnology	/		
Content:	Biocatalysis and Approaches to Bioreactor design of Biotechnologi Management as Environmental So	Biotransformatior enzyme modifica n and product yiel cal techniques ir well as in the m cience	n, Industrial enzyr ation and large ld, introduction to n Forensic Scier nanagement of (nology and in scale industr process contr nce, Wildlife, Greenhouse c	nmobi ial er rolano Fisho gases	lization of enzymes. nzyme applications. d management. Use eries, and Forestry , Floral Design and
Learning Outcomes:	 Onderstand 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 (3 rd Order) (Six Numbers)	
Delivery Information:	30 Campus		ہ۔ Full/Part Time		Period Year/1st/2 nd Semester	
	SMU		Full			Year
Periods per week:	Classes	Practicals	Tutorial	Seminar	s	Independent Learning
	5	3 hours	1			30 hours
Pre-requisite modules for this module:	BTEC 201; BTEC 2	202, BTEC 203, BT	EC 204, MBIA021 8	& MBIA022		
Co-requisites modules for module:	BTEC 302, BTEC 3	303 and BTEC 304				
Assessment	Formative asses Theoretical and F Draft Portfolio Summative asses Test, Quiz ar	ssment: Practical Assessm o of Environmenta ssment: id Practicals.	nent al ScienceTheory	and Practice	asses	ssed mid-year.
Assessment criteria (see Annex 1 for assessment criteria grid)	 Test, Quiz and Practicals. Specific educational outcome 1: 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: 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	Summative assess	sment: Theoretical sment: Test and I	and Practical Exa Practicals	m-		

	Minimum Form Assessment Mark for exam admission (%)	40%					
Mark	% Formative Assessment Mark	60%					
Structure:	% Summative Assessment Mark	40%					
	Minimum final mark to pass (%)	50%					
		Paper 1	Paper 2	Paper 3	Paper 4		
	Theory/Practical	Theory	N/A	N/A	N/A		
Summative	nt Duration	3hrs	N/A	N/A	N/A		
Paper:	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A		
	Sub minimum	40%	N/A	N/A	N/A		

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

Module Code:	BTEC 302								
Module Name:	Plant and Microbi	al Biotechnology							
Content:	Micro-propagation transgenic plants. pharmaceuticals fermentation. The Production and u the production of	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:	 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 C	redits	ITS Course Level		CES	CESM Code (3 rd Order) (Six Numbers)			
module mormation.	30		3			131101			
Delivery Information:	Cam	pus	Full/Part	Гime	Yea	Period nr/1st/2nd Semester			
	SM	U	Full			Year			
Periods per week	Classes	Practicals	Tutorial	Seminar	S	Independent Learning			
	5	3hours	1			30 hours			
Pre-requisite modules for this module:	BTEC 201 2, BTEC	C 203, BTEC 204, N	BIA021 and MBIA)22	BTEC 201 2, BTEC 203, BTEC 204, MBIA021 and MBIA022				

Co-requisi	tes mod	ules for module:	BTEC 301, BTEC 302 and BTEC 304				
Assessme	nt		Formative assessment: Practical and Th Summative assessment Final Portfolio of Biotechn	neoretical Assessment : ology Theory and Prac	tice assessed at end	of programme.	
Assessme assessmen	nt crite t criteria	e ria (see Annex 1 for grid)	 Specific educational outcome 1: 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: 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: 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 				
-	Minimu for exa	m Form Assessment Mark m admission (%)		40%			
Mark Structure:		Assessment Mark	60%				
	Minim	Assessment Mark	40%				
	winimu	m mark to pass (%)	Paper 1	50%	Paper 3	Paper 4	
	The	eory/Practical	Theory	N/A	N/A	N/A	
Summative Assessme	e nt Du	ration	3hrs	N/A	N/A	N/A	
Paper:	% Ass	contribution to Summative sessment Mark	100%	N/A	N/A	N/A	
	Su	b minimum	40%	N/A	N/A	N/A	

CURRICULUM INFORMATION								
Department: Biochemistry & Biotechnology School: Science & Technology						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:	 Understand t Understand t Describe and medical diagonal 	 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 C	redits	ITS Course	Level	CES	SM Code (3 rd Order) (Six Numbers)
	30		3		131	101
Delivery Information:	Campus		Full/Part Time		Period Year/1 st /2 nd Semester	
	SMU		Full			Year
Periods per week	Classes	Practical's	Tutorial	Seminar	ars Independent Learning	
	5	3 hours	1	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 asses • Theoretical a Summative asses Final Portfolio of	ssment: nd Practical Asse essment: Biotechnology Tl	essment. heory and Practice	assessed at	end o	of programme.
Final Portfolio of Biotechnology Theory and Practice assessed at end of progra Specific educational outcome 1: • Understand and describe the central dogma of molecular biology (DNA transcription and translation) in prokaryocytes • Describe the causes, types and mechanisms of mutation in prokaryocytes • Describe the causes, types and mechanisms of mutation in prokaryocytes • Describe microbial sex and conjugation Specific educational outcome 2: • Understand the nature and use of plasmids and bacteriophages • Understand and describe the principles of nucleic acid mapping, hysequencing and self-directed mutagenesis					gy (DNA replication, yocytes oping, hybridization,	

Assessme	ent metho	ds	 Formative assessment Theoretical and Prace For the practicals of various management Summative assessment 	t: ctical Assessment. students attend visit a nt practices. nt:	Micro Biology labora	tory and understand		
Minimum Form Assessment Mark for exam admission (%)			40%					
Mark	% Formative Assessment Mark		60%					
Structure:		% Summative Assessment Mark	40%					
	Minimur	n final mark to pass (%)	50%					
			Paper 1	Paper 2	Paper 3	Paper 4		
•	The	ory/Practical	Theory	N/A	N/A	N/A		
Summativ Assessme	ent Dura	ation	3hrs	N/A	N/A	N/A		
Paper:	% c Ass	contribution to Summative essment Mark	100%	N/A	N/A	N/A		
	Sub	minimum	40%	N/A	N/A	N/A		

CURRICULUM INFORMATION								
Department:	Bioc	hemistry & Biotechno	logy		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 ar	nd 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:	 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 C	redits	ITS Course Level		CES	M Code (3 rd Order) (Six Numbers)	
	30		3		131 ⁻	131101	
Delivery Information:	Campus		Full/Part Time		Yea	Period Year/1 st /2 nd Semester	
	SMU		Full		Year		
Periods per week	Classes	Practical's	Tutorial	Seminars	S	Independent Learning	
	5	3 hours	1			30 hours	

Pre-requisi	isite modules for this module: BTEC 201 and BTEC 202, BTEC 203, BTEC 204, MBIA 021 & MBIA 022							
Co-requisit	tes modu	lles for module:	BTEC 301, BTEC 302 and BTEC 303					
Assessme	nt	 Formative assessment: Practical and Theoretical Assessment Draft Portfolio of Environmental Science Theory and Practice assessed mid Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of programme. 				essed mid-year. ed at end of		
Assessme assessmen	nt crite t criteria (ria (see Annex 1 for grid)	 Specific educational outcome 1: Understand different concepts in environmental legislation. Understand the need for environmental sustainability. Specific educational outcome 2: Explain various methods of environmental administration in South Africa. 					
Assessme	nt metho	ds	 Formative assessment: Theoretical and Practical Assessment. For the practicals students attend will visit a nearby community and discuss issue around environmental management. Student will submit a report on the attitude an feelings towards environmental management Summative assessment: 					
	Minimu for exar	n Form Assessment Mark n admission (%)	40%					
Mark		% Formative Assessment Mark	60%					
Structure:		% Summative Assessment Mark	40%					
	Minimu	n final mark to pass (%)	50%					
			Paper 1	Paper 2	Paper 3	Paper 4		
0	The	ory/Practical	Theory/Practical	N/A	N/A	N/A		
Summative Assessment Duration		3hrs	N/A	N/A	N/A			
Paper:	% (Ass	contribution to Summative essment 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	e Studies					
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:	After successfully completing the module, the student should be able to: • 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 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 rep						
	SAQA Credits		ITS Course Level Code		CESM	Code (3 rd Order)	
Module Information:	24			3		130101	
Periods per Week:	Classes	Prac	ticals	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 test practical reports and summer	s/quizzes, native the	formative ory assessr	theory assessments nent at the end of th	s, short formative p ie module	practical assessments,	
Assessment Weighting:	Min Formative Assessmer	nt mark for	exam adm	ission (%)		40	

	Final may	-k –	% Formative Asse	60	
	Filiai Iliaik –		% Summative Ass	40	
	Min Final Assessment mark to pass (%)				50
		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment	Theory / Practical	Theory			
Paper:	Duration	3 hrs			
	Sub minimum	inimum 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:	 After successfully completing the module, the student should be able to: 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 exorine systems List the different functions of the different endocrine in the body Discuss tropic hormones, pineal glands and circadian rhythm 						
Module Information:	SAQA Credits		TI	IS Course Level Code C		ESM Code (3 rd Order)	
	Classes	Practical	c .	Tutorial	Sominars	Independent Learning	
Periods per Week:	4 x 40 min	1 x 3 hrs	5	Per arrangement	0	1.25 hrs	
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Methods:	Combination of class practical reports and	tests/quizzes, summative the	form ory a	ative theory assessn issessment at the en	nents, short formativ d of the module	ve practical assessments,	
	Min Formative Asses	sment mark for	r exa	m admission (%)		40	
Assessment Weighting:	Final M	ark =		% Formative Asse	ssment Mark	60	
Abscollient Weighting.		uik		% Summative Ass	essment Mark	40	
	Min Final Assessmer	nt mark to pass	(%)			50	
		Paper 1		Paper 2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Theory					
Paper:	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 Biologi	cal 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:	After successfully completing the module, the student should be able to: • 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,							
Module Information:	SAQA Cred	lits	[]	S Course Level Cod	e CESM	Code (3 rd Order)		
	12			3		130101		
Periods per Week:	Classes	Practica	ls	Tutorial	Seminars	Independent Learning		
	4 x 40 min	1 x 3 hr	S	Per arrangement	0	3.5 nrs		
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Methods:	Combination of class to practical reports and s	ests/quizzes, summative the	formati ory ass	ve theory assessments essment at the end of	s, short formative pra the module	ctical assessments,		
	Min Formative Assess	ment mark for	r exam	admission (%)		40		
Assessment Weighting:	Final M	ark -		% Formative Assess	ment Mark	60		
Assessment weighting.	T IT CI WI			% Summative Asses	40			
	Min Final Assessment	mark to pass	(%)			50		
		Paper	1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory	/					
Paper:	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: 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 Cre	S Course Level Co	ode	CESM Code	(3 rd Order)				
	12		3			130601			
Periods per Week:	Classes 4 x 40 min	Practicals 1 x 3 hrs	Tutorial Per arrangement	S	Seminars 0	Independent Learning 3.5 hrs			
Pre-requisite module/s:	Compulsory registra	ation of BIO010M a	and/or MBIO011						
Co-requisites module/s :	None								
Assessment Methods:	Combination of class practical reports an	s tests/quizzes, for disummative theory	mative theory asses assessment at the	ssment end of	s, short formation in the module	ative practical assessments,			
	Min Formative Asse	essment mark for e	kam admission (%)			40			
Assessment	Final	lark =	% Formative As	sessm	ent Mark	60			
Weighting:	i ingi i		% Summative A	ssessn	nent Mark	40			
	Min Final Assessme	ent mark to pass (%	b)			50			
		Paper 1	Paper 2	P	Paper 3	Paper 4			
Summative	Theory / Practical	Theory							
Assessment Paper:	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 Inve	ertebrates						
Module Content:	Systematic review and adaptive biodiversity of the invertebrates and non-vertebrate chordates: Protists, Porifera, Cnidaria, Ctenopohora, 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:	 After successfully completing the module, the student should be able to: Distinguish between morphological characteristics of Protists, Porifera, Cnidaria, Ctenopohora, 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 chordates to their way of life Evaluate and compare the reproductive and development strategies of the representatives of hemichordates and lower chordates 							
	SAQA Cr	redits ITS		Course Level Code		CESM Code (3rd Order)		
Module Information:				•			100001	
Module Information:	20			3			130601	
Module Information: Periods per Week:	20 Classes	Practicals	5	3 Tutorial	S	Seminars	130601 Independent Learning	
Periods per Week:	20 Classes 4 x 40 min	Practicals 1 x 3 hrs	6	3 Tutorial 2 x 40 min	S	Seminars 0	130601 Independent Learning 5 hrs	
Module Information: Periods per Week: Pre-requisite module/s	20 Classes 4 x 40 min MBIO011 & MZOO0	Practicals 1 x 3 hrs	6	3 Tutorial 2 x 40 min	S	Seminars 0	130601 Independent Learning 5 hrs	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s	20 Classes 4 x 40 min MBIO011 & MZOO0 None	Practicals 1 x 3 hrs 12	3	3 Tutorial 2 x 40 min	S	Seminars 0	130601 Independent Learning 5 hrs	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods:	20 Classes 4 x 40 min MBIO011 & MZOO0 None Combination of cla practical reports ar	Practicals 1 x 3 hrs 12 ss tests/quizze nd summative t	s, formati heory ass	3 Tutorial 2 x 40 min we theory assessessment at the	ssments end of	eminars 0 s, short forma the module	130601 Independent Learning 5 hrs tive practical assessments,	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods:	20 Classes 4 x 40 min MBIO011 & MZOO0 None Combination of cla practical reports ar Min Formative Ass	Practicals 1 x 3 hrs 12 Iss tests/quizze nd summative t ressment mark	s es, formati heory ass for exam	3 Tutorial 2 x 40 min we theory assessessment at the admission (%)	ssments end of	6 0 s, short forma the module	130601 Independent Learning 5 hrs tive practical assessments, 40	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods: Assessment	20 Classes 4 x 40 min MBIO011 & MZOO0 None Combination of cla practical reports ar Min Formative Ass	Practicals 1 x 3 hrs 12 ss tests/quizze nd summative t essment mark	s, formati heory ass for exam	3 Tutorial 2 x 40 min we theory assess sessment at the admission (%) % Formative	ssments end of Assess	Seminars 0 s, short forma the module ment Mark	130601 Independent Learning 5 hrs tive practical assessments, 40 60	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods: Assessment Weighting:	20 Classes 4 x 40 min MBIO011 & MZOO0 None Combination of cla practical reports ar Min Formative Ass Fina	Practicals 1 x 3 hrs 12 https://www.insticeling ind summative to ressment mark al Mark =	s, formati heory ass for exam	3 Tutorial 2 x 40 min ve theory asses sessment at the admission (%) % Formative % Summative Mark	ssments end of Assess e Asses	6 0 5, short forma the module ment Mark sment	130601 Independent Learning 5 hrs tive practical assessments, 40 60 40	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods: Assessment Weighting:	20 Classes 4 x 40 min MBIO011 & MZOO0 None Combination of cla practical reports ar Min Formative Ass Fina Min Final Assessm	Practicals 1 x 3 hrs 12 Iss tests/quizze Ind summative t Ind summative t Inessment mark	s, formati heory ass for exam	3 Tutorial 2 x 40 min we theory assess sessment at the admission (%) % Formative % Summative Mark	ssments end of Assess e Asses	6 0 5, short forma the module ment Mark sment	130601 Independent Learning 5 hrs tive practical assessments, 40 60 40 50	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods: Assessment Weighting:	20 Classes 4 x 40 min MBIO011 & MZOOO None Combination of cla practical reports ar Min Formative Ass Fina Min Final Assessm	Practicals 1 x 3 hrs 12 https://www.akstorestation of summative to ressment mark al Mark = hent mark to pa Paper 1	s, formati heory ass for exam	3 Tutorial 2 x 40 min we theory assess sessment at the admission (%) % Formative % Summative Mark Paper 2	ssments end of Assess Asses	Seminars 0 s, short forma the module ment Mark sment Sment	130601 Independent Learning 5 hrs tive practical assessments, 40 60 40 50 Paper 4	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods: Assessment Weighting: Summative Paper:	20 Classes 4 x 40 min MBIO011 & MZOOO None Combination of cla practical reports ar Min Formative Ass Fina Min Final Assessm Theory / Practical	Practicals 1 x 3 hrs 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	s, formati heory ass for exam	3 Tutorial 2 x 40 min we theory assess sessment at the admission (%) % Formative % Summative Mark Paper 2	Sements end of Assess Asses	6 0 5, short forma the module ment Mark sment Paper 3	130601 Independent Learning 5 hrs tive practical assessments, 40 60 40 50 Paper 4	
Module Information: Periods per Week: Pre-requisite module/s Co-requisite module/s Assessment Methods: Assessment Weighting: Summative Paper:	20 Classes 4 x 40 min MBIO011 & MZOOO None Combination of cla practical reports ar Min Formative Ass Fina Min Final Assessm Theory / Practical Duration	Practicals 1 x 3 hrs 12 Iss tests/quizze Ind summative t Itessment mark Ind Mark = Inent mark to pa Paper 1 Theory 3 hrs	s, formati heory ass for exam	3 Tutorial 2 x 40 min ve theory assessessment at the admission (%) % Formative % Summative Mark Paper 2	Sometical Stress	Seminars 0 s, short forma the module ment Mark sment Paper 3	130601 Independent Learning 5 hrs tive practical assessments, 40 60 40 50 Paper 4	

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:	 After successfully completing the module, the student should be able to: 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 other 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 Cre	dits	1	ITS Course Level Code		de	CESM Code (3 rd Order)		
	20	_			3			130601	
Periods per Week:	Classes	Pra	cticals		Futorial	S	Seminars	Independent Learning	
Pre-requisite module/s:	4 x 40 min MBIO011 & MZOO	1) 012	k 3 nrs	2	x 40 min		0	5 nrs	
Co-requisite module/s:	None								
Assessment Methods:	Combination of clas	s tests/ d summ	quizzes, forr ative theory	native assess	theory assess sment at the e	ments, nd of tl	short formatione module	ve practical assessments,	
	Min Formative Asse	essment	mark for ex	am adı	nission (%)			40	
Assessment	Fin	al Mark	=		% Formative Mark	e Asses	ssment	60	
Weighting:					% Summativ Mark	/e Asse	essment	40	
	Min Final Assessme	ent mark	k to pass (%))				50	
			Paper '	1	Paper 2		Paper 3	Paper 4	
Summative	Theory / Practical		Theory						
Assessment Paper:	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:	 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 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 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 						
Learning Outcomes:	 design of management plans for conservation purposes and commercial wildlife farming After successfully completing the module, the student should be able to: 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 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 Credit	S	ITS	Course Level Code	е	CES 1306(SM Code (3 rd Order)
	Classes	Prac	ticals	Tutorial		Seminars	Independent Learning
Periods per Week:	5 x 40 min	1 x 3	3 hrs	Per arrangemen	nt	0	10 hrs
Pre-requisite module/s:	MZOA021 and MZOB022	and MCH	M011				
Co-requisite module/s:	None						
Assessment Methods:	Combination of class practical reports and su	tests/quizz ummative	zes, form theory as	ative theory assess ssessment at the en	sment d of th	ts, short forma ne module	tive practical assessments,
	Min Formative Assess	ment mark	k for exan	n admission (%)			40
Assessment	Final Ma	rk =	-	% Formative Asses	ssmer	nt Mark	60
weighting.	Min Final Assessment	manle ta m		% Summative Asse	essme	ent Mark	40
	IVIIN FINALASSESSMENT	mark to pa	ass (%)	Dency 2		Demore 2	JU Denar 4
Commentations	Theony / Prostical	ть	er 1	Paper 2		Paper 3	Paper 4
Summative Assessment Paper	Duration	2 1110	re la				
	Sub minimum	409	%				
			'				

CURRICULUM INFORMATION							
Department: Biology & Environmental Sciences School: Science & Technology							
Last Revision date:	2018	First Year Offered (New): 2019					
Replace this Modul	e 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:	 After successfully completing the module, the student should be able to: 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-Darwanism 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 Cred	its	ITS Co	ourse Level Cod	e (CESM Code (3 rd Order)			
	32		3			130701			
Periods per Week:	5 x 40 min	1 v 3 h	Do		Seminars	10 h			
Pre-requisite module/s:	MZOA031and MCHM0	12	T CI		0	1011			
Co-requisite module/s:	None								
Assessment Methods:	Combination of class practical reports and	tests/quizzes, fo summative theo	ormativ ry asse	ve theory assessmessment at the en	ents, short forma d of the module	tive practical assessments,			
	Min Formative Asses	sment mark for	exam a	admission (%)		40			
Assessment	Final	lark =		% Formative Ass	essment Mark	60			
Weighting:				% Summative As	sessment Mark	40			
	Min Final Assessmer	it mark to pass (%)			50			
		Paper 1		Paper 2	Paper 3	Paper 4			
Summative	Theory / Practical	Theory							
Assessment Paper:	Duration	3 hrs							
	Sub minimum	40%							

ENVIRONMENTAL BIOLOGY - BSCG01

CURRICULUM INFORMATION							
Department:	Biolo	gy & Environmental S	ciences		School:	Science & Technology	
Last Revision d	ate:	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 t	o Envir	onmental S	Science					
Module Content	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-aqeous titrations, indicators. Colorimetric: Spectrophotometric reagents, elementary visible Spectrophotometry: spectrophotometric titrations.								
Learning Outcomes	 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 								
	SAQA Cre	dits	ITS C	Course Level	Code		CESM	l Code	
Module information									
	Classes	Pract	icals	Tutorial	Semir	ars	Independen	t Learning	
Periods per week			10						
Pre-requisite module(s)	MPHS011& N	<u>APHSO</u>	12,MCHN	1011&MCHM0	12 , MBIO0	11 & MZOC	0012, MMTH0	11 &MMTH012	
Co-requisite module(s)	EMI202,EHS	5201,M	ICB201 &	MICB202					
Assessment Methods	Formative tes	sts, Ass	signments,	Summative wi	itten exam	nation		40	
A	Min Formativ	e Asse	ssment Ma	ark for exam ac	imission (%	o)		40	
Assessment Weighting	Final Mark -	_		% Form	ative Asses	s Mark		60	
	Final Mark =	-		% Sumr	native Asse	ess iviark		40	
	iviin Finai mai	гк то ра	ass to pass	(%) Den				50	
Summative appagament	The em (Dress)	la al	Paper 1	Paper 2					
Dapar:	Durotian	icai							
rapei:	Duration								
	Sub minimur	n							

CURRICULUM INFORMATION										
Department:	Biolo	gy & Environmental So	ciences		School:	Science & Technology				
Last Revision	date:	2019		First Year Offered (New):	2020					
Replace this I	Module (existing module(s)?	No	If YES, give the mod codes:	dule					

Module code	EMT 202									
Module name	Environmen	ntal Ma	anagemen	t						
Module Content	Definition, so	cope	and elemer	nt of En	ivironm	ental n	nanageme	nt and planr	ning, History and Rise of	
	Environmenta	al Ma	nagement a	and Con	cern in	South	Africa. E	lements of e	environment management,	
	environmenta	al prob	plems such	as pollut	tion inc	luding	solid wast	e, land degra	adation and soil and water	
	conservation	as w	ell as healt	h implica	ation of	f noise.	Issues re	elated to Env	rironmental Standards and	
	Regulations	Regulations Enforcement Agency. Environmental Protection Agencies Mandates and Limitations.								
	Environmental Law and Implementation in South Africa. Contributions or otherwise, of International									
	Institutions to	o mar	nage the E	nvironme	ent suc	h as l	Jnited Nat	ions Confere	ence on Environment and	
	Development	t (UNC	ED); Non-g	jovernme	ental Or	ganisat	ions (NGC	ls).		
Learning Outcomes	 Define an 	nd und	erstand env	rironment	tal man	ageme	nt and plar	ning.		
	 Appreciat Identify or 	te the	need for En	vironmer	ntal Mar	nageme	ent in Souti	n Africa.		
	 Identity St Describe 	 Identify some elements of environmental management and principles. Describe the role and functions of Environmental Managers 								
	 Integrate 	 Integrate the role of International Institutions and Non-Governmental Organizations 								
	SAQA Crec	dits	ITS Co	ourse Le	vel Co	de		CES	SM Code	
Module information	0			.		<u> </u>				
Periods per week	Classes	Pract	icals	Iutorial		Semin	ars	Independer	nt Learning	
Pre-requisite module(s)	MPHS011&	MPHS	012 MCHM	1011&MC	CHM012	2 MBI	0011 & MZ	00012 MMT	H011 & MMTH012	
Co-requisite module(s)	FMT 201 FH	HS 201	& FHS202	MICB20	01 & MI	CB202	5011 a m2			
Assessment Methods	Formative tes	sts. As	sianments.	Summat	ive writ	ten exa	mination			
	Min Formativ	e Ass	essment Ma	ark for exa	am adn	nission	(%)		40	
Assessment Weighting				% F0	ormativ	e Asse	ss Mark		60	
	Final Mark =	=		% S	ummati	ve Ass	ess Mark		40	
	Min Final ma	irk to p	ass to pass	(%)					50	
	Paper 1 Paper 2									
Summative assessment	Theory/Pract	tical								
Paper:	Duration									
	Sub minimur	m								

CURRICULUM INFORMATION									
Department:	Biolo	gy & Environmental So	ciences		School:	Science & Technology			
Last Revision	date:	2019		First Year Offered (New):	2020				
Replace this I	/lodule e	existing module(s)?	No	If YES, give the mod codes:	dule				

Module code	EHS 201
Module name	Fundamentals of Environmental Health Science
	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,
Module Content	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	 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 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 Cre	dits	ITS Cour	se Level Co	ode	CESM Code				
	Classes Pract		icals Tu	Tutorial S		ars	Independer	nt Learning		
Periods per week								<u> </u>		
Pre-requisite module(s)	MPHS011&	MPHS	012 ,MCHM0	1&MCHM01	2 , MBI0	2011 & MZ	200012,MMT	H011 & MMTH012		
Co-requisite module(s)	EMT 201 &	EMT20	2 , EHS 202,	MICB201 & N	MICB202	2				
Assessment Methods	Formative te	ests, As	signments, Su	ummative wr	itten exa	mination				
	Min Formati	ve Asse	essment Mark	for exam ad	mission	(%)		40		
Assessment Weighting				% Formative Assess Mark						
	Einel Maule			% Formati	ve Asse	ss Mark		60		
	Final Mark	=		% Formati % Summa	ve Asse tive Ass	ss Mark ess Mark		60 40		
	Final Mark Min Final ma	= ark to p	ass to pass (%	% Formati % Summa	ve Asse tive Ass	ss Mark ess Mark		60 40 50		
Commentions and a second second	Final Mark Min Final ma	= ark to p	ass to pass (% Paper 1	% Formati % Summa 6) Paper 2	ve Asse tive Ass	ss Mark ess Mark		60 40 50		
Summative assessment	Final Mark Min Final ma Theory/Prac	= ark to p ctical	ass to pass (% Paper 1	% Formati % Summa 6) Paper 2	ve Asse tive Ass	ss Mark ess Mark		60 40 50		

CURRICULUM INFORMATION									
Department:	Biolo	gy & Environmental So	ciences		School:	Science & Technology			
Last Revision	date:	2019		First Year Offered (New):	2020				
Replace this Module existing module(s)?				If YES, give the mod codes:	dule				

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	 Describe food borne diseases
	 Understand the epidemiology of food borne diseases.
	 Identify pathogens causing food borne diseases.
	 Expolain 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. 										
	SAQA Credits	ITS C	ourse Level C	ode	CESM Code						
Module information											
Pariada par waak	Classes Pra	cticals	Tutorial	Semir	nars	Independe	nt Learning				
Ferious per week											
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										
	Min Formative As		40								
Assessment Weighting			% Forma	% Formative Assess Mark % Summative Assess Mark			60				
	Final Mark =		% Summ				40				
	Min Final mark to	pass to pas	s (%)				50				
		Paper 1	Paper 2								
Summative assessment	Theory/Practical										
Paper:	Duration										
	Sub minimum										

CURRICULUM INFORMATION									
Department:	Biolog	gy & Environmental So		School:	Science & Technology				
Last Revision	date:	2019		First Year Offered (New):	2020				
Replace this M	/lodule e	existing module(s)?	No	If YES, give the module codes:					

Module code	MICB201								
Module name	Introductio	on to N	<i>Aicrobiol</i>	ogy					
	History and	d deve	elopment	of	microbiology	. Key	concepts in microbiology. Classifie	cation and	
	characteriza	tion of	the differer	nt typ	pes of microo	organisr	ms. Comparison of prokaryotic and euka	ryotic cells.	
	Nutritional a	and ree	quirement	and	microbiolog	gical m	nedia, cultivation and growth of micro	organisms.	
Module Content	Physical or	ganiza	tion of ba	acter	ria, bacteria	l chror	mosomes, cytoplasm, cell wall and	membrane	
	components	. Bacte	erial toxins	and	Methods for	identifi	cation of bacteria		
	 Understa 	and the	history an	d de	velopment o	of microl	biology		
	 Discuss key concepts in microbiology 								
	 Classify 	 Classify and characterize different types of microorganisms Differentiate between prokaryotic and eukaryotic cells 							
	 Different 								
Learning Outcomes	 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	compo	onents						
	 Understa 	and and	d describe	diffe	rent method	s for ide	entification of bacteria.		
	SAQA Cre	dits	ITS C	ours	e Level Co	de	CESM Code		
Module information									
Periods per week	Classes	Pract	ticals	Tu	torial	Semir	nars Independent Learning		
Pre-requisite module(s)	MPHS011&	MPHS	012 ,MCH	M01	1&MCHM01	2 , MBI	0011 & MZOO012,MMTH011 & MMTH	012	
Co-requisite module(s)									
Assessment Methods	Formative te	ests, As	signments	s, Su	mmative wri	tten exa	amination		
	Min Formati	ve Ass	essment M	lark	for exam adr	nission	40		
Assessment Weighting	<u></u>				% Formativ	e Asse	ess Mark 60		
	Final Mark	=			% Summat	ive Ass	Sess Mark 40		
	Min Final ma	ark to p	ass to pas	s (%))		50		
					- 6				

	Theory/Practical		
Summative assessment	Duration		
Paper:	Sub minimum		

		C	URRICULUM INI	FORMATION		
Department:	Biolo	gy & Environmental So	ciences		School:	Science & Technology
Last Revision	date:	2019		First Year Offered (New):	2020	
Replace this I	Module (existing module(s)?	No	If YES, give the mod codes:	dule	

Module code	MICB202								
Module name	Environme	ntal ar	nd Fungal	Microbio	ology				
	Zoosporic f	ungi. T	he Deuter	romycotin	ia, Yeas	st. Funç	gi as sapr	otropots. Fur	ngi and humans. Microbial
	populations	in air,	water and	d soil. Th	e effect	s of ab	iotic factor	rs on microo	rganisms. Measurement of
	bacterial nui	mbers,	biomass a	nd activiti	es in mi	crobial e	ecosystem	s. The roles o	f microorganisms in carbon,
	oxygen, nit	rogen,	sulphur a	and phos	sphorus	cycles	. Ecologic	al aspects	of biodegration of waste.
Module Content	Microorgani	sms in	mineral a	ind energ	gy recov	very. Th	ne role of	microorganis	ms in water quality (water
	pollution, wa	ater tre	atment, se	wage trea	atment	and sol	id municipa	al waste). Ind	lices of sanitary quality and
	microbiological standards. Water quality testing techniques and water purification technology								
	 Understa 	and and	d describe	the class	ification	of fung	i		
	 Describe 	e the ef	fects of ab	iotic facto	ors on m	icroorg	anisms		
	 Measure 	e bacte	rial numbe	rs in air, b	piomass	and ec	osystems		
	 Describe 	e the ro	les of micr	oorganisr	ms in ca	rbon, o	xygen, nitro	ogen, sulphu	r and phosphorus cycles
Learning Outcomes	 Understa 	and and	d describe	ecologica	al aspec	ts of bio	degradatio	on	
	 Understa 	and and	d describe	the role of	of microo	organisi	ns in wate	r pollution and	d treatment.
	Understa	and and	d describe	water qua	alitv test	ing and	purificatio	n trchnoloav.	
	SAQA Cre	dits	ITS C	ourse L	evel Co	de	•	CES	SM Code
Module information	· · ·								
Pariade par week	Classes	Pract	icals	Tutorial		Semin	ars	Independer	nt Learning
renous per week									
Pre-requisite module(s)	MPHS011&	MPHS	012 ,MCH	M011&M	CHM012	2 , MBI0	D011 & MZ	200012,MMT	TH011 & MMTH012
Co-requisite module(s)									
Assessment Methods	Formative te	ests, As	signments	s, Summa	ative writ	ten exa	mination		1
	Min Formati	ve Ass	essment N	lark for ex	xam adr	nission	(%)		40
Assessment Weighting				% F	ormativ	e Asse	ss Mark		60
	Final Mark	=		% 5	Summat	ve Ass	ess Mark		40
	Min Final ma	ark to p	ass to pas	s (%)					50
			Paper 1	Pa	per 2				
Summative assessment	Theory/Prac	tical							
Paper:	Duration								
	Sub minimu	ım							1

		C	URRICULUM INF	ORMATION		
Department:	Biolo	gy & Environmental So	ciences		School:	Science & Technology
Last Revision	date:	2019		First Year Offered (New):	2020	
Replace this I	Module (existing module(s)?	No	If YES, give the mod codes:	dule	

Module code	EHS 301							
Module name	Human Nut	trition	in Health a	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. Formulationof Special Diets, Nutritional Diseases and how some of these are prevented: (Energy-related Diseases, Vitamin-related Diseases, Mineral-related Diseases, and Nutritional Excesses). Management of Nutritional Diseases.Diseases.MicroorganismsCausingMost Food Contamination. Food spoilage, Food poisoning, Food borne infection and intoxication. Prevention of food borne diseases outbreak.							
	 Define b Classify Hygienic 	asic tei food in metho	minology ir to groups. ds of food	n human nutriti preparation an	on and d d preserv	iseases /ation.		
Learning Outcomes	 Understation Analyse Identify description 	and sor and un differen	ne disease derstand va t microrgar	s caused by in arious method nisms causing	nproper for s that car food pois	ood diet. 1 be used ir oning.	n managing r	nutritional diseases.
	SAQA Cre	dits	ITS Co	ourse Level C	ode		CES	SM Code
Module information								
Periods per week	Classes	Pract	icals	Tutorial	Semir	nars	Independe	nt Learning
Pre-requisite module(s)	EMT 201 &	EMT 2	02, EHS20	1 & EHS202				
Co-requisite module(s)	EHS302							
Assessment Methods	Formative te	ests, As	signments,	, Summative w	ritten exa	amination		
	Min Formati	ve Ass	essment Ma	ark for exam a	dmission	(%)		40
Assessment Weighting				% Forma	tive Asse	ss Mark		60
	Final Mark	=		% Summ	ative Ass	ess Mark		40
	Min Final ma	ark to p	ass to pass	s (%)				50
	-		Paper 1	Paper 2				
Summative	Theory/Prac	tical						
assessment	Duration							
Paper:	Sub minimu	IM						

CURRICULUM INFORMATION Department: Biology & Environmental Sciences School: Science & Technology Eirst Year Offered School: Science & Technology

Last Revision date:	2019		First Year Offered (New):	2020
Replace this Module	existing module(s)?	No	If YES, give the mod codes:	dule

Module code	EHS 302
Module name	Occupational and Health Safety
	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 work place. Relationship between work and health. Health and safety
Module Content	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 firefighti	ng. He	alth and s	afety	y audits as r	nanage	ment tools.	. Health and	safety plans. Accidents :
	case studies								
	 Define or 	ccupati	onal healt	h					
	 Discuss of 	 Discuss challenges for the development of occupational health and safety. 							
	 Explain t 	 Explain the scope of occupational health and safety. 							
	 Describe 	 Describe the interrelationship between occupational health and development 							
Learning Outcomes	 Identify t 	Identify the elements of a work environment.							
	 Discuss t 	 Discuss the three common interactions in the work place 							
	 Explain the 	 Explain the interrelationships between work and health 							
	SAOA Credite ITS Course Lovel Code CESM Code								
Module information	SAQA Credits 115 Course Level Code CESM Code								
	Classes	Pract	acticals Tu		torial	Semir	ars	Independent Learning	
Periods per week	0100000	11000		100					
Pre-requisite module(s)	EMT 201 & E	EMT 20	02, EHS20)1 &	EHS202				
Co-requisite module(s)	EHS301, EF	PS301,	& EPS30	2					
Assessment Methods	Formative te	sts, As	signments	s, Su	mmative wri	tten exa	mination		
	Min Formativ	/e Asse	essment N	lark i	for exam ad	nission	(%)		40
Assessment Weighting					% Formative Assess Mark				60
	Final Mark	=			% Summat	tive Assess Mark			40
	Min Final ma	irk to p	ass to pas	s (%	b)				50
			Paper 1	,	Paper 2				
Summative assessment	Theory/Pract	tical							
Paper:	Duration								
Sub minimum									

		CU	RRICULUM INFO	RMATION		
Department:	Biolo	gy & Environmental So	ciences		School:	Science & Technology
Last Revision	date:	2019		First Year Offered (New):	2020	
Replace this I	Module (existing module(s)?	No	If YES, give the mod codes:	dule	

Module code	EPS 301
Module name	Community Health and Development
Module Content	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.
Learning Outcomes	 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 agaist health hazards within the community health perspectives. Appreciate the importance of good environment Discuss the impact of pollution on community health.

	SAQA Cre	dits	ITS C	ourse l	evel C	ode		CE	SM Code
Module information									
Bariada par waak	Classes	Pract	icals	Tutoria	torial Se		nars	Independe	nt Learning
Periods per week									
Pre-requisite module(s)	EMT201 & E	EMT202	2, EHS201	& EHS2	202				
Co-requisite module(s)	EHS301 & E	HS302	2, EPS302						
Assessment Methods	Formative te	ests, As	signments	, Summ	ative wr	itten exa	amination	1	
	Min Formati	ve Asse	essment M	ark for e	exam ac	Imission	(%)		40
Assessment Weighting				% Formative Assess Mark					60
	Final Mark =			%	% Summative Assess Mark			K	40
	Min Final ma	ark to p	ass to pas	s (%)					50
			Paper 1	P	aper 2				
Summative assessment	Theory/Prac	tical							
Paper:	Duration								
-	Sub minimu	Im							

		C		ORMATION			
Department:	Biolog	gy & Environmental So	ciences		School:	Science & Technology	
Last Revision	date:	2019		First Year Offered (New):	2020		
Replace this I	/lodule e	existing module(s)?	No	If YES, give the module codes:			

Module code	EPS 302							
Module name	Environme	ntal Ep	bidemiology	у				
Module Content	Social and behaviour th health Syste	behavio neories em and	oural perspe , Health pro Administrat	ectives in envi motion prograu ion in South Af	ronment ms in Sc rica. Epi	al health, outh Africa idemiologic	Social, cultur , Global healt cal evidence	al & environmental health h challenges, Principles of
Learning Outcomes	 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. 							
	SAQA Credits ITS Course Level Code CESM Code							
	SAQA Cre	dits	ITS Co	urse Level Co	ode		CES	SM Code
Module information	SAQA Cre	dits	ITS Co	ourse Level Co	ode		CES	SM Code
Module information Periods per week	SAQA Cre Classes	Pract	icals	Tutorial	Semin	nars	CES	SM Code
Module information Periods per week Pre-requisite module(s)	Classes EMT 201 &	Pract	icals	Tutorial	Semin	nars	CES	M Code
Module information Periods per week Pre-requisite module(s) Co-requisite module(s)	Classes EMT 201 & EHS301 & E	Pract EMT 20 EHS302	icals 02, EHS201 2, EPS301	Tutorial & EHS202	Semin	nars	CES	M Code
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods	Classes EMT 201 & EHS301 & E Formative te	EMT 20 EMT 20 EHS302 Ests, As	icals 02, EHS201 2, EPS301 ssignments,	Tutorial & EHS202	Semin	ars	CES Independer	M Code
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods	Classes EMT 201 & EHS301 & E Formative te Min Formati	EMT 20 EMT 20 EHS302 ests, As	icals D2, EHS201 2, EPS301 ssignments, essment Ma	Tutorial & EHS202 Summative wr	itten exa	ars amination (%)	CES Independer	M Code
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods Assessment Weighting	SAQA Cre Classes EMT 201 & EHS301 & E Formative te Min Formati	Edits Pract EMT 20 EHS302 ests, As ve Asso	icals D2, EHS201 2, EPS301 ssignments, essment Ma	Tutorial & EHS202 Summative wr ark for exam ad % Formati	itten exa mission ve Asse	ars amination (%) ss Mark	CES Independer	M Code t Learning 40 60
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods Assessment Weighting	Classes EMT 201 & EHS301 & E Formative te Min Formati	edits Pract EMT 20 EHS302 ests, As ve Asso	icals D2, EHS201 2, EPS301 asignments, essment Ma	Tutorial & EHS202 Summative wr ark for exam ad % Formati % Summa	itten exa mission ve Asse	amination (%) ss Mark ess Mark	CES	M Code It Learning 40 60 40
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods Assessment Weighting	SAQA Cre Classes EMT 201 & EHS301 & E Formative te Min Formati Final Mark Min Final mark	Pract EMT 20 EMT 20 EHS302 ests, As ve Asso ve Asso = ark to p	D2, EHS201 2, EPS301 3 signments, essment Ma	Tutorial & EHS202 Summative wr ark for exam ad % Formati % Summa (%)	itten exa mission ve Asse	amination (%) ess Mark ess Mark	CES Independer	M Code at Learning 40 60 40 50
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods Assessment Weighting	SAQA Cre Classes EMT 201 & EHS301 & E Formative te Min Formati Final Mark Min Final ma	EMT 20 EMT 20 EMT 20 EHS302 EH	icals icals D2, EHS201 2, EPS301 ssignments, essment Ma pass to pass Paper 1	Tutorial & EHS202 Summative wr ark for exam ad % Formati % Summa (%) Paper 2	itten exa mission ve Asse	amination (%) ss Mark ess Mark	CES Independer	M Code at Learning 40 60 40 50
Module information Periods per week Pre-requisite module(s) Co-requisite module(s) Assessment Methods Assessment Weighting Summative assessment	SAQA Cree Classes EMT 201 & EHS301 & E Formative te Min Formati Final Mark Min Final ma Theory/Prac	EMT 20 EMT 20 EMT 20 EHS302 ests, As ve Asso = ark to p	icals icals D2, EHS201 2, EPS301 isignments, essment Ma pass to pass Paper 1	Tutorial & EHS202 Summative wr ark for exam ad % Formati % Summa (%) Paper 2	itten exa mission ve Asse tive Ass	amination (%) ss Mark ess Mark	CES	M Code It Learning 40 60 40 50
Module informationPeriods per weekPre-requisite module(s)Co-requisite module(s)Assessment MethodsAssessment WeightingSummative assessment Paper:	SAQA Cre Classes EMT 201 & EHS301 & E Formative te Min Formati Final Mark Min Final mar Theory/Prac Duration	EMT 20 EMT 20 EMT 20 EHS302 ests, As ve Asse = ark to p	icals 2, EHS201 2, EPS301 asignments, essment Ma pass to pass Paper 1	Tutorial & EHS202 Summative wr ark for exam ad % Formati % Summa (%) Paper 2	itten exa mission ve Asse tive Ass	amination (%) ss Mark ess Mark	CES	M Code at Learning 40 60 40 50

ENVIRONMENTAL MANAGEMENT & TOXICOLOGY - BSCG01

CURRICULUM INFORMATION									
Department: Biology & Environmental Sciences School: Science & T									
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:	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-aqeous titrations, indicators. Colorimetric: Spectrophotometric reagents, elementary visible Spectrophotometry: spectrophotometric titrations.						
Learning Outcomes:	 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 (3 rd Order (Six Numbers)		
	20		2			140503	
Delivery Information:	Campus		Full/Part Time		Yea	Period r/1 st /2 nd Semester	
	SM	IU	Full		2/1 ^{s⊤} Sem		
Periods per week	Classes	Practicals	Tutorial	Seminar	s	Independent Learning	
	5	3 hours	1			40 hours	
Pre-requisite modules for this module:	MZOO011& MZO0 MMTH012	2012, MCHM0118	MCHM012,MPHS	5011& MPHS	6012,I	MMTH011&	
Co-requisites modules for module:	EMT202,EHS201,	MICB201 & MICB	202				
Assessment	 Formative assessment: Theoretical and Practical testing at end of Module with feedback. Draft Portfolio of Environmental Science Theory and Practice assessed mid- Summative assessment: Final Portfolio of Environmental Science Theory and Practice assessed at end of program 				sessed mid-year. nd of programme.		
Assessment criteria (see Annex 1 for assessment criteria grid)	Specific education	al outcome 1:					

		 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. Specific educational outcome 2: Identify various instruments used for environmental sampling and analysis. Ability to operate and use spectrophotometers for environmental samples. 					
Assessm	ent methods	 Formative assessment: 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. Summative assessment: Test, Quiz and Practicals 					
	Minimum Form Assessment Mark for exam admission (%)	40%					
Mark	% Formative Assessment Mark	60%					
Structure:	% Summative Assessment Mark	40%					
	Minimum final mark to pass (%)	50%					
		Paper 1	Paper 2	Paper 3	Paper 4		
0	Theory/Practical	Theory	Theory	N/A	N/A		
Assessme	ent Duration	3hrs	3hrs	N/A	N/A		
Paper:	% contribution to Summative Assessment Mark	100%	100%	N/A	N/A		
	Sub minimum	40%	40%	N/A	N/A		

CURRICULUM INFORMATION								
Department:	Biolo	gy & Environmental Sc	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	Outco	omes:	 Define and understand environmental management and planning. Identify some elements of environmental management and principles. Describe the role and functions of Environmental Managers. 					
Module In	form	ation	SAQA Credits		ITS Course Level		CESM Code (3 rd Order) (Six Numbers)	
		20)	2		140503		
Delivery lefermetion			Cam	ipus	Full/Part	Time	Period Year/1 st /2 nd Semester	
Delivery mormation.		SM	1U	Contact/Fi	ull Time	2/2 nd Sem		
Pariads par weak			Classes	Practicals	Tutorial	Seminar	s Independent Learning	
- 00000 p	<u> </u>		5	3 hours	1		40 hours	
Pre-requis	site m	nodules for this module:	MZOO011, MZOC MPHS012,MMT	012, MCHM011, N H011&MMTH012	MCHM012 ,MPHS 2	011&		
Co-requis	ites r	nodules for module:	EMT 202					
Assessment			 Formative assessment: Theoretical and Practical Assessment. Draft Portfolio of Environmental Health Theory and Practice assessed mid-year. Summative assessment: Final Portfolio of Environmental Health Theory and Practice assessed at end of programme. 					
Assessment criteria (see Annex 1 for assessment criteria grid)			 Specific educational outcome 1: Appreciate the need for Environmental Management in South Africa. Specific educational outcome: Explain how vaccines are distributed Integrate the role of International Institutions and Non-Governmental Organizations. 					
Assessment methods			 Formative assessment: 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. Summative assessment: Test. Quiz and Practicals 					
	Min for	imum Form Assessment Mark exam admission (%)	40%					
Mark		% Formative Assessment Mark	60%					
Structure:		% Summative Assessment Mark	40%					
Minimum final mark to pass (%)			50%					
			Paper 1	F	Paper 2	Paper 3	Paper 4	
0 "		Theory/Practical	Theory/Pract	ical	N/A	N/A	N/A	
Assessme	/e ent	Duration	3hrs		N/A	N/A	N/A	
Paper:		% contribution to Summative Assessment Mark	100%		N/A	N/A	N/A	
		Sub minimum	40%		N/A	N/A	N/A	

CURRICULUM INFORMATION								
Department:	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 Environme	ntal Health S	cience			
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	 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 						
Module information	SAQA Credits	ITS Cou	urse Level Co	ode	CESM Code		
Poriodo por wook	Classes Pra	cticals	Futorial	Seminar	rs Independent Learning		
Pre-requisite module(s)	MZOO011, MZOO	012, MCHM011,	MCHM012,M	PHS011&	MPHS012,MMTH011&MMTH012		
Co-requisite module(s)	EMIT202, EHS20	1,MICB201,MI	CB2UZ	itten even	inction		
Assessment Methods	Formative tests,	Assignments, a	Summative wi				
Assessment Weighting	Final Mark =	% Formati % Summa	ve Assess tive Asses	40 6 Mark 60 ss Mark 40 50 50			
		Paper 1	Paper 2				
Summative assessment	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	EHS 202							
Module name	Food borne D	iseases and	Human I	Parasitic Dise	eases			
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	 Describe for 	od borne dise	ases					
	Understand	the epidemic	logy of fo	od borne dise	ases.			
	 Identify pat 	nogens causir	ng food bo	rne diseases.				
	Expolain va	rious ways of	managing	g food borne d	iseases.			
	 Describe methods that can be used to prevent food borne diseases. 							
	 Identify some common parasites in South Africa. 							
	 Understand 	the importan	ce of man	aging the para	asites.			
	SAQA Credit	s ITS (Course L	evel Code		CES	SM Code	
Module information								
Periods per week	Classes F	racticals	Tutorial	Sem	nars	Independe	nt Learning	
Pre-requisite	MZOO011, MZC	O012, MCHM0	11, MCHM	012 ,MPHS01	1& MPHS01	2,MMTH011	&MMTH012	
module(s)								
Co-requisite								
module(s)								
Assessment Methods	Formative tests	s, Assignment	s, Summa	tive written ex	amination		-	
	Min Formative	Assessment N	Mark for e	kam admissio	า (%)		40	
Assessment			% F	Formative Ass	ess Mark		60	
Weighting	Final Mark =		<u>%</u>	Summative As	sess Mark		40	
	Min Final mark	to pass to pa	<u>ss (%)</u>				50	
	Theony/Dreatie	Paper 1	Ра	per 2				
Summative	Duration	וג						
assessment	Sub minimum							
Paper:		Sub minimum						
CURRICULUM INFORMATION								
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Department:	Department: Biology & Environmental Sciences School: Science & Technology							
Last Revision date: 2019 First (New			First Year Offered (New):	2020				
Replace this I	/lodule e	existing module(s)?	No	If YES, give the mod codes:				

Module code	MICB201								
Module name	Introductio	n to N	Aicrobiolo	gy					
	History and	l deve	elopment o	of microbiolog	y. Key	concepts in micro	biology. Classification and		
	characterizat	tion of	the differen	t types of micro	organisr	ns. Comparison of pro	karyotic and eukaryotic cells.		
	Nutritional and requirement and microbiological media, cultivation and growth of microorganisms.								
Module Content	Physical organization of bacteria, bacterial chromosomes, cytoplasm, cell wall and membrane								
	components	. Bacte	erial toxins a	and Methods fo	r identifi	cation of bacteria			
	 Understa 	 Understand the history and development of microbiology 							
	 Discuss I 	 Discuss key concepts in microbiology 							
	 Classify a 	and ch	aracterize o	different types o	of microo	rganisms			
	 Differenti 	ate be	tween prok	aryotic and eul	aryotic c	ells			
Learning Outcomes	 Describe 	the nu	utritional re	quirements of I	oacteria				
	 Discuss t 	the nat	ure and use	es of different t	ypes of b	acteria growth media			
	 Describe 	the p	hysical org	anization of ba	acteria, t	pacterial chromosome	s, cytoplasm, cell wall and		
	bacterial	compo	onents						
	Understa	ind and	d describe o	different metho	ds for ide	entification of bacteria.			
	SAQA Cre	dits	ITS Co	ourse Level C	ode	CE	SM Code		
Module information									
Devie de versus els	Classes	Prac	ticals	Tutorial	Semin	ars Independ	ent Learning		
Periods per week									
Pre-requisite	MZOO011, M	ZOO01	2, MCHM01	1, MCHM012 ,M	PHS011	& MPHS012,MMTH01	1&MMTH012		
module(s)									
Co-requisite									
module(s)									
Assessment Methods	Formative te	sts, As	signments,	Summative wi	itten exa	imination			
	Min Formativ	/e Ass	essment Ma	ark for exam ac	Imission	(%)	40		
Assessment				% Format	ive Asse	ss Mark	60		
Weighting	Final Mark	=		% Summa	tive Ass	ess Mark	40		
	Min Final ma	ark to p	ass to pass	s (%)			50		
			Paper 1	Paper 2					
Summative	Theory/Pract	tical							
assessment	Duration								
Paper:	Sub minimu	m							

CURRICULUM INFORMATION								
Department:	Biolo	gy & Environmental So	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	Environme	ntal ar	nd Fungal N	licrobiology			
	Zoosporic fu	ungi. T	he Deutero	mycotina, Yea	ast. Fung	i as saprotropots. Fu	ingi and humans. Microbial
	populations	in air,	water and	soil. The effec	ts of abi	otic factors on micro	organisms. Measurement of
	bacterial numbers, biomass and activities in microbial ecosystems. The roles of microorganisms in						
	carbon, oxy	gen, ni	trogen, sulp	hur and phosp	horus cy	cles. Ecological aspec	cts of biodegration of waste.
Module Content	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						
	 Understa 	and and	d describe th	ne classificatio	n of fungi		
	 Describe 	the ef	fects of abic	tic factors on r	nicroorga	anisms	
	 Measure 	bacte	rial numbers	in air, biomas	s and ec	osystems	
	 Describe 	the ro	les of micro	organisms in c	arbon, o	kygen, nitrogen, sulphi	ur and phosphorus cycles
Learning Outcomes	 Understa 	and and	d describe e	cological aspe	cts of bio	degradation	
	 Understa 	and and	d describe th	ne role of micro	oorganisr	ns in water pollution a	nd treatment.
	 Understa 	and and	d describe w	ater quality te	sting and	purification trchnology	/.
	SAQA Cre	dits	ITS Co	urse Level C	ode	CE	SM Code
Module information							
Periods per week	Classes	Pract	icals	Tutorial	Semin	ars Independe	ent Learning
	11700044	70004	0.1401114044	NOUNDIO N			
Pre-requisite	MZOO011, M	20001	2, MCHM011	, MCHM012 ,M	PHS0118	& MPHS012,MMTH01	1&MM1H012
module(s)							
Co-requisite							
module(s)							
Assessment Methods	Formative te	ests, As	ssignments,	Summative wr	itten exa	mination	
	Min Formativ	ve Ass	essment Ma	rk for exam ac	mission	(%)	40
Assessment	E' I M I			% Format	ive Asses	ss Mark	60
Weighting	Final Mark	=		% Summa	ative Asse	ess Mark	40
	Min Final ma	ark to p	ass to pass	(%)			50
	TI (D.	P 1	Paper 1	Paper 2			
Summative	neory/Prac	ucal					
assessment	Duration						
Paper:	Sub minimu	11					

CURRICULUM INFORMATION								
Department:	Biol	ogy & Environmental S	School:	Science and Technology				
Last Revision date: 2019				First Year Offered (New):	2020			
Replace this Mo	odule	existing module(s)?	No	If YES, give the mo codes:	odule			

Module code	EMT 301							
Module Name	Environmental	Toxicology						
Content:	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.							
Learning Outcomes:	 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 (3 rd Order) (Six Numbers)			
	30		3		130906			
Delivery Information:	Campus		Full/Part 1	Гime	Period Year/1 st /2 nd Semester			
	SM	IU	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	2						
Co-requisites modules for module:	No							
Assessment	Formative assess Theoretical a Draft Portfolio Summative assess Test, Quiz and Pra	ment: nd Practical Ass o of Environmer ssment: acticals.	sessment tal ScienceTheory	v and Practice	assessed mid-year.			
Assessment criteria (see Annex 1 for assessment criteria grid)	 Specific educational outcome 1: Explain how hazardous substance enters into water, soil and plants List different methods of hazardous disposal Specific educational outcome 2: Understand and describe the effect of metals in the environment Describe the adverse effects of metals in humans, plants and animals. 							
Assessment methods	Formative assess Summative asses	sment: Theoretic ssment: Test, Pr	al and Practical Ex acticals and Quiz	am-				
	Formative assessment: Theoretical and Practical Exam- Summative assessment: Test, Practicals and Quiz							

	% Formative Assessment Mark % Summative Assessment Mark	60% 40%					
Min	imum 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	Duration	3hrs	N/A	N/A	N/A		
Paper:	% contribution to Summative Assessment Mark	100%	N/A	N/A	N/A		
	Sub minimum	40%	N/A	N/A	N/A		

CURRICULUM INFORMATION								
Department:	Bio	logy & Environmental \$	School:	Science and Technology				
Last Revision date: 2019			First Year Offered (New):	2020				
Replace this M	odule	existing module(s)?	No	If YES, give the r codes:	nodule			

Module code	EMT 302						
Module Name	Pollution Monito	oring 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:	 Identify and classify different waste management techniques. List different factors affecting air pollution. Understand different methods of monitoring air pollution. 						
Module Information:	SAQA C	redits	edits ITS Course		CESM (S	l Code (3rd Order }ix Numbers)	
	30 3		14		140503		
Delivery Information:	Campus		Full/Part Time		Period Year/1st/2nd Semester		
	SMU		Full			Year	
Periods per week:	Classes	Practicals	Tutorial	Seminar	s	Independent Learning	
	5	3hours	1			30 hours	
Pre-requisite modules for this module:	EMT 201 AND EM	IT 202					
Co-requisites modules for module:	No						
Assessment	Formative assessment: 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 education Identify Specific education	al outcome 1: y different metho al outcome 2:	ds for treating wa	ste water			

			 Understand bioremed 	liation techniques use	d for soil.				
			 List different methods 	s for noise control and	techniques.				
Assessment methods Formative assessment: • Theoretical and Practical Assessment • For the practicals students visit a company and understand various involve in monitoring pollutants. Students are expected to submit a report Summative assessment: Report on visit to Industrial Companies, Practical, Test and Quiz.					various processes it a report.				
	Minim for exa	um Form Assessment Mark am admission (%)	40%						
Mark		% Formative Assessment Mark	60%						
Structure:		% Summative Assessment Mark		40%					
	Minim	um final mark to pass (%)		50%					
			Paper 1	Paper 2	Paper 3	Paper 4			
	ſ	Theory/Practical	Theory/Practical	N/A	N/A	N/A			
Summati Assessm	ive nent	Duration	3hrs	N/A	N/A	N/A			
Paper:		% 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 Mo	odule e	xisting module(s)?	No	If YES, give the r codes:	nodule			

Module code	EMT 303						
Module Name	Natural Resources Managemen	t					
Content:	Natural resources types and ori use of resources and concept of Survey of resources within the ec resources, Forest resources, etc minerals, etc. Community resour utilization, administration and Resource economics and mana nature and conservation of sp studies concerned with conco management. Development of resources and ecosystem subject and potentials of South African Approaches to resources m sustainability. Waste minimizatio processing and value-adding.	gin, environment, resource an sustainable development. Cla cological regions of South Africa cological regio	d development; rational ssification of resources, a (Earth Minerals, Water zing, lands, soils, foods, nd pressure on resource urces in South Africa. ervation – Protection of iltural landscape. Case to natural resources t principles of natural rocesses Current uses resources of the Earth, urces utilization and chniques for resources				
Learning Outcomes:	 Identify different natural reso Describe different ways of ma 	urces in South Africa. anaging natural resources.					
	urces.						
Module Information:	SAQA Credits	SAQA Credits ITS Course Level CESM Code (3rd O (Six Numbers					

			30			3	131207		
Deliverv	Delivery Information:		Campus		Full/Pa	Full/Part Time		Period Year/1 st /2 nd Semester	
Denvery			SM	IU	Full Tutorial Seminars			Year	
Periods per week:			Classes	Practical's	Tutorial	Seminars Inde		Independent Learning	
		-	5	3 hours	1			40 hours	
Pre-requ	iisite m	odules for this module:	EMT 201 and EMT	202					
Co-requi	isites n	nodules for module:	No						
Assessn	nent		Formative assess Theoretical a Summative assess Final Portfolio of E	sment: nd Practical As ssment: nvironmental Sci	sessment. ence Theory and	Practice assesse	d at e	nd of programme.	
Assessn assessme	nent c ent crite	r iteria: (see Annex 1 for eria grid)	 Specific educational outcome 1: Describe different ways of conserving natural resources Specific educational outcome 2: Understand current use and potential use of natural resources. Understand the techniques involved in resource processing and utilization. 						
Assessment methods			 Formative assessment: Theoretical and Practical Assessment. For the practicals students attend visit a natural game reserve and understand various management practices. Summative assessment: 						
	Minin for ex	num Form Assessment Mark	40%						
Mark		% Formative Assessment Mark			60%				
Structure:		% Summative Assessment Mark			40%				
	Minin	num final mark to pass (%)			50%				
			Paper 1		Paper 2	Paper 3		Paper 4	
		Theory/Practical	Theory/Pract	ical	N/A	N/A		N/A	
Summat	ive	Duration	3hrs		N/A	N/A		N/A	
Paper:	nent	% contribution to Summative Assessment Mark	100%		N/A	N/A		N/A	
		Sub minimum	40%		N/A	N/A		N/A	

CURRICULUM INFORMATION								
Department	Department: Biology & Environmental Sciences					School:	Science and Technology	
Last Revisi	on date:	2019		First Y Offere	First Year 2020			
Replace thi	s Module e	xisting module(s)?	No	No If YES, give the module codes:				
Module co	de		EMT 304		•	1		
Module Na	me		Environmental Ed	ducation				
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 Or	utcomes:		 Describe bas Understand a Analyse some 	ic environmen Ind describe th e socio politica	tal manageme le steps involv Il factors invol	ent principles res in EIA. ve in environ	s. Imental management.	
Module Info	ormation:		SAQA Cr	edits	ITS Co	ourse Level	CESM Code (3 rd Order) (Six Numbers)	
			30			3	131205	
Delivery Inf	ormation:		Campus		Full/Part Time		Period Year/1 st /2 nd Semester	
			SMU		Full		Year	
Pariods par weak:							Independent	
Periods per	week:		Classes	Practical's	Tutorial	Semin	Learning	
Periods per	week:		Classes 5	Practical's 3 hours	Tutorial	Semin	Interpretation Learning 30 hours	
Periods per Pre-requisit	r week: te modules	for this module:	Classes 5 EMT 201 and 202	Practical's 3 hours	Tutorial 1	Semin	30 hours	
Periods per Pre-requisit Co-requisit	r week: te modules es modules	for this module:	Classes 5 EMT 201 and 202 No	Practical's 3 hours	Tutorial 1	Semin	30 hours	
Periods per Pre-requisit Co-requisit Assessmen	r week: te modules es modules it	for this module:	Classes 5 EMT 201 and 202 No Formative assess Practical and Draft Portfolio Summative assess Final Portfolio of En	Practical's 3 hours ment: Theoretical As of Environme sment: hvironmental Sc	Tutorial 1 ssessment ental Science ience Theory a	Theory and F	Practice assessed mid-year.	
Periods per Pre-requisit Co-requisit Assessmen assessment	r week: te modules es modules it it criteria grid)	for this module: for module: (see Annex 1 for	Classes 5 EMT 201 and 202 No Formative assess Practical and Draft Portfolio Summative assess Final Portfolio of En Specific educe Understand de Understand th Specific educe Explain variou	Practical's 3 hours ment: Theoretical As o of Environmental Sc ational outcon lifferent concep ne need for en ational outcon us methods of	Tutorial 1 ssessment ental Science ience Theory a ne 1: ots in environr vironmental s ne 2: environmenta	Theory and F nd Practice as nental legisla ustainability.	Practice assessed mid-year. ssessed at end of programme. ation.	
Periods per Pre-requisit Co-requisit Assessmen assessment Assessment	r week: te modules es modules it rt criteria grid) it methods	for this module:	Classes 5 EMT 201 and 202 No Formative assess Practical and Draft Portfolio Summative assess Final Portfolio of En Specific educe Understand de Understand the Specific educe Explain various Formative assess Theoretical an For the practical an For the practical and For the practical and Summative assess	Practical's 3 hours 3 hours ment: Theoretical As o of Environmet sment: nvironmental Sc ational outcon lifferent concer he need for en ational outcon us methods of ment: nd Practical As cals students a onmental mana rds environme ssessment:	Tutorial 1 assessment ental Science ience Theory a ience Theory a	Semin Theory and F nd Practice as mental legisla ustainability. I administrat t a nearby co ent will subm nent	Practice assessed mid-year. ation. tion in South Africa. procession is such a second by the secon	
Periods per Pre-requisit Co-requisit Assessmen assessment Assessment	te modules es modules es modules nt criteria grid) nt methods	for this module: for module: (see Annex 1 for) ; ; ; ; ; ; ; ; ; ; ; ; ;	Classes 5 EMT 201 and 202 No Formative assess Practical and Draft Portfolio Summative assess Final Portfolio of En Specific educ Understand d Understand d Understand th Specific educ Explain variou Formative assess Theoretical an For the practi around enviro feelings towa Summative a	Practical's 3 hours 3 hours ment: Theoretical As o of Environme sment: nvironmental Sc ational outcon lifferent concer ne need for en ational outcon us methods of ment: nd Practical As cals students onmental mana rds environme ssessment:	Tutorial 1 ssessment ental Science ience Theory a ne 1: ots in environr vironmental s ne 2: environmental ssessment. attend will visi agement. Stud ntal managen 40%	Semin Theory and F nd Practice as mental legisla ustainability. Il administrat t a nearby co ent will subm nent	Practice assessed mid-year. essessed at end of programme. ation. tion in South Africa.	

	Minimu	% Summative Assessment Mark m final mark to pass (%)	40% 50%				
			Paper 1	Paper 2	Paper 3	Paper 4	
.	Th	neory/Practical	Theory/Practical	N/A	N/A	N/A	
Assessmen	nt Du	uration	3hrs	N/A	N/A	N/A	
Paper:	% As	contribution to Summative ssessment Mark	100%	N/A	N/A	N/A	
	Su	ub minimum	40%	N/A	N/A	N/A	

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 modul	l e(s)? Yes	If YES, give the module codes:	FCH010M			

Module Code:	МСНМ000					
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.					
Learning Outcomes::	 At the end of this course students should: 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 basic concepts about chemical equilibrium and to implement the equilibrium law and have an understanding of the importance of K 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 					

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::	At the end of this cours Know the concep Know the importa Know chemical sy Have a clear idea Have a basic pict extract the inform Know how to use Understand the b Know the energy reactions occurrir Have a clear idea Understand the b and temperature r Understand the ir Know the worth o know the factors t Have sound know balance these rea Know the differen Be able to calcula Understand the c Understand the c Know the different Be able to calcula Understand the c Know how equilib laboratories Know the basic con equation Understand cell p	to f significa ince of accur ymbols, form a of the atom ure of the la ation summa a balanced asic concep changes invi- ag under cor of Hess's la asic properti relationships nportance of f reaction ra that influence vledge concep actions t expression ate how the a oncept of rea asic concep original function as a concept or a conc	should: nt figures racy in re- nulae and nic structury yout of the equations t of kinet volved dur nstantpre- aw and he ies of gas be f Gibbs fri- tes e the rate erning all as for the addition co- action rev- ts about of f the impo- ce the ph- cerning e d be able	and the use thereof cording measuremen equations ure of atoms he periodic table and erein s in stoichiometric cal ic and potential energ uring chemical reaction ssure eats of formation sses, the kinetic theor e able to use Dalton's ee energy and its rela- e of chemical reaction concepts about acid concentration of solu of a solute will influence versibility chemical equilibrium fortance of K d of aqueous solution electrochemistry and l	in chemi its be able lculation gy ons and l ry of gas s law of p ation to t is ls and ba tions ce the cc and to in s and ho how elec	to use the pe s be able to cal ses as well as partial pressu he spontaneit ases. They wi plligative prop nplement the pw this knowle ctricity is relate a calculations	ns riodic table and to culate heat of s pressure, volume re ty of reactions ill have the skills to erties of solutions equilibrium law edge is used in ed to chemical
	SAQA Credits		ITS C	ourse Level Code		CESM Code	(3 rd Order)
Module Information:	24			3		1:	30101
Periods per Week:	Classes	Practical	ls 1	Futorial	Semi	inars	Independent Learning
	4 x 45 min	1 x 3 hrs	6 2	2 x 1 hrs		0	1.25 hrs
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Methods:	Combination of class te assessments, practical	ests/quizzes reports and	, summa I summat	tive theory assessme ive theory assessme	ents, sho nt at the	rt summative end of the m	practical odule
	Min Summative Assess	sment mark	for exam	admission (%)			40
Assessment Weighting	Final Mark =			% Summative Asse	essment	Mark	60
roocooment weighting.				% Summative Asse	essment	Mark	40
	Min Final Assessment mark to pass (%) 50					50	

		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment	Theory / Practical	Theory			
Paper:	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:	 After completion of this module, students should: 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 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 						

Learning Outcomes:	 Relate molecular various function properties of org Draw conformat meaning of the transmission of transm	rr structure to al groups. De ganic compour ional isomers erms eclipsed of cyclohexane ing of the term mechanisms entify in moled s bases as rea sed where ne quations and s d dehydration oduct when m is and water to ting appropria lectivity of hyd n of a mixture dity of acetyle ons suitable for nple organic c aracteristics the echanisms fo cyanohydrin, n of an aldehy conditions. Sh	physical scribe hy- nds using sa d, stagge and dis as angle, and expl cules: m action sit cessary specific e reaction ore than o unsymi- te chem dration. § of the tw ene and to or conver- ompoun nat influe r nucleo hemiace de or a k now how	properties of alkane ydrogen bonding an awhorse diagrams a tred, anti and gauche tinguish between ay torsional and van d ain what is meant b ultiple bonds, polar l es in organic molecu examples of dehydro s to form alkenes, a one is possible. Pre metrical alkenes and ical equations, how Show how to conver vo terminal alkynes with ting these alkynes t ds starting from ace ence reactivity of the philic addition. Write tal and acetal from a ketone, and write me aldehydes and keto	is and oth d predict i nd Newm e conform dial and ed er Waals y homolyt bonds, ele ules. Know phalogena nd the us edict the p l alkynes to convert t an alkyn n other hy o their con tylene and e carbonyl e reaction aldehydes echanisms nes can b	er organic con its effect on the an projections ations. Draw tl quatorial positi strain ic and heteroly ectrophiles, nu w how to write ation reactions e of Zaitseff's i products of the by applying Ma t alkynes to alc e to either a c drocarbons, a rresponding ca d another simp group and illu equations and s and ketones. s for the proce pe prepared by	npounds with e physical b. Know the he boat and chair ons in the chair. ytic bond cleavage. cleophiles, Lewis mechanisms for all to form alkenes rule to predict the addition of arkovnikov's rule dehydes or ketones <i>is</i> or <i>trans</i> alkene arbanions. Design le organic reagent istrate the general I mechanisms for Write an equation ss under acid- and oxidation of
Module Information:	SAQA Credits		ITS Cou	urse Level Code		CESM Code	(3 rd Order)
	24		03			140401	
Periods per Week:	Classes	Practicals		Tutorial	Semina	ars	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%): Te examination	ests, Practical	s, Tutori	als and/or Assignme	ents. Sum	mative (40%):	1 x 3 hrs written
	Min Summative Asse	ssment mark	for exan	n admission (%)			40
A a a a a mant Mainhtin ni	Final Mark -			% Summative Asse	ssment N	lark	60
Assessment weighting:				% Summative Asse	ssment N	lark	40
	Min Final Assessmer	nt mark to pas	s (%)				50
		Paper 1		Paper 2	Paper 3	3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

CURRICULUM INFORMATION						
Department: Chemistry & Chemical Technology School: Science & Technology						
Last Revision date:	2 011		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 1	A					
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						
	Students should						
Learning Outcomes:	 Students should 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 ofatoms 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 constantpressure 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 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 						
	SAQA Credits			rse Level Code			ada (2rd Ordar)
Module Information:	12			3			1040 (3 Order)
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	1					l
Co-requisite module/s:	MMTH011 and MMTH	H012					
Assessment Methods:	Summative (60%): Te examination	ests, Practicals	, Tutorial	s and/or Assignment	s. Summative	(40%): 1 :	< 3 hrs written
	Min Summative Asse	ssment mark fo	or exam a	dmission (%)			40
Appapament Mainhting	Einal Mark	=		% Summative A	Assessment Ma	ark	60
Assessment weighting:		_		% Summative A	Assessment Ma	ark	40
	Min Final Assessmen	t mark to pass	(%)				50
		Paper 1		Paper 2	Paper 3		Paper 4

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

CURRICULUM INFORMATION					
Department: Chemistry & Chemical Technology School: Science & Technology					
Last Revision date	2 011	First Year Offered (New):	2013		
Replace this Modu	le 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:	 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 different intermolecular attractions found in liquids and how these attractions influence the physical properties of 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 with various functional groups. Describe hydrogen bonding and predict its effect on the physical properties of organic compounds with various functional groups. Lescribe hydrogen bonding and predict its effect on the physical properties of organic compounds with various functional groups. Attaget, 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 eclipsed, staggered, anti and gauche conformations. Draw the boat and chair conformations of cyclohexane and distinguish between axial and equator

Learning Outcomes:	 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 alephale. 						
Madula Informations	SAQA Credits		ITS Cou	Irse Level Code		CESM Code	(3rd Order)
module information:	12		3		140401)1
Periods per Week:	Classes	Practicals		Tutorial	Semina	ars	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	2					
Assessment Methods:	Summative (60%): Te examination.	ests, Practical	ls, Tutoria	als and/or Assignme	ents. Sum	mative (40%)	: 1 × 3 hrs written
	Min Summative Assessment mark for exam admission (%) 40						
Accomment Weighting	Final Mark =			% Summative Asses	ssment N	lark	60
Assessment weighting.				% Summative Assessment Mark			40
	Min Final Assessment mark to pass (%) 50						50
		Paper 1		Paper 2	Paper 3	3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%			1		

CURRICULUM INFORMATION							
Department:	Department: Chemistry & Chemical Technology School: Science & Technology						
Last Revision date:	2 011	First Year Offered (New):	2013				
Replace this Module existing module(s)? Yes If YES, give the module codes: CHM							

Module Code:	MCHA021						
Module Name:	Organic Chemistry 2						
Module Content:	Stereochemistry; Conjuga acids and their derivatives	ition and Arom s; Amines: Pre	aticity; Substitution re paration and their rea	eactions of A ctions. Epo>	romatic comp (ides:	oounds; Carboxylic	
Learning Outcomes	 After completion of this module, students should be able to: Define chiral carbons and identify them in molecules Define anatiomers and racemic mixtures and recognize compounds with two chiral carbons Assign <i>R</i> and <i>S</i> configurations to stereoisomers an 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-Craft 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 acylation of activating ortho, para-directing groups Explain why the halogens are deactivating ortho, para-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 of these salts, and the synthetic utility in conjuction with electrophilic aromatics substitution reactions (habogenation for aromatic diazonium salts). the replacement reactions of these salts, and the synthetic utility in conjuction with electrophilic aromatics showing the preparation of aromatic diazonium salts. The replacement reactions of animes with acids to form ammonium salts Explain what is meant b						
Module Information:	SAQA Credits		ITS Course Level Co	ode	CESM Code	• (3 rd Order)	
	Classes	Practicals	Tutorial	Somir		Independent	
Periods per Week:	4 × 45 min	1 × 6 hrs	1 × 45 min	Semir	1015	Learning 6.1 hrs	
Pre-requisite module/s :	MCHM012	1. 0.40		1			
Co-requisites module/s :	N/A						

Assessment Methods:	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination.					
	Min Summative Assessr	ment mark for exa	m admission (%)		40	
Assessment Weighting:	Final Mark =		% Summativ	ve Assessment Mark	60	
			% Summativ	40		
	Min Final Assessment m	nark to pass (%)			50	
		Paper 1	Paper 2	Paper 3	Paper 4	
Summative Assessment	Theory/Practical	Theory				
Paper:	Duration	3 hrs				
	Sub minimum	40%				

CURRICULUM INFORMATION					
Department: Chemistry & Chemical Technology School: Science & Technology					
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Module	existing module(s)? Y	′es	If YES, give the module codes:	CHM201M	

Module Code:	MCHB021						
Module Name:	Inorganic Chemistry 2						
Module Content:	Atomic structure; Genera Introduction to Coordinati	al Bonding; Ma on Chemistry o	in Group chemistry: s- & of Transition Metals; Inorgar	o-block ele nic solids	ements; Acids and bases;		
Learning Outcomes:	 After completing this module, students should be able to: 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 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	CE	SM Code (3 rd 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, examination.	Practicals, Tu	torials and/or Assignments.	Summativ	e (40%): 1 × 3 hrs written		
	Min Summative Assessm	ent mark for ex	cam admission (%)		40		
Assessment Weighting:	Final Mark =		% Summative Assessment Mark 60				
Assessment Weighting.			% Summative As	% Summative Assessment Mark 40			
	Min Final Assessment ma	ark to pass (%) 50					
		Paper 1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory					
Paper:	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 Ana Application of statist chemistry (including neutralization titration Introduction to electro	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 titrimentry; Complexometric titrations; Oxidation-reduction titrimetry. Introduction to electrochemistry: Potentiometry					
Learning Outcomes:	 After completion of the module, students should be able to: 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 tirrimetry 						
Module Information:	SAQA Credits ITS		ITS Cou	irse Level Code	CESM Code (3 rd Order)		
	10	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.						
	Min Summative Assessment mark for exam admission (%) 40						
Accomment Weighting	Final Mark =			% Summative Asses	ssment Mark	60	
Assessment weighting.				% Summative Asses	40		
	Min Final Assessment mark to pass (%) 50				50		
		Paper 1		Paper 2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Theory					
Paper:	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 thermodynar equilibria. Physical prope diagrams. Properties of	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 govern the physical and colloids and surface film:	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					
Modulo Information:	SAQA Credits		ITS Course	Level Code		CESM Co	ode (3 rd Order)
	10		T	3		14	0405
Periods per Week:	Classes	Practica	ils	Tutorial	Sem	inars	Independent Learning
	4 × 45 min	1 × 6 hrs	3	1 × 45 min		N/A	6.1 hrs
Pre-requisite module/s :	MCHM011 & MMTH011		<u> </u>				
Co-requisites module/s:	None						
Assessment Methods:	Summative (60%): Tests examination	s, Practicals	, Tutorials ar	nd/or Assignment	ts. Sum	mative (40	%): 1 × 3 hrs written
	Min Summative Assessment mark for exam admission (%) 40						
Accessment Weighting	Einal Mark -			% Summative Assessment Mark 60			60
Assessment weighting:				% Summative Assessment Mark 40			40
	Min Final Assessment mark to pass (%) 50						
		Paper 1		Paper 2	Рар	er 3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs	s				
	Sub minimum	40%	, 0				

CURRICULUM INFORMATION						
Department:	Department: Chemistry & Chemical Technology School: Science & Technology					
Last Revision date:	2 011		First Year Offered (New):	2013		
Replace this Modu	le existing module(s)?	Yes	If YES, give the module codes:			

Module Code:	MCHA031				
Module Name:	Physical Chemistry 3				
Module Content:	 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	Physical Chemistry 3					
Module Content:	 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), 						
Learning Outcomes:	Students should be a and separation meth	Students should be able to demonstrate knowledge of electro-analytical methods, spectrometric methods and separation methods					
Modulo Information:	SAQA Credits		ITS C	ourse Level Code		CESM Code	(3 rd Order)
	16	16		3		1404	405
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	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%): Te examination	ests, Practicals	, Tutor	ials and/or Assignm	ients. Sumr	mative (40%):	1 × 3 hrs written
	Min Summative Asse	essment mark for	or exar	m admission (%)			40
A	Final Mark -			% Summative Asse	essment Ma	ark	60
Assessment weighting:	Final Wark -			% Summative Assessment Mark			40
	Min Final Assessmer	nt mark to pass	(%)				50
		Paper 1		Paper 2	Paper	3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

CURRICULUM INFORMATION					
Department: Chemistry & Chemical Technology School: Science & Technology					
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Modul	e existing module(s)?	No	If YES, give the module codes:		

Module Code:	MCHB031					
Module Name:	Inorganic Chemistry 3	organic Chemistry 3				
Module Content:	 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). Organomentallic chemistry and Isolobal analogies. Orranometallic 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 lanthanides), isolobal analogy and organometallic chemistry (with application to homogeneous catalysis)					
Module Information:	SAQA Credits	ITS Course Level Code	CESM Code (3 rd 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	CHB021						
Co-requisite module/s:	None	one						
Assessment Methods:	Summative (60%): T examination	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination						
	Min Summative Asse		40					
A	Final Marks	_	% Summa	ative Assess Mark	60			
Assessment weighting:		Final Wark =		ative Assess Mark	40			
	Min Final Assessmen	50						
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
	Sub minimum	40						

CURRICULUM INFORMATION					
Department: Chemistry & Chemical Technology School: Science & Technology					
Last Revision date:	2 011		First Year Offered (Nev	v): 2013	
Replace this Module	e existing module(s)?	No	If YES, give the modul	e codes:	

Module Code:	MCHA032							
Module Name:	Analytical Chemis	Analytical Chemistry 3						
Module Content:	Electro-Analytical absorption spectr Chromatography techniques	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 t and separation m	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 Co					CESM Co	de (3 rd Order)	
	16			3		140	0402	
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning	
	4 × 45 min	1 × 6 hrs		1 × 45 min		'A	11.8 hrs	
Pre-requisite module/s :	MCHA022							
Co-requisites module/s :	None							
Assessment Methods:	Summative (60%) examination	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination						
	Min Summative A	ssessment mark	for exam a	dmission (%)			40	
A	Final Mar	l	% Summative Assessment Mark			/lark	60	
Assessment weighting:		K –	%	% Summative Assessment Mark			40	
	Min Final Assess	ment mark to pas	s (%)				50	

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

CURRICULUM INFORMATION					
Department:	Chemistry & Chemical	School: Science & Technology			
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Modul	e existing module(s)?	No	If YES, give the module codes:		

Module Code:	MCHB032						
Module Name:	Organic Chemistry 3	Organic Chemistry 3					
Module Content:	 Substitution and elimination reactions: SN1, SN2, E1, E2. Carbonyl chemistry: reactions at the α position (Aldol condensation and related reactions). Carboxylkic 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: Reactions and mechanisms of organicmolecules 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 Co	ourse Level Code		CESM Code	(3 rd Order)
	16			3			140404
Periods per Week:	Classes	Practicals		Tutorial	Semina	rs	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%): Te examination	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 hrs written examination					
	Min Summative Asse	Min Summative Assessment mark for exam admission (%) 40					
Accessment Weighting	Einal Mark -			% Summative Asses	sment Ma	ark	60
Assessment weighting:				% Summative Asses	sment Ma	ark	40
	Min Final Assessmer	t mark to pass	(%)				50
		Paper 1		Paper 2	Paper 3		Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

DEPARTMENT: COMPUTER SCIENCE & INFORMATION TECHNOLOGY

CURRICULUM INFORMATION					
Department:	Computer Science & Inf	ormation Technology	School: Science & Technology		
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Module	e existing module(s)?	No	If YES, give the module codes:		

Module Code:	MCSC000					
Module Name:	Introduction to Compu	uting concepts	and algor	ithms		
Module Content:	COMPUTING CONCEPTS: Basic concepts in ICT Concepts of operating systems and networks Data storage and binary number system Microsoft Office Software Applications ALGORITHMS Fundamental Algorithmic concepts and problem solving Concepts of Programming languages Basic Logic gates and Karnaugh maps FUNDAMENTALS OF C++ PROGRAMMING Introduction to Programming Program components in C++ Data types, Declarations, and Displays Assignment and Interactive input					
	Control Structure	res (if, if/else, w	/hile, do/w	hile, switch, for)		
Learning Outcomes:	 The learner at this level should be ableto: 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 solvingproblems 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 					
Module Information:	SAQA Credits		ITS Cou	rse Level Code	CESM Co	ode (3 rd 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					<u> </u>
Assessment Methods:	A module mark will be and tests. The theory The module mark is c practical mark. The fin the ratio 2:3	e obtained from and practical m alculated at 10 nal mark will be	continuo ark of 409 % of the c derived t	us assessment ba % is mandatory for quizzes, 30% of th from a three-hour	ased on quizzes, as r a student to qualif he tests and 20% o written examinatio	signments, practical work y for the final examination. f the n and the module mark in

Module Code:	MCSC000	MCSC000					
Module Name:	Introduction to Comp	ntroduction to Computing concepts and algorithms					
	Min Summative Asse	ssment mark for e	exam admission (%)		40		
A	Final Mark =		% Summative	Assessment Mark	60		
Assessment weighting:			% Summative	Assessment Mark	40		
	Min Final Assessment mark to pass (%)				50		
		Paper 1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

CURRICULUM INFORMATION					
Department: Computer Science & Information Technology School: Science & Technology					
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Module	e existing module(s)?	No	If YES, give the module codes:		

Module Code:	МСОВ000					
Module Name:	Introduction to data organization and artificial Intelligence (AI)					
Module Content:	DATA ORGANIZATION • 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 ARTIFICIAL INTELLIGENCE • Fundamentals of Artificial Neural Networks (ANN) • Expert Systems • Introduction to Theory of computations • Introduction to Web development PROCEDURAL AND OBJECT ORIENTED PROGRAMMING • 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:	After successful completion of the module, the student should be able to: • 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 webdesign • 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:	МСОВ000							
Module Name:	Introduction to data organization and artificial Intelligence (AI)							
Madala Informations	SAQA Credits		ITS Course	e Level Co	de	CESM Co	de (3 rd Order)	
	24			3		()60601	
Periods per Week:	Classes	Practicals	Tutor	rial	Sem	inars	Independent Learning	
·	4 x 45 min	2 x 45 min	2 x 4	5 min		0	4 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Methods:	and tests. The the The module mark final mark will be o the ratio 2:3.	is calculated at	mark of 40% i 10% of the qu ee-hour writte	s mandator uizzes, 30% en examina	ry for a stude 6 of the tests ition and the	nt to qualify and 20% module ma	of the practical work. The practical mark.The link in	
	Min Summative Assessment mark for exam admission (%) 40					40		
A	Einal Mar		%	% Summative Assessment Mark 60				
Assessment weighting:	Final Mark =		%	% Summative Assessment Mark			40	
	Min Final Assessn	nent mark to pas	s (%)				50	
		Paper 1	Pap	per 2	Paper	3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs	3					
	Sub minimum	40%)					

CURRICULUM INFORMATION					
Department:	Department: Computer Science & Information Technology School: Science & Technology				
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Modul	e existing module(s)?	No	If YES, give the module codes:	COSC101	

Module Code:	MCOA011	MCOA011				
Module Name:	Computing Concepts and Algorithms	Computing Concepts and Algorithms				
Module Content:	Fundamental concepts of computing systems and networks, fundamental logic gates and functions, karnaugh r	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:	 The learner at this level should be ab Demonstrate a thorough understa Demonstrate a thorough understa Understand algorithms and how t Develop logical constructs for sol Demonstrate problem solving cap Understand and use information Effectively use software productiv Understand the basics of a specir development 	 The learner at this level should be able to: 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 solvingproblems 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 (3 rd Order)			
	12	3	060601			

Module Code:	MCOA011							
Module Name:	Computing Concepts	Computing Concepts and Algorithms						
Periods per Week	Classes	Practicals	Tutorial	Seminars	Independent Learning			
	5	1.5	2	0	4			
Pre-requisite module/s:	None	None						
Co-requisite module/s:	MMTH011, MSTS01	MMTH011, MSTS011						
Assessment Methods:	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.							
			% Summative Asses	ssment Mark	60			
Assessment Weighting:	Final mark =		% Summative Asses	ssment Mark	40			
	Min Final Assessmer	nt mark to pass (%)			50			
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
	Sub minimum	40%						

CURRICULUM INFORMATION					
Department:	Computer Science & Inf	formation Technology	School: Science & Technology		
Last Revision date:	2 011		First Year Offered (New):	2013	
Replace this Modul	e existing module(s)?	No	If YES, give the module codes:		

Module Code:	MCOA012	MCOA012				
Module Name:	Data Organization and Artificial Inte	Data Organization and Artificial Intelligence				
Module Content:	 DATA ORGANIZATION Files and Data Structures; Introduction to Database concepts Advanced algorithm development Intermediate Object Oriented Programming using C++ compiler ARTIFICIAL INTELLIGENCE Fundamentals of Artificial Neural Networks (ANN) Expert Systems Introduction to Theory of computations Introduction to Web development 					
Learning Outcomes:	 After successful completion of the module, the student should be able to: Apply different search strategies in computer processing; Explain how the Turing testworks; 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 (3 rd Order)			
	12	3	060601			

Module Code:	MCOA012	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	None									
Co-requisite module/s:	MMTH012 ; MSTS01	MMTH012; MSTS012									
Assessment Methods:	and tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examinatio 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.										
	Min Summative Asse	essment mark for ex	am admission	(%)		40					
Assassment Weighting:	Final mark	=	% Summative Assessment Mark		ssessment Mark	60					
Assessment Weighting.			% Su	Immative A	ssessment Mark	40					
	Min Final Assessmer	nt mark to pass (%)				50					
		Paper 1	Paper 2		Paper 3	Paper 4					
Summative Assessment	Theory / Practical	Theory									
Paper:	Duration	3 hrs									
	Sub minimum	40%									

CURRICULUM INFORMATION							
Department: Computer Science & Information Technology School: Science & Technology							
Last Revision date:	ast 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:	 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:	 After successful completion of the module, the student should be able to 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 							
Module Information:	SAQA Credits		ITS Co	urse Level Code	;	CESM Code	(3 rd Order)	
	20			3		00	60702	
Periods per Week:	Classes	Practicals		Tutorial	Semina	ars	Independent Learning	
	5	1.5		0		0	6	

Module Code:	MC0A021	MC0A021						
Module Name:	Data Structures							
Pre-requisite module/s:	MMTH011, MMTH01	2, MCOA011, MC	COB011					
Co-requisite module/s:	MMTA021	MMTA021						
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, practical worl 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.							
			% Summative	Assess Mark	40 60			
Assessment Weighting:	Final mark =		% Summative	Assess Mark	40			
	Min Final Assessmer	nt mark to pass (%	(o)		50			
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
	Sub minimum	40%						

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

Module Code:	MCOA022	MCOA022						
Module Name:	Computer Organiz	Computer Organization & Architecture						
Module Content:	 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:	 Understanding Interface Asse Write program 	g of the design an mbly language to s in Assembly lar	d opera high le nguage.	tions of the Assemb vel languages.	oly langua	ge.		
Madula Information :	SAQA Credits		ITS Co	urse Level Code		CESM Cod	e (3 rd Order)	
module mormation:	20			3		06	0701	
Periods per Week:	Classes	Classes Practicals Tutorial Seminars Independent Learning						
	5 1.5 0 0 6							
Pre-requisite module/s:	MMTH011, MCOA	MMTH011, MCOA011, MCOB011						
Co-requisite module/s:	MMTA022							

Module Code:	MCOA022	MCOA022						
Module Name	Computer Organizat	Computer Organization & Architecture						
Assessment Methods:	A module mark will b and tests. The theory The module mark is final mark will be obt the module mark in t	module mark will be obtained from continuous assessment based on quizzes, assignments, practical work nd tests. The theory and practical mark of 40% is mandatory for a student to qualify for the final examination. he module mark is calculated at 10% of the quizzes, 30% of the tests and 20% of the practical mark. The nal mark will be obtained from a three-hour comprehensive written examination and he module mark in the ratio 2:3.						
	Min Summative Asse	Min Summative Assessment mark for exam admission (%) 40						
	F ¹ 1 1			Assessment Mark	60			
Assessment Weighting:	Final mark =		% Summative A	Assessment Mark	40			
	Min Final Assessme	nt mark to pass (S	%)		50			
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
	Sub minimum	40%						

CURRICULUM INFORMATION							
Department: Computer Science & Information Technology School: Science & Technology							
Last Revision date:	2 011		First Year Offered (New):	2013			
Replace this Modul	Replace this Module existing module(s)? Yes If YES, give the module codes: COSC351						

Module Code:	MCOA031							
Module Name	Database Systems	Database Systems						
Content:	Database Systems; Da Modelling; Advanced D Implementation.	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:	 Knowledge of the following: 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. 							
Module Information:	SAQA Credits		ITS C	ourse Level Code		CESM Code	(3 rd Order)	
	16			3		06060)1	
Periods per week:	Classes	Practicals		Tutorial	Semi	nars	Independent Learning	
	2	1.5		0		0	8	

Module Code:	MCOA031	MCOA031					
Module Name	Database Systems						
Pre-requisite module/s:	MCOA021,MCOA022,	MMTH011, MMT	FH012				
Co-requisite module/s:	None						
Assessment Methods:	A module mark will be practicals. The final ma module mark	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					
	Min Summative Assess		40				
	Final marks -		% Summative A	Assessment Mark	60		
Assessment Weighting:	Final mark =		% Summative A	Assessment Mark	40		
	Min Final Assessment	mark to pass (%)		50		
	-	Paper 1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory					
Paper: Duration 2 hrs							
	Sub minimum	40%					

CURRICULUM INFORMATION							
Department: Computer Science & Information Technology School: Science & Technology							
Last Revision date:	ast 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 Ope Scheduling, Inpu Cloud Computing	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:	 Understandir Understandir Knowledge o Understandir Appreciation Knowledge a Understandir Knowledge o Appreciation 	ig of the concept of ig and appreciation f virtual memoryted ig of processor sche of I/O and File hand ind appreciation of g of computer secu f distributed system of cloud computing	a process of concurrent processin chniques eduling techniques lling strategies embedded systems urity issues s paradigm	ığ				
Module Information:	SAQA Credits		ITS Course Level Coo	de CESM Co	de (3 rd Order)			
	16		3	0	060999			
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning			
•	2	1.5		0	8			
Pre-requisite module/s:	MCOA021,MCOA	A022, MMTH011, N	IMTH012					
Co-requisite module/s:	None							
Assessment Methods:	A module mark v and tests. The th The final mark wi the ratio 2:3.	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	ICOB031						
Module Name:	Operating Systems							
	Min Summative Asse	Min Summative Assessment mark for exam admission (%)						
	Final mark -			Assessment Mark	60			
Assessment weighting:	Final mark =		% Summative A	Assessment Mark	40			
	Min Final Assessmer		50					
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	2 hrs						
	Sub minimum	40%						

CURRICULUM INFORMATION							
Department:	Computer Science & Inf	formation Technology	School: Science & Technology				
Last Revision date:	2 011		First Year Offered (New):	2013			
Replace this Module	e existing module(s)?	Yes	If YES, give the module codes:	COSC372			

Module Code:	MCOA032								
Module Name:	Artificial Intelligence	Artificial Intelligence							
Module Content:	Predicate Calculu Methods, Knowledg Natural Language	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:	 Knowledge of p Understanding Appreciation ar Understanding Understanding Knowledge of a Knowledge of n Knowledge of n 	 Knowledge of predicate calculus representation Understanding of general state space search techniques Appreciation and use of stochasticmethods Understanding of knowledge representationschemes 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		le	CESM Code (3 rd Order)			
	16		3		060102				
Periods per Week:	Classes	Practicals		Tutorial	Sen	ninars	Independent Learning		
	2	1.5				0	8		
Pre-requisite module/s:	MCOA021,MCOA0	22, MMTH011, N	/MTH01	2					
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								
	Min Summative As	sessment mark fo	or exam	admission (%)			40		
A a a a a mant Mainhtin m	Final mark	_		% Summative	Assessme	nt Mark	60		
Assessment weighting:	rinai mark	-		% Summative	Assessme	nt Mark	40		
	Min Final Assessm	ent mark to pass	(%)				50		

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

CURRICULUM INFORMATION							
Department:	Computer Science & Inf	formation Technology	School: Science & Technology				
Last Revision date:	2 011		First Year Offered (New):	2013			
Replace this Modul	e existing module(s)?	Yes	If YES, give the module codes:	COSC382			

Module Code:	MCOB032							
Module Name:	Computer Networks							
Content:	Networking Basics; Ph Area Networks.	iysical Layer	Technol	ogies; Local Area I	Networ	ks; TCP/IP Inte	ernet-Working; Wide	
Learning Outcomes:	At the end of this cours General principle of Packet and circuits Network Architectur Network characteris Data encoding and Ethernet and wirele TCP/IP Addressing IP WANS	At the end of this course students are expected to have mastered the following: • 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			ourse Level Code		CESM Code (3 rd Order)		
	16			3		060902		
Periods per week:	Classes	Practicals		Tutorial Seminars		nars	Independent Learning	
	2	1.5				0	8	
Pre-requisite module/s:	MCOA021,MCOA022,	MMTH011, N	1MTH01	2				
Co-requisite module/s:	None							
Assessment Methods:	A module mark will be The final mark will be c	obtained from obtained from	the ave	uous assessment ba rage of a three-hour	ased or writter	n quizzes, assign examination a	nments, and tests. and the module mark.	
	Min Summative Assess	sment mark fo	or exam	admission (%)			40	
	Final mark -			% Summative Asse	essmen	t Mark	60	
Assessment weighting:	Final mark –			% Summative Asse	essmen	t Mark	40	
	Min Final Assessment	mark to pass	(%)				50	
		Paper 1		Paper 2	Paper	• 3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	2hrs						
	Sub minimum	40%						

DEPARTMENT: MATHEMATICS & APPLIED MATHEMATICS

CURRICULUM INFORMATION									
Department:	Mathem	atics and A	and Applied Mathematics					ol: Science & Technology	
Last Revision	date:			First Year Offered (New): 2023					
Replace this M	Nodule exi	sting module	e(s)?	NO	If YES, give the module codes:				
Module linked	I to Qualifi	cation/s:	BSc in Ma	athematical Science	Science BSc(ECP)				
Migration Stra	itegy:		No		(If YES, Section G must also be completed)				

Module Code: (4 alphabetic & 3 numeric)	MAPA000						
Module Name:	Elementary Applied Ma	thematics					
	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.						
	Lines and planes in space a linear equations resulting from and properties, Inverses of so of these determinants.	and linear systems: Lines and pla n their equations, Gauss eliminatio quare matrices and determinants, F	nes, Systems of n, Matrix operations Properties and uses				
Content:	Further integration and its Integration techniques, Trigor Area between two curves.	applications: The fundamental the nometric substitutions, Integration b	orem of calculus, by partial fractions,				
	Vectors with constant component: Definition, Magnitude, Position in space, Addition, Multiplication, Dot and cross product, Impotent vector properties.						
	Vector function: Calculus such as; limits, Continuity and derivative at a point (product rule, chain rule and quotient rule), Integral on an interval.						
	Application of vectors to moving particles: Connecting particles in plane surfaces, Work, energy and Power, Projectiles, Motion in a circle.						
Learning Outcomes:	 After successfully completing Obtain limits of a function Identify continuous function Evaluate definite and in curve Know and represent vection Apply and solve problem following situations: Connecting pate Connecting pate Work, energy Projectiles Motion in a circle 	the module, the student should be on in single variable at any point tions and differentiable functions definite integral of a function betwe tors with constant components in s is in mechanics using various laws inticles in horizontal surface inticles in incline plane and power	able to: en points under the pace of motion in the				
Module Information:	SAQA Credits (4; 8; 12; 16; 20; 24; 28;32)	ITS Course Level	CESM Code (3 rd Order) (Six Numbers)				

				24	24						150201	
Delivery Info	rmation:			Cam	ipus		Full/Part	Time		(Ye	Period ear/1 st /2 nd Sem	ı)
Derivery mile	ination.			SN	<i>I</i> U		Fu	II			1 st Year	
Periods per	week:			Classes Practicals		Tutorial	Se	eminars	6	Independer Learning	nt	
i enous per				5 hours		0	3 hours		0		4	
Pre-requisite	modules	for this modu	lle:	None								
Co-requisite	s modules	for module:		MMTH000								
Assessment criteria The theory of 40% is mandatory for a student to qualify for the final exammodule mark is calculated at 20% of the tutorial and 40% of the tests.					amination. The	e						
Assessment method				A module mark tests. The fina continuous ass	k will b I mark sessme	e obtaine will be d ent mark.	d from continuous erived from a thr	s asses ee-hou	ssment ir writter	based 1 exan	on tutorials ar nination and th	nd he
	Minimum for exam (Form Assessm	nent Mark	40%								
Mark Structure:		% Formative Assessment I	Mark	40%								
		% Summative Assessment I	e Mark	60%								
-	Minimum	final mark to pa	ass (%)				50%					
				Paper 1		Pa	aper 2	Paj	per 3		Paper 4	
0	Theory/p	ractical		Theory								
Assessment	Duratior	ı		3 hours								
Paper:	% cont Assessr	ribution to S nent Mark	Summative	60%								
	Sub mir	imum		40%								
			SECTION	N F: MODULAR	INFO	RMATION	REQUIRED					
Department:	Mathem	atics and Appl	ied Mathem	atics				Scho	ool:	Scien Techr	ce & iology	
Last Revisio	n date:				F	irst Year	Offered (New):	2023				
Replace this	Module ex	kisting modul	e(s)?	NO	lf c	f YES, giv codes:	e the module					
Module linke	ed to Quali	fication/s:	BSc in Ma Mathema	athematics and Applied BSc(ECP)			BSc(ECP)					
Migration St	rategy:				(If YES, Se	ection G must also	be co	mpletec	I) NO		

CURRICULUM INFORMATION Science & School: Department: **Mathematics and Applied Mathematics** 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(ECP) BSc in Mathematical Science Migration Strategy: No (If YES, Section G must also be completed)

Module Code	e: (4 alpha	betic & 3 numeric)	MAPB000						
Module Nam	e:		Introductio	n to Compu	tational Mathe	ematics			
Content:			Numerical alg and converge its extensions, Using nume differences, I solving linear method and G of matrix Oper Gauss-Siedel	gorithm of fun nce, The bisect Error analysis rical method Hermite interp system; elimir auss-Jordan el ration, Determir iterative Techn	ctions in one var tion method, Fixed for iterative meth to determine: colation, and spl mation method, su imination, Matrix nant, LU factorizat iques, relaxation	iable: Review of d point iteration, l od, Muller's meth Lagrange point interpolation ibstitution metho operation, Inversion. Inversion. iterative met echniques for so	of calc Newto iod. olynoi n. Dire id, Ga e mati hods; lving	culus, Algorithm on's method and mials, Divided ect methods for auss elimination rices, Properties The Jacobi and linear systems.	
Learning Ou	tcomes:		 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. 					to: method and	
Module Information:			SAQA ((4; 8; 12; 16; 2	Credits 20; 24; 28;32)	ITS Cour	se Level	CES Ord	SM Code (3 rd er) (Six Numbers)	
			24	4	3			150201	
Delivery Info	rmation:		Can	Campus Full/Part Time Perio (Year/1st/2r			Period ear/1 st /2 nd Sem)		
	Delivery information:		SMU		Full-time		2 nd Year		
Periods per week		Classes	Practicals	Tutorial	utorial Seminar		Independent		
Periods per	week:		0140000					Learning	
Periods per	week:		5 hours	0	3 hours	0		4	
Periods per v Pre-requisite	week: e modules	for this module:	5 hours MAPA000	0	3 hours	0		4	
Periods per v Pre-requisite Co-requisite	week: e modules s modules	for this module: s for module:	5 hours MAPA000 MMTB000	0	3 hours	0		4	
Periods per v Pre-requisite Co-requisite Assessment	week: e modules s modules criteria	for this module: s for module:	5 hours MAPA000 MMTB000 The theory of module mark	0 40% is mandat	3 hours	0 o qualify for the f al and 40% of the	inal e	4 xamination. The	
Periods per v Pre-requisite Co-requisite Assessment Assessment	week: e modules s modules criteria method	for this module: s for module:	5 hours MAPA000 MMTB000 The theory of module mark i A module mark tests. The fina continuous as	0 40% is mandat s calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a f	0 o qualify for the f al and 40% of the pus assessment hree-hour written	final e tests based n exa	4 xamination. The d on tutorials and mination and the	
Periods per v Pre-requisite Co-requisite Assessment Assessment	week: e modules s modules criteria method Minimum Mark for e	for this module: s for module: Form Assessment exam admission (%)	5 hours MAPA000 MMTB000 The theory of module mark i A module mark tests. The fina continuous as	0 40% is mandat s calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t c. 40%	0 o qualify for the f al and 40% of the bus assessment hree-hour written	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the	
Periods per v Pre-requisite Co-requisite Assessment Assessment	week: e modules s modules criteria method Minimum Mark for e	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark	5 hours MAPA000 MMTB000 The theory of module mark i A module mark tests. The fina continuous as	0 40% is mandat is calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a f 40% 40%	0 o qualify for the f al and 40% of the pus assessment hree-hour written	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the	
Periods per v Pre-requisite Co-requisite Assessment Assessment Mark Structure:	week: e modules s modules criteria method Minimum Mark for e	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark % Summative Assessment Mark	5 hours MAPA000 MMTB000 The theory of module mark i A module mark tests. The fina continuous as	0 40% is mandat s calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t 40% 40% 60%	0 o qualify for the f al and 40% of the pus assessment hree-hour written	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the	
Periods per v Pre-requisite Co-requisite Assessment Assessment Mark Structure:	week: modules s modules criteria method Minimum Mark for e	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark % Summative Assessment Mark final mark to pass (%)	5 hours MAPA000 MMTB000 The theory of module mark in A module mark tests. The fina continuous as	0 40% is mandat s calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t 40% 40% 60% 50%	0 o qualify for the f al and 40% of the bus assessment hree-hour writter	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the	
Periods per v Pre-requisite Co-requisite Assessment Assessment Mark Structure:	week: e modules s modules criteria method Minimum Mark for e Minimum	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark % Summative Assessment Mark final mark to pass (%)	5 hours MAPA000 MMTB000 The theory of module mark in A module mark tests. The fina continuous as Paper 1	0 40% is mandat is calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t 40% 40% 60% 50% Paper 2	0 o qualify for the f al and 40% of the bus assessment hree-hour writter Paper 3	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the Paper 4	
Periods per v Pre-requisite Co-requisite Assessment Assessment Mark Structure:	week: e modules s modules criteria method Minimum Mark for e Minimum Theory/g	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark % Summative Assessment Mark final mark to pass (%)	5 hours MAPA000 MMTB000 The theory of module mark in A module mark tests. The fina continuous as Paper 1 Theory	0 40% is mandat is calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t 40% 40% 60% 50% Paper 2	0 o qualify for the f al and 40% of the bus assessment hree-hour written Paper 3	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the Paper 4	
Periods per v Pre-requisite Co-requisite Assessment Assessment Mark Structure: Summative Assessment Paper:	week: e modules s modules criteria method Minimum Mark for e Minimum Theory/p Duratio	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark % Summative Assessment Mark final mark to pass (%) practical n	5 hours MAPA000 MMTB000 The theory of module mark in A module mark tests. The fina continuous as Paper 1 Theory 3 hours	0 40% is mandat is calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t 40% 40% 60% 50% Paper 2	0 o qualify for the f al and 40% of the bus assessment hree-hour writter Paper 3	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the Paper 4	
Periods per v Pre-requisite Co-requisite Assessment Assessment Mark Structure: Summative Assessment Paper:	week: e modules s modules criteria method Minimum Mark for e Minimum Theory/p Duratio % cont Assess	for this module: s for module: Form Assessment exam admission (%) % Formative Assessment Mark % Summative Assessment Mark final mark to pass (%) practical n tribution to Summative ment Mark	5 hours MAPA000 MMTB000 The theory of module mark in A module mark tests. The fina continuous as Paper 1 Theory 3 hours 60%	0 40% is mandat is calculated at rk will be obtain al mark will be sessment mark	3 hours ory for a student t 20% of the tutoria ned from continue derived from a t 40% 40% 60% 50% Paper 2	0 o qualify for the f al and 40% of the bus assessment hree-hour writter Paper 3	inal e tests basec n exa	4 xamination. The d on tutorials and mination and the Paper 4	

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 Applie	ed Mathematics					
Module Content:	Calculus of real funct and indefinite integral complex number with	ction: Domain, ra of a function, Fu its operations. Th	inge, l ndame ne cor	mit, continuity of a fur ental Theorem of calcr jugates, modulus and	nction, Th ulus. Con division	ne derivative of a hplex numbers, th of complex numb	function, The Definite ne definition of pers.
	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.						
	Further integration a Trigonometric substitu	and its application	o ns : T i by pa	he fundamental theor artial fractions, Area b	em of cal etween tv	culus, Integration vo curves.	i techniques,
	Vectors with constant constant constant cross product, Impote	nt component: I nt vector properti	Definiti ies.	on, Magnitude, Positio	on in spa	ce, Addition, Mult	iplication, Dot and
	Vector function: Cale quotient rule), Integra	culus such as; lin I on an interval.	nits, C	ontinuity and derivativ	e at a po	int (product rule,	chain rule and
	Application of vecto Projectiles, Motion in a	rs to moving pa a circle.	rticles	: Connecting particle	s in plane	surfaces, Work,	energy and Power,
Learning Outcomes:	After successfully completing the module, the student should be able to: 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: Connecting particles in horizontal surface Work, energy and power Projectiles 						
	SAQA Credits		ITS C	ourse Level Code		CESM Code (3	rd Order)
Module Information:	12			3		150201	
Periods per week:	Classes	Practicals		Tutorial	Sem	inars	Independent Learning
	5	0		2		0	4
Pre-requisite module/s:	Admission criteria						
Co-requisites module/s:	MMTH011 and MMT	H012					
Assessment Methods:	Continuous summati Summative theory as	ve assessment l ssessment will b	based e don	on Quizzes, Tutoria e at the end of the m	ls, Assig odule.	nments, Practica	als and Tests.
	Min Summative Asse	essment mark fo	r exar	n admission (%)			40
Assessment Weighting:	Final mark =			% Summative Asse	ssment N	/lark Aarla	60
	Min Final Assassme	at mark to page	(0/)	% Summative Asse	ssment	lark	40
	with Filler Assessmen	Daper 1	(/0)	Paper 2	Para	ur 3	Ju Paper 4
Summative Assessment	Theory / Practical	Theory		rapei 2	Fape	i J	Гареі 4
Summative Assessment Paper:	Duration	3 hre					
	Sub minimum	40%					
	3444	. 3 / 0					
CURRICULUM INFORMATION							
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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 Mathe	Computational Mathematics						
Module Content:	Numerical algorithm bisection method, Fi method, Muller's met Using numerical r interpolation, and substitution method, matrices, Properties Gauss-Siedel iterative	 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. 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. 						
Learning Outcomes:	 After successfully completing the module, the student should be able to: 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 						on's method.	
Madula Information :	SAQA Credits	ITS Course Level Code CESM Co			CESM Code	ode (3 rd Order)		
module information:	12			3		150201		
Periods per week:	Classes	Practicals		Tutorial Seminars		ars	Independent Learning	
	5	1		2		0	4	
Pre-requisite module/s:	Admission criteria							
Co-requisite module/s:	MMTH011 and MMT	H012						
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practicals and Tests. Summative assessment will be done at the end of the module.					als and Tests.		
	Min Summative Asse	essment mark for	or exa	m admission (%)			40	
A a a a a m a n t Mai wh tim m	Final mark -	Et al and a			% Summative Assessment Mark			
Assessment weighting:	Fillal mark -	% Summative Assessment Mark				ark	40	
	Min Final Assessment mark to pass (%) 50							
		Paper 1		Paper 2	Paper	3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
	Sub minimum	40%						

CURRICULUM INFORMATION					
Mathematics and Applied Mathematics Department:	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 n Introduction to PDEs	matrix, Eigenvalue method and fundamental system; Introduction to PDEs						
	 At the end of the module students should be able to: Distinguish between linear and non-linear ODEs. Understand the difference between the order and the degree of ODEs and PDEs. 							
Learning Outcomes:	 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. 							
Madula Information:	SAQA Credits		ITS Co	ourse Level Code		CESM Code (3 rd Order)	
wodule information:	20			3		150201		
Periods per week:	Classes	Practicals		Tutorial	Semi	nars	Independent Learning	
	5	0		2		0	6	
Pre-requisite module/s:	MAPM011, MAPM0	12, MMTH011 ai	nd MM1	H012				
Co-requisites module/s:	MMTA021							
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practicals and Tests. Summative assessment will be done at the end of the module.							
	Min Summative Ass	Min Summative Assessment mark for exam admission (%) 40						
A	Final marks				% Summative Assessment Mark 60			
Assessment weighting:	Final mark	-		% Summative Assessment Mark 40			40	
	Min Final Assessme	nt mark to pass	(%)				50	
		Paper 1		Paper 2	Pape	r 3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	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 mod Apply interpola Approximate d Evaluate integr Apply various t Euler method,	dule, a learner will be tion of various type to erivative using forwar als numerically by me echniques to solve In Range Kutta order 2	able to: approximate functions d, backward and centra eans of trapezium rules itial Value Problems fo and 4, and method of e	s on a given int al difference me s, Simpson rule r Ordinary Diffe xtrapolation	erval, ethod; e as well erential E	as quadrature rules. Equations including	
	SAQA Credits ITS Course Level Code CESM Code (3rd Order)						
Module Information:	20		3		1	50201	
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, Practicals and Tests. Summative assessment will be done at the end of the module.						
	Min Summative Asse	ssment mark for exar	m admission (%)			40	
	Final mark -		% Summative Assessment Mark			60	
Assessment weighting:	Final mark –		% Summative Assess	40			
	Min Final Assessment mark to pass (%) 50						
		Paper 1	Paper 2	Paper 3		Paper 4	
Summative Assessment	Theory / Practical	Theory					
Paper:	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; Coutte flow; Poiseuille flow; Flow between two rotating cylinders.
Learning Outcomes:	 At the end of the module a student should be able to: 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 Coutte flow, Poiseuille flow, flow between two rotating cylinders, and related flows.

Madula Information	SAQA Credits		ITS C	ITS Course Level Code C 3			e (3 rd Order)
module information:							201
Periods per week:	Classes	Practicals		Tutorial	al Semina		Independent Learning
	3	0		2		0	8
Pre-requisite module/s:	MMTA021, MMTA02	2, MAPA021 ar	nd MA	PA022			
Co-requisite module/s:	MAPA032	MAPA032					
Assessment Methods:	Continuous summative assessment based on Quizzes, Tutorials, Assignments, Practicals and Tests. Summative assessment will be done at the end of the module.						
	Min Summative Assessment mark for exam admission (%)						40
A	Final mark =			% Summative Assessment Mark			60
Assessment weighting:				% Summative Assessment Mark			40
	Min Final Assessme	nt mark to pass	(%)				50
		Paper 1		Paper 2	Pape	r 3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	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	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:	 At the end of this module, students will be able to 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 							
Module Information:	SAQA Credits			TS Course Leve	el Code	CESM Code (3rd Order)		
	10		<u> </u>		150201 Devie d (15 arm)			
Delivery Information:	SMU			Contact-Full T	imo	1st Semester		
	Classes	Prac	ticals	Tutorial	Seminars	Independent Learning		
Periods per week:	3		0	2	0	<u>8</u>		
Pre-requisite modules for this module:	MMTA021, MMTA022, MAPA021 and MAPA022							
Co-requisites modules for module:	MAPA031							
ASSESSMENT:								
Assessment Criteria:	Continuous formative assessme	ent base	ed on Qu	izzes, Tutorials,	Assignments,	Practicals 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.						
	Min Formative Assessment mark for exam admission (%) 40%						
Assessment	Final mark -	Final mark = % Formative Assess Mark					
Weighting:	% Summative Assess Mark						
	Min Final Assessme	nt mark to pass (%)	mark to pass (%)				
		Paper 1	Paper 1 Paper 2 Paper 3				
Summative	Theory / Practical	Theory					
Assessment Paper:	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 Electromagneti	sm				
Module Content:	Mathematical Theory Minkowski space-time Velocity, acceleration	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. Special Relativity: Classical electrodynamics; Maxwell's equations; Continuity equations; Gauge					
	invariance of electron Maxwell's equation in field and Equations of	assical electrodyr nagnetic field; V 4-dimensional Mil motion derived fro	ariation ariation nkows om vari	r; Maxwell's equation n principles in field ki space; Equations iational methods.	ns; Continu d theory; E of motion; I	ity equation culer-Lagra Lagrangiar	ns; Gauge inge's equations; n for a charged
Learning Outcomes:	 At the end of the module a student should be able to: 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			ourse Level Code		CESM Co	ode (3 rd Order)
	16			3 1			201
Periods per week:	Classes	Practicals		Tutorial	Seminars		Independent Learning
	3	0		2	0		8
Pre-requisite module/s:	MMTA021, MMTA022	, MAPA021 and N	ЛАРАС)22			
Co-requisites module/s:	MAPA034						
Assessment Methods:	Continuous summative Summative assessme	e assessment bas nt will be done at	sed on th e er	Quizzes, Tutorials, nd of the module.	Assignmen	ts, Practica	als and Tests.
	Min Summative Asses	sment mark for e	xam a	dmission (%)			40
Accomment Weighting	Final mark -		%	Summative Assess	s Mark		60
Assessment weighting.			%	Summative Assess	s Mark		40
	Min Final Assessment	mark to pass (%))				50
	·	Paper 1		Paper 2	Paper 3		Paper 4
Summative	Theory / Practical	Theory					
Assessment Paper:	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	MAPA034						
Module Name:	Introduction to Finar	ncial Mathematics						
Content:	Introduction to mark relationships, binom	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: Understand some dynamics of financial markets and financial instruments. Understand interest rates and bond markets Price simple financial instruments. 							
	SAQA Credits ITS Course Level Code CESM Code (3rd Order)							
Module Information:	16			3			150201	
Periods per week:	Classes	Prac	ticals Tutorial Seminars		Seminars	Indep	bendent Learning	
Terious per week.	3	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 Summative assessm	e assessment bas nent will be done a	ed on Qu t the end	uizzes, Tutorials, . I of the module.	Assignments,	Practical	s and Tests.	
Assessment	A module mark will	be calculated from	continuo	ous assessment a	nd be combin	ed with s	ummative	
Methods:	assessment in the ra	atio 3:2 respectivel	y, to get	the final mark. Th	nere will be a s	suppleme	ntary assessment.	
	Min Formative Asse	ssment mark for ex	am adm	nission (%)			40%	
Assessment	Final mark =	% Formative Ass	ess Marl	k			60%	
Weighting:		% Summative As	sess Ma	ark			40%	
	Min Final Assessme	ent mark to pass (%)		_		50%	
		Paper 1		Paper 2	Paper	3	Paper 4	
Summative	Theory / Practical	Iheory						
Assessment Paper:	Duration	2 Hours						
	Sub minimum 40%							

CURRICULUM INFORMATION					
Mathematics and Applied Mathematics Department: 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: FMH010M	MATH101,			

Module Code:	ММТНООО
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 Theore trigonometric substitu	m of Calculus, ution	techni	ques of integration t	oy substitu	tion, parts, part	ial fractions and
Learning Outcomes:	After successfully completing the module, the student should be able to: 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 invertigonometric functions Understand limit concept and representation of one sided limits and continuity of functions Understand infinite limits, limits at infinity and asymptotes Understand relationship between differentiability and continuity Be able to apply the rules of 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 Prove the Mean Value 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						composite and inverse ctions n Sum tegrals
Module Information:	SAQA Credits		ITS C	ourse Level Code		CESM Code (3 rd Order)
	24	1		3		15010	1
Periods per week:	Classes	Practicals		Tutorial	Semina	rs	Independent Learning
	6	0		4		0	4
Pre-requisite module/s:	Admission criteria						
Co-requisite module/s:	None						
Assessment Methods:	Continuous summativ assessment will be d	ve assessment one at the end	based of the	on Quizzes, Tutoria module.	als, Assign	ments, and Tes	sts. Summative
	Min Summative Asse	ssment mark for	or exar	m admission (%)			40
A	Final Mark -			% Summative Asse	essment M	ark	60
Assessment weighting:	Final Wark -			% Summative Asse	essment M	ark	40
	Min Final Assessmer	nt mark to pass	(%)				50
		Paper 1		Paper 2	Paper 3	}	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

CURRICULUM INFORMATION					
Mathematics and Applied Mathematics Department 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: FMH010M	MATH101,			

Module Code:	ММТВ000
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: 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 C			Course Level Code		CESM Code (3 rd Order)
	24			3		150101	
Periods per week:	Classes	Practicals		Tutorial	Semina	rs	Learning
	6	0		4		0	4
Pre-requisite module/s:	Admission criteria						
Co-requisite module/s:	None			. <u>.</u>			
Assessment Methods:	Continuous summativ assessment will be d	ve assessment one at the end	based of the	d on Quizzes, Tutoria module	ais, Assign	ments, and Les	sts. Summative
	Min Summative Asse	ssment mark fo	or exa	m admission (%)			40
Accessment Weighting	Final Mark =			% Summative Asse	essment M	ark	60
Assessment weighting:				% Summative Assessment Mark			40
	Min Final Assessmen	it mark to pass	(%)				50
		Paper 1		Paper 2	Paper 3		Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	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, substitution	techniques c	of integra	tion by substitution,	, parts, pa	rtial fractions a	and trigonometric	
	After successfully cor	npleting the n	nodule, t	he student should b	e able to			
	Define a function a	nd determine	domain	and range				
	Sketch functions a trigonometric function	nd understar	nd the al	gebra and operation	ons of fur	nctions, the co	mposite and inverse	
	 Inderstand limit concent and representation of one sided limits and continuity of functions 							
Learning Outcomes:	Understand infinite	limite limite	presenta at infinity	and asymptotes			ICLIONS	
	Understand the derivative of a given function from first principles							
	 Onderstand relationship between differentiability and continuity Be able to apply the rules of differentiation including the above rule. 							
	Prove the Mean Va	due theorem t	for differ	ential calculus	IIIIue			
	Approximate a defi	nite integral to	o within a	any desired dearee	of accura	cy by a Riema	inn Sum	
	Recognise anti-diff	erentiation (in	definite	ntegral) as the reve	erse of dif	ferentiation		
	Evaluate integrals	of some algeb	oraic, exp	conential and trigon	ometric fu	unctions		
	Recognise the Fun	damental The	eorem of	Calculus and use it	t for evalu	ating definite i	ntegrals	
	Prove the Mean Va	lue Theorem	for integ	rals		Ū	Ū	
	 Use techniques of 	Integration						
Madada Informations	SAQA Credits	ITS Co		urse Level Code		CESM Code (3 rd Order)		
Module Information:								
	12			3		150101		
					Independent			
Periods per week:	Classes	Practicals		l utorial Semina		ars Learning		
	4	0		4		0	4	
Pre-requisite module/s:	Selection criteria							
Co-requisite module/s:	None							
Assessment Methods:	A module mark will be c ratio 3:2 respectively, to	e get the final m	continuoi ark. Ther	is assessment and be e will be a supplement	e combined Itary asses	sment	e assessment in the	
	Min Summative Assessment mark for exam admission (%) 40					40		
Accoccmont Woighting:	Final Mark =			% Summative Assessment Mark 60			60	
Assessment weighting.				% Summative Asse	essment I	Mark	40	
	Min Final Assessment	mark to pass	s (%)				50	
		Paper	1	Paper 2	Paper	3	Paper 4	
Summative Assessment	Theory / Practical	Theor	у					
Paper:	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 Cartesian products, the F	reduction method and the Cramers' Rule. Set Theory ,relationship in sets, constructions, set algebra, Cartesian products, the Power Sets.							
At the end of the module	students shou	ild be al	ble to:					
 To use the principle of mathematical Induction as a method of proof and use it to prove mathemat statements 								
• To be able to recognis	 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. 							
 Solve a system of linea Demonstrate when a s 								
 beinonstrate when a s have good knowledge 	of matrix alge	bra and	theory related to m	atrices	5010110115			
 find determinants of m 	atrices and the	eir prope	erties					
use the Cramers' Rule	to solve a sys	stem of I	inear equations	tasian nu		n aata, aat alaabaa,		
 Describe and construct relations; relation type: 	s).	onsnips	Detween Sets; Car	tesian pr	oducis; powe	r sets; set algebra;		
SAQA Credits			ITS Course Level Code		CESM Code (3 rd Order)			
12			3		150101			
Classes	Practicals		Tutorial		nars	Independent Learning		
4	0		4		0	4		
Selection criteria								
None								
A module mark will be assessment in the ratio 3	calculated fr 3:2 respectively	om con y, to get	tinuous assessme the final mark. The	nt and b re will be	e combined a supplemen	with summative stary assessment		
Min Summative Assessments mark for exam admission (%) 40								
Final Mark =			% Summative Assessment Mark			60		
				% Summative Assessment Mark				
Min Final Assessment mark to pass (%)			50			50		
	Paper 1		Paper 2	Pape	r 3	Paper 4		
Theory/ Practical	Theory							
Duration	3 hre							
Baration	51113							
	reduction method and the Cartesian products, the F At the end of the module • To use the principle of statements • To be able to recognis • Solve a system of line • Demonstrate when a s • have good knowledge • find determinants of m • use the Cramers' Rule • Describe and construe relations; relation type SAQA Credits 12 Classes 4 Selection criteria None A module mark will be assessment in the ratio 3 Min Summative Assesson Final Mark = Min Final Assessment m	reduction method and the Cramers' Ru Cartesian products, the Power Sets. At the end of the module students shout • To use the principle of mathematical statements • To be able to recognise, prove and a • Solve a system of linear equations u • Demonstrate when a system has no • have good knowledge of matrix alge • find determinants of matrices and the • use the Cramers' Rule to solve a system • Describe and construct (sets; relation relations; relation types). SAQA Credits 12 Classes Practicals 4 0 Selection criteria None A module mark will be calculated fr assessment in the ratio 3:2 respectively Min Summative Assessments mark for Final Mark = Min Final Assessment mark to pass (% Paper 1 Theory/ Practical Theory	reduction method and the Cramers' Rule. Set Cartesian products, the Power Sets. At the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students should be at the end of the module students will be calculated the properties. SAQA Credits ITS Co 12 ITS Co 14 0 Selection criteria None A module mark will be calculated from con assessment in the ratio 3:2 respectively, to get Min Summative Assessments mark for exam a Final Mark = Min Final Assessment mark to pass (%) Paper 1 Theory	reduction method and the Cramers' Rule. Set Theory ,relationship Cartesian products, the Power Sets. At the end of the module students should be able to: • To use the principle of mathematical Induction as a method of statements • To use the principle of mathematical Induction as a method of statements • To be able to recognise, prove and apply the Binomial theorem • Solve a system of linear equations using different methods • Demonstrate when a system has no solution, unique and infinit • have good knowledge of matrix algebra and theory related to m • 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; Car relations; relation types). SAQA Credits ITS Course Level Code 12 3 Classes Practicals Tutorial 4 0 4 Selection criteria 0 4 None A module mark will be calculated from continuous assessme assessment in the ratio 3:2 respectively, to get the final mark. The Min Summative Assessments mark for exam admission (%) § Final Mark = % Summative Asses % Summative As	reduction method and the Cramers' Rule. Set Theory ,relationship in sets, Cartesian products, the Power Sets. At the end of the module students should be able to: • • To use the principle of mathematical Induction as a method of proof a statements • • To be able to recognise, prove and apply the Binomial theorem to expan • • Solve a system of linear equations using different methods • • Demonstrate when a system has no solution, unique and infinitely many • • 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 privelations; relation types). • SAQA Credits ITS Course Level Code 12 3 Classes Practicals Tutorial Yead 0 4 Selection criteria • • None A module mark will be calculated from continuous assessment and be assessment in the ratio 3:2 respectively, to get the final mark. There will be final Mark = % Summative Assessment Min Summative Assessment mark to pass (%) • % Summative Assessment	reduction method and the Cramers' Rule. Set Theory ,relationship in sets, constructions, Cartesian products, the Power Sets. At the end of the module students should be able to: • To use the principle of mathematical Induction as a method of proof and use it to prevent statements • To be able to recognise, prove and apply the Binomial theorem to expand powers of be 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; powerelations; relation types). SAQA Credits ITS Course Level Code CESM Code 12 3 15 Classes Practicals Tutorial Seminars 4 0 4 0 Selection criteria Sessements mark for exam admission (%) % Min Final Mark = % Summative Assessment Mark % Summative Assessment Mark % Summative Assessment mark to pass (%) Paper 1 Paper 2 Paper 3		

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.

	After successfully completing the module, the student should be able to:								
	 Define convergent sec 	quence and se	everal of	ther given definition	S.				
	 Test convergence of v 	arious sequer	nces.						
Learning Outcomes	 Apply various tests of 	convergence	to a wid	e range of infinite s	eries.				
Leanning Outcomes.	 Understand the conce 	pt of vector fu	nction v	vith one variable.					
	 Differentiate, integrate 	, find limits of	vector f	functions and deteri	mine the	arc length.			
 Understand definitions of limits and continuity of functions of two variables. 									
	Determine the limit of	functions of tv	vo varia	bles.					
	Determine directional	derivative of a	i functio	n with the aid of de	finition a	nd in terms of	gradient vector.		
	 Evaluate double integr 	rals for a wide	range	of functions.					
	 Understand the conce 	pt of line integ	grals and	d evaluate line integ	grals.				
	 Evaluating line integra 	lls using Gree	n's The	orem.					
	Understand the basic	concepts and	ideas o	f first order differen	tial equa	itions.			
	 Solve separable, linea 	r and exact e	quations	6.		1			
Module Information:	ITS Course Level Code		ITS Co	urse Level Code		CESM Code (3 rd Order)			
	20	20		3		150101			
Periods per week:	Classes	Practicals	_	Tutorial	Semina	ars	Independent Learning		
	5	0		2		0	6		
Pre-requisite module/s:	MMTH011 and MMTH01	2 OR MMT	H000 ar	nd MMTB000					
Co-requisites module/s:	None								
Assessment Methods:	Continuous summative a assessment will be done	assessment ba at the end of	ased on the mo	Quizzes, Tutorials, dule.	Assignr	ments, and Te	sts. Summative		
	Min Summative Assessn	nent mark for	exam a	dmission (%)			40		
Accessment Weighting:	Final mark =			% Summative Assessment Mark			60		
Assessment weighting.	1 III (ai iii (ai k -			% Summative Assessment Mark			40		
	Min Final Assessment m	ark to pass (%	6)				50		
		Paper 1		Paper 2	Paper	3	Paper 4		
Summative Assessment Theory / Practical Theory									
Paper:	Duration	3 hrs							
	Sub minimum	40%							

CURRICULUM INFORMATION					
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:	ММТА022
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: 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 appiblicators of subspaces 							
Module Information:	SAQA Credits		ITS Co	urse Level Code	!	CESM Code	(3 rd Order)	
	20			3		15	0102	
Periods per week:	Classes	Practicals		Tutorial Semin		nars Learning		
	5	0		2		0	6	
Pre-requisite module/s:	MMTH011 and MMTH01	12 OR MMT	H000 ar	nd MMTB000				
Co-requisite module/s:	None							
Assessment Methods:	Continuous summative a assessment will be done	assessment b e at the end of	ased on the mo	Quizzes, Tutoria dule	ls, Assign	ments, and Te	sts. Summative	
	Min Summative Assessr	ment mark for	exam a	dmission (%)			40	
Accoccment Weighting:	Final mark -		% Summative Assess Mark			k 60		
Assessment weighting.		Fillal Mark –		% Summative A	ssess Mar	ark 40		
	Min Final Assessment mark to pass (%)						50	
	Paper 1 Paper 2 Paper 3							
Summative Assessment Theory / Practical Theory								
Paper:	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, erm 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: 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. 						
Madula Information	SAQA Credits ITS Course Level Code CESM Code (3rd Order)						(3 rd Order)
would information:	16 3 150103				103		
	Classes	Practicals		Tutorial	Semi	nars	Independent Learning

Periods per week:	3	0	2	0	8				
Pre-requisite module/s:	MMTA021 and MMTA022								
Co-requisites module/s:	MMTB031	/MTB031							
Assessment Methods:	Continuous summative asses assessment will be done at th	ntinuous summative assessment based on Quizzes, Tutorials, Assignments and Tests. Summative sessment will be done at the end of the module.							
	Min Summative Assessment mark for exam admission (%) 4								
	Final mark =		% Summative Asses	sment Mark	60				
Assessment weighting:			% Summative Asses	sment Mark	40				
	Min Final Assessment mark t		50						
		Paper 1	Paper 2	Paper 3	Paper 4				
Summative Assessment Paper:	Theory / Practical	Theory							
	Duration	2 hrs							
	Sub minimum	40%							

	CURRICUL	UM INFORM	IATION				
Department: Mathematic	s and Applied Mathen	natics		School: Scien	ce & Techn	ology	
Last Revision date: 2011				First Year Offer	red (New):	0,	2013
Replace this Module existing	module(s)? Yes			If YES, give the	module co	odes:	MATH351
Module Code:	MMTB031						
Module Name:	Abstract Algebra						
Module Content:	Groups: Definition and examples of groups including permutation groups and quaternion groups, alementary 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. Rings and Fields: Rings, integral domains, fields, subrings, ideals, quotient rings, ring homomorphisms, isomorphism theorems, ring of polynomials, polynomials over \mathbb{Z} , Qand \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} .						
Learning Outcomes:	At the end of the mod mathematical statement. Identify various mathema State and prove the Understand the pro Define homomorphi Apply homomorphis Apply first, second ar	dule a student atical structures corems and app perties of variou ism and isomor sm and isomorp nd third isomorp	as variou as variou bly the cor us groups ohism bet hism cono blism theo	e able to: rite dou s groups or rings. ncepts in problems ween groups cepts in problems prems in problems	wn a clear	and coher	ent proof of a
Module Information:	SAQA Credits		ITS Cou	rse Level Code	CE	ESM Code ((3 rd Order)
	16	1		3		1501	02
Periods per week:	Classes	Practicals		Tutorial	Seminars		Independent Learning
	3	0		2		0	8
Pre-requisite module/s:	MMTA021 and MMTA02	2					
Co-requisite module/s:	MMTA031			innea Tutoriala Aa	-i	and Tasta	Cummetius
Assessment Methods:	assessment will be done	at the end of the	ie module	izzes, Tulonais, As	signments,	anu resis.	Summative
	Min Summative Assessment mark for exam admis			mission (%)			40
Assassment Weighting	Final mark =		9	% Summative Assess Mark			60
naacaament weighting.			9	6 Summative Asse	ss Mark		40
	Min Final Assessment m	ark to pass (%)			_		50
l		Paper 1		Paper 2	Paper 3		Paper 4

Summative Assessment	Theory / Practical	Theory		
Paper:	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:	 After successfully completing the module, the student should be able to: 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. 								
Madala Informations	SAQA Credits ITS Course Level Code CESM Code (3rd Ord								
Module Information:	16			3		15010)1		
Periods per week:	Classes	Practicals		Tutorial	Semina	ars	Independent Learning		
	3	0		2		0	8		
Pre-requisite module/s:	MMTA021 and MMTA0)22							
Co-requisites module/s:	MMTB032								
Assessment Methods:	Continuous summative assessment will be dor	e assessment bas ne at the end of th	ed on ne mod	Quizzes, Tutorials lule.	s, Assignm	ents, and Tes	sts. Summative		
	Min Summative Assess	sment mark for ex	xam ac	Imission (%)			40		
Assessment Weighting:	Final mark =		% Summative Assessment Mark 60						
				% Summative As	40				
	Min Final Assessment	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: MATH382					

Module Code:	ММТВ032							
Module Name:	Mathematical Analysis II							
Module Content:	Preliminary concepts of s sets.Convergence, Conve Closed sets, Bounded se functions, Open and Clo spaces, Path connected spaces, Characterization	reliminary concepts of sets and functions. Definition and examples of Metric spaces. Open balls and open ets. 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 unctions, Open and Closed maps, Homeomorphisms in Metric spaces. Connectedness and connected paces, Path connected spaces, Compactness and Compact spaces, Continuous functions on compact paces, Characterization of compact Metric spaces.						
Learning Outcomes:	 fter successfully completing the module, the student should be able to: .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 Co			urse Level Code		CESM Code (3 rd Order)		
	16	16		3		150103		
Periods per week:	Classes	Practicals		Tutorial	Semina	ars	Independent Learning	
	3	0		2		0 8		
Pre-requisite module/s:	MMTA021 and MMTA022	2						
Co-requisites module/s:	MMTA032							
Assessment Methods:	Continuous summative as assessment will be done	ssessment ba at the end of t	sed on the mod	Quizzes, Tutorials, ule.	Assignm	ents and Test	s. Summative	
	Min Summative Assessm	ent mark for e	exam ac	mission (%)			40	
Accessment Weighting	Final mark =			% Summative Assessment Mark 60				
Assessment weighting:	T mai mark –			% Summative Assessment Mark 40				
Min Final Assessment mark to pass (%) 50							50	
		Paper 1		Paper 2	Paper	3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	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	Introduction to General Physics 1A						
Module Content:	Measurements – Phys measuring tools and un Mechanics: Frame of momentum, types of for forces, rotational Motior Energy and tempera substances, phase tran transfer mechanisms. Properties of matter: E Modern Physics: Atom	 Measurements – Physical quantities and vectors, scientific method, unit conversions, significant figures, measuring tools and uncertainty, operational definitions, proportional reasoning with mass and volume. 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. 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. Properties of matter: Elasticity, fluid Mechanics and Thermal Physics 						
Learning Outcomes:	 After successfully completing this module students should be able to: 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			CESM Co	de (3 rd Order)	
	24			03			140701	
Periods per Week:	Classes	Practicals		Tutorial	Semi	nars	Learning	
	4 x 45 min	1 x 3 hrs		2 x 1 hrs		0	1.25 hour	
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Methods:	Continuous assessmen Summative assessmen	ts: tests and as t: one theory e>	signme aminat	nts; Practical as ion at the end of	sessments the year	-		
	Min Summative Assess	ment mark for e	exam a	dmission (%)			40	
Assessment Weighting:	Final Mark =		-	% Summative A % Summative A	ssessment	Mark Mark	<u> </u>	
	Min Final Assessment r	nark to pass (%	(j)				50	
		Paper 1	, 	Paper 2	Pape	r 3	Paper 4	
Summative Assessment	Theory / Practical	Theory				-		
Paper:	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: Demonstrate an understanding of underlying ideas and concepts of electricity Define Coulomb's law and apply it for interaction of stationery 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	ITS Course Level Code CESM Code (3rd Or 03 140701			ode (3 rd Order) 140701	
Periods per Week:	Classes	Practicals		Tutorial	Semir	ars	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 assessmen Summative assessmen	ts: tests and as t: one theory ex	signme amina	ents tion at the end of th	ne year			
	Min Summative Assessment mark for exam admission (%) 40							
Assessment Weighting:	Final Mark =			% Summative Assessment Mark 60				
Assessment weighting.	% Summative Assessment Mark 40					40		
	Min Final Assessment mark to pass (%)						50	
		Paper 1		Paper 2	Pape	r 3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	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, Physi Energy, Impulse and mo Properties of matter: E Modern Physics: Atomi	ical quantities a mentum, and F lasticity, Fluid I c Structure and	and ve Rotatio Mecha d Nucle	ctors, Kinematics nal Motion nics and Thermal ear Physics	, Dynamics Physics	s, Statics, Work	and Mechanical
Learning Outcomes:	 After successfully completing this module students should be able to: 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 tomomentum 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 the atomic nuclei structure, atomic forces and nuclear energy Carry out calculations involving the relationship between energy and mass loss for fission and fusi- reactions 						
Module Information:	SAQA Credits		ITS	Course Level Co	ode	CESM Code	(3 rd Order)
Periods per Week:	Classes	Practicals		ہ Tutorial	Semin	ars	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 examination.	s, Practicals, Tu	utorials	and/or Assignme	ents. Sumn	native (40%): 1	× 3 hour written
	Min Summative Assessn	nent mark for e	xam a	dmission (%)			40
Accessment Weighting	Final Mark =			% Summative As	sessment	Mark	60
Assessment weighting.				% Summative As	sessment	Mark	40
	Min Final Assessment m	ark to pass (%)				50
		Paper 1		Paper 2	Paper	3	Paper 4
Summative Assessment	Theory/ Practical	Theory					
Paper:	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	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 Define Coulomb's Know how to calcu Know how a capac Define correctly ele Know the originalit Understand the Ha Understand Hooke Differentiate betwee Understand the ap Understand the na Understand how in	 After taking this module student should be able to: Define Coulomb's law and apply it for interaction of stationery 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 							
Madula Informations	SAQA Credits IT		ITS Co	urse Level Code	e	CESM Code	(3 rd Order)		
module mormation.	12	12		3		140701			
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	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 examination	s, Practicals, T	utorials	and/or Assignme	ents. Summ	ative (40%): 1	× 3 Hours written		
	Min Summative Assessment mark for exam admission (%) 40								
A a a a a a m a mt 10/a i mh tim m	Final Mark -			% Summative A	ssessment	Mark	60		
Assessment weighting:				% Summative A	40				
	Min Final Assessment m	ark to pass (%	6)				50		
		Paper 1		Paper 2	Paper 3	3	Paper 4		
Summative Assessment	Theory/ Practical	Theory							
Paper:	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	Classical Mechanics						
Module Content:	Vector Analysis, Kinema and Rigid bodies.	atics, Lagran	gian and	Hamiltonian med	chanics, Ce	entral force m	otion, Oscillations	
Learning Outcomes:	After completion of this m Use mathematical r Solve real problems Make a correlation Solve and analyze n Use Lagrangian an problems, including	 After completion of this module students are expected to: 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 Co	urse Level Code		CESM Code	(3 rd Order)	
Periods per Week:	Classes	Practicals		03 Tutorial	Semina	Independent		
	5	2		1			2.6 hrs	
Pre-requisite module/s:	MPHS011 and MPHS012	2						
Co-requisite module/s:	MPHB021,MMTA021	MPHB021,MMTA021						
Assessment Criteria:	Describe, explain and ap Analysis, Kinematics, Lag bodies.	ply in a logica grangian and	l manne Hamiltor	r the principles, c nian mechanics, (oncepts an Central forc	d facts relate e motion, Os	d to Vector cillations and Rigid	
Assessment Methods:	Summative (60%): Tests examination.	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 Hours written examination.						
	Min Summative Assessm	nent mark for	exam ad	lmission (%)			40	
A accoment Weighting	Final mark -			% Summative As	sessment	Mark	60	
Assessment weighting:				% Summative As	sessment	Mark	40	
	Min Final Assessment mark to pass (%) 50						50	
		Paper '	1	Paper 2	Paper 3		Paper 4	
Summative Assessment	Theory / Practical	Theory	,					
Paper:	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	MPHB021						
Module Name:	Modern Physics							
Module Content:	Special and general rel Physics, Nuclear structu particles.	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 mo Differentiate betwe Correctly calculate Perform Lorentz Tr Describe where cla Blackbody Radiation	 After completing this module, students should be able to: 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		1		2.6 hrs		
Pre-requisite module/s:	MPHS011 and MPHS01	2						
Co-requisite module/s:	MPHA021 and MMTA02	MPHA021 and MMTA021						
Assessment Criteria:	Describe, explain and a general relativity, Quar Nuclear structure, Radic	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 examination.	Summative (60%): Tests, Practicals, Tutorials and/or Assignments. Summative (40%): 1 × 3 Hours written examination.						
	Min Summative Assess	ment mark for	exam a	dmission (%)		40		
Accoccment Weighting:	Final mark -			% Summative Asse	60			
Assessment weighting.	Filidi Ilidik –				% Summative Assessment Mark			
	Min Final Assessment n	nark to pass (%	6)			50		
		Paper 1		Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory						
Paper:	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	MPHA022							
Module Name:	Electrodynamics and	Electrodynamics and Electronics							
Module Content:	Electrodynamics: E matter. Electronics: Electron	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 Solve problems Demonstrate the symmetric situal Demonstrate the be electrically a Understand ele Identify the fund devices.	 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. 							
Madula Information	SAQA Credits		ITS Course Level C	ode	CESM Code (3rd Or		3 rd Order)		
would information.	10		03		140799				
Periods per Week:	Classes	Practicals	Tutorial	Seminars		Inde Le	pendent arning		
	5	2	1	2	2.6 hrs				
Pre-requisite module/s:	MPHS011 and MPHS	S012							
Co-requisite module/s:	MPHB022 and MMT	A022							
Assessment Criteria:	Describe, explain an Electrodynamics: E matter. Electronics:	nd apply in a logica lectrostatic fields in v Electronic Circuits, S	al manner the princip acuum and in matter, Semiconductors and In	bles, concepts a Magnetostatic fi troduction to So	and facts elds in va lid State	s relati acuum Physic	ed to and in s.		
Assessment Methods:	Summative (60%): Te examination.	ests, Practicals, Tuto	rials and/or Assignme	nts. Summative	(40%): 1	× 3 Ho	ours written		
	Min Summative Asse	Min Summative Assessment mark for exam admission (%) 40							
Accessment Weighting	Final mark =		% Summative Assessment Mark			60	1		
Assessment weighting.		% Summative Assessment Mark				40	I		
	Min Final Assessmer	Min Final Assessment mark to pass (%) 50							
		Paper 1	Paper 2	Paper	3		Paper 4		
Summative Assessment	Theory / Practical	Theory							
Paper:	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 Op	Waves and Physical Optics					
Module Content:	Waves: General wave pr motion and Fourier meth Physical Optics: Waves	Naves : General wave properties; Simple, damped, forced and coupled oscillators; Transverse wave notion and Fourier methods. Physical Optics : Waves in optical systems. Interference and diffraction theory and Polarization					
Learning Outcomes:	After taking this modules • Describe wave prope • Describe oscillators a • Understand wave pre-	 fter taking this module students should be able to: Describe wave properties Describe oscillators and their behavior when an external force acts Understand wave phenomena such interference and diffraction. 					
Modulo Information:	SAQA Credits ITS Course Level Code CESM Code (3rd Order)						
module information.	10		()3	140799		
Periods per Week:	Classes	Practicals		Tutorial	Seminars	Independent Learning	
	5 2			1		2.6 hrs	
Pre-requisite module/s:	MPHS011; MPHS012	MPHS011; MPHS012					
Co-requisite module/s:	MPHA022,MMTA022						
Assessment Criteria:	Describe, explain and ap General wave properties Fourier methods. Physic Polarization.	pply in a logical ; Simple, damp c al Optics : Wa	manne bed, for ves in c	r the principles, cor ced and coupled os optical systems, Inte	ncepts and facts rela cillators; Transverse erference and diffrac	ted to Waves : wave motion and tion theory and	
Assessment Methods:	Summative (60%): Tests examination.	, Practicals, Τι	utorials	and/or Assignment	s. Summative (40%)	1 × 3 hour written	
	Min Summative Assessn	nent mark for e	xam ac	lmission (%)		40	
	Final mark -			% Summative Ass	essment Mark	60	
Assessment weighting:	Final mark -			% Summative Ass	essment Mark	40	
	Min Final Assessment m	ark to pass (%)			50	
	-	Paper 1		Paper 2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Theory					
Paper:	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:	NPHA031			
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: 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. 			

Madula Information.	SAQA Credits		ITS Course Level Code			CESM Code (3rd Order)		
module information:	16		04			140799		
Periods per Week:	Classes	Practicals		Tutorial	Semi	nars	Independent Learning	
	5	2		1			10.2 hrs	
Pre-requisite module/s:	MPHA021; MPHB021, MPHA022, MPHB022, MMTA02			IMTA021 and M	21 and MMTA022			
Co-requisite module/s:	MPHB031,	PHB031,						
Assessment Criteria:	Describe, explain and app mechanics, Schrödinger e to one-dimensional system	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, examination.	Practicals, Tut	orials a	nd/or Assignmei	nts. Summa	ative (40%): 1 :	× 3 h written	
	Min Summative Assessme	ent mark for ex	am adr	nission (%)			40	
A a a a a m a m t M/a i m h tim m	Final marks		% Summative Assessment Mark				60	
Assessment weighting:	Final mark -		% Summative Assessment Mark				40	
	Min Final Assessment mai	k to pass(%)					50	
		Paper 1		Paper 2	Pape	r 3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	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 Sta	Thermodynamics and Statistical Mechanics							
Module Content:	Thermodynamics: Fund Thermodynamic potential Statistical Mechanics: 0	Fhermodynamics: Fundamental concepts, Ideal and real gases, 1 st , 2 nd and 3 rd laws of thermodynamics and Fhermodynamic potential. Statistical Mechanics: Classical statistical Physics and Quantum Statistics							
Learning Outcomes:	 After taking this module student should be able to: 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. 								
Medule Information	SAQA Credits		ITS Cou	irse Level Code	e	CESM Code	(3 rd Ord	er)	
module information:	16			03		14079	9		
Periods per Week	Classes	Practicals	т	Tutorial		Seminars		Independent Learning	
•	5	2		1			10.2 hrs		
Pre-requisite module/s:	MPHA022, MPHB022, M	PHA021, MPH	IB021,M	MTA021 and M	MTA022				
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, examination.	, Practicals, Ti	utorials a	nd/or Assignme	ents. Summ	native (40%): 1	×3hw	ritten	
	Min Summative Assessm	ent mark for e	exam adn	nission (%)				40	
Accoccment Weighting	Final mark =			% Summati	ve Assessi	ment Mark		60	
rissessment weighting.				% Summative Assessme		ment Mark		40	
	Min Final Assessment ma	ark to pass (%)					50	

		Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment	Theory / Practical	Theory			
Paper:	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	Solid State Physics						
Module Content:	Atomic structure of matt crystals and the band th	er, Crystallogr eory.	aphy, X-	ray diffraction the	eory, Therm	al vibrations,	Free electrons in	
Learning Outcomes:	 After taking this module Describe the crystal Determine the recipr importance of unit control Coherent and critica crystals. 	students shou structure ofso ocal lattice fro ells in each cas I understandin	ld be ab lids. m the re- ie. g of the o	le to: al space lattice fo concept of transla	r cubic stru ational invar	ctures and ap	preciate the nt symmetry of	
Modulo Information:	SAQA Credits		ITS Co	urse Level Code		CESM Code	(3 rd Order)	
module information:	16			04		14079	99	
Periods per Week:	Classes	Practicals	cals Tutorial Ser		Semin	eminars Independent Learning		
	5	2		1	1		10.2 hrs	
Pre-requisite module/s:	MPHA022, MPHB022,	MPHA021, MF	PHB021,	MMTA021, MMT	TA022			
Co-requisite module/s:	MPHB032							
Assessment Criteria:	Describe, explain and a of matter, Crystallograp crystals and the band th	apply in a logic hy, X-ray diffra neory.	al mann action th	er the principles, eory, Thermal vib	concepts a prations, Fre	nd facts relate ee electrons ir	ed to Atomic structure	
Assessment Methods:	Summative: Tests, Prace	cticals, Tutoria	ls and/o	r Assignments. S	ummative:	1 × 3 hour wri	tten	
	Min Summative Assess	ment mark for	exam a	dmission (%)			40	
A	Final mark =		% Summative Assessment Mark			ent Mark	60	
Assessment weighting:	Final mark –			% Summative Assessment Mark			40	
	Min Final Assessment r	mark to pass ('	%)				50	
		Paper 1		Paper 2	Pa	per 3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	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, Trans Electrodynamics: Electrom and momentum.	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 stu Apply the techniques of Describe the operation transistor, <i>etc.</i>; Analyse the operation operational amplifiers; Perform design calcula Demonstrate an under 	 After taking this module student should be able to: Apply the techniques of AC theory in a complex representation; Describe the operation of simple semiconductor devices: junction diode, bipolar transistor, field-effect transistor, <i>etc.</i>; 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 Cod	e (3 rd Order)		
	16			03	1407	^{'99}		
Periods per Week:	Classes	Practicals		Tutorial	Seminars	Independent Learning		
•	5	2	1			10.2 hrs		
Pre-requisite module/s:	MPHA021, MPHA022, MP	HB021, MPHE	3022,I	/IMTA021 and MMTA0	22			
Co-requisite module/s:	MPHA032							
Assessment Criteria:	Describe, explain and app Transistors, Amplifiers and of electrodynamics, Energy	ly in a logica Oscillator circ and moment	l mar cuits. l um.	ner the principles, co Electromotive force, Fa	ncepts and facts raday's law, Pote	related to Diodes, ntial formulation		
Assessment Methods:	Summative (60%): Tests, I examination.	Practicals, Tut	orials	and/or Assignments. S	ummative (40%)	1 × 3 hour written		
	Min Summative Assessme	nt mark for ex	am ao	Imission (%)		40		
Accorement Weighting:	Final mark =			% Summative Assessment Mark 60				
Assessment weighting.	T mar mark =			% Summative Assessment Mark 40				
	Min Final Assessment mar	k to pass (%)				50		
		Paper 1		Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory						
Paper:	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	MSTS000								
Module Name:	Descriptive Statistics	Descriptive Statistics								
Module Content:	Definitions and concepts Elementary probability t probability distributions: Sampling distributions: interval; Confidence Inter mean, proportion and v ANOVA. Chi-square tes	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 nterval; Confidence Interval for the mean, proportion and variance. Test of hypotheses: Tests for the nean, 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:	 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	SAQA Credits		ITS Course Level Code		CESM Code (3 rd Order)			
	12	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 at have basic knowledge c	ole to demonst of probability.	rate tha	t s/he has the ability	to organ	nize and sum	marize data and			
Assessment Methods:	A module mark will be o practical work and tests comprehensive written s	btained from co . Tutorials will b summative asso	ontinuou e comp essmen	us summative assess ulsory. The final mar t and the module mai	ment ba k will be rk in the	sed on quizze obtained from ratio 2:3.	es, assignments, a 1 x 3 hour			
	Min Summative Assess	ment mark for e	exam ac	Imission (%)			40			
Accomment Weighting	Final mark =			% Summative Asses	sment N	lark	60			
Assessment weighting.	T mai maix –			% Summative Assessment Mark			40			
	Min Final Assessment n	Min Final Assessment mark to pass (%) 50								
		Paper 1		Paper 2	Pape	er 3	Paper 4			
Summative Assessment	Theory / Practical	Theory								
Paper:	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	MSTS011							
Module Name:	Introduction To Statist	Introduction To Statistics							
Module Content:	Definitions and conce statistics. Elementary variables and probabil	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 comp Distinguish the d Organize and sur Compute values Evaluate probabi Use elementary p	 fter successful completion of the module, the student should be able to Distinguish the different types ofdata; 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	SAQA Credits ITS Course Level Code CESM Code (3rd Order)							
	12	_		3 150301					
Periods per Week:	Classes	Practicals		Tutorial	Sem	inars	Independent Learning		
	5	0.5		1		0	4		
Pre-requisite module/s:	None								
Co-requisite module/s:	MMTH011								
Assessment Criteria:	A student should be have basic knowledge	able to demo of probability	nstrate 1	that s/he has th	e ability t	o organize	and summarize data and		
Assessment Methods:	A module mark will be practical work and tes written summative ass	obtained from sts. Tutorials sessment and	n contin will be o the moo	uous summative compulsory. Th dule mark in the	e assessm e final ma ratio 2:3.	ent based o ark will be ol	on quizzes, assignments, btained from a three-hour		
	Min Summative Asses	sment mark f	or exam	admission (%)			40		
	Final mark -			% Summative	Assessm	ent Mark	60		
Assessment weighting:	Final mark -			% Summative Assessment Mark			40		
	Min Final Assessment	mark to pass	(%)				50		
		Paper '	1	Paper 2	Pap	oer 3	Paper 4		
Summative Assessment	Theory / Practical	Theory	1						
Paper:	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 nterval; 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 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 Co	de (3 rd Order)
	12		3				150301
Periods per Week:	Classes	Practicals		Tutorial Seminars		6	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.						
	Min Summative Assess	sment mark for e	exam	admission (%)			40
A a a a a a a a a a t M/a i a h fin au	Final mark -			% Summative Ass	sessment I	Mark	60
Assessment weighting:	Filiai Iliaik -			% Summative Ass	sessment I	Mark	40
	Min Final Assessment	mark to pass (%)				50
		Paper 1		Paper 2	Paper 3		Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	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	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 completi Know the basic con Identify the important Derive distributions 	 After successful completion of the module, the student should be able to 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)						3 rd Order)
	20		3		150302		
	Classes	Practical	S	Tutorial	Ser	ninars	Independent Learning

Periods per Week:	6	0.5	2	0	8					
Pre-requisite module/s:	MMTH011, MMTH012, MS	IMTH011, MMTH012, MSTS011, MSTS012								
Co-requisite module/s:	MMTA021	MTA021								
Assessment Criteria:	A student should be able to distributions.	student should be able to demonstrate that s/he has a satisfactory knowledge of the theory of statistical stributions.								
Assessment Methods:	A module mark will be obta work and tests. Tutorials comprehensive written exa	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.								
	Min Summative Assessment mark for exam admission (%) 40									
	Final mark -		% Summative	60						
Assessment weighting:	Final mark -		% Summative	40						
	Min Final Assessment mar	k to pass (%)			50					
		Paper 1	Paper 2	Paper 3	Paper 4					
Summative Assessment	Theory / Practical	Theory								
Paper:	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 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 • Know the important • Estimate parameters • Conduct statistical to	 Inter successful completion of the module, the student should be able to Know the important sampling distributions. Estimate parameters. Conduct statistical tests. 						
Module Information:	SAQA Credits		ITS (Course Level Code		CESM Code	(3 rd Order)	
	12			3		15030	2	
Periods per Week:	Classes	Practicals		Tutorial Semi		nars	Independent Learning	
	6	0.5		2		0 8		
Pre-requisite module/s:	MMTH011, MMTH012, M	STS011, MST	5012					
Co-requisite module/s:	MMTA022							
Assessment Criteria:	A student should be able	to demonstrate	that s	s/he has a satisfacto	ry knov	vledge of statis	tical inference.	
Assessment Methods:	A module mark will be ob and tests. Tutorials will comprehensive written ex	tained from cor be compulso amination and	ntinuo ory. T the m	us assessment base The final mark will odule mark in the ra	d on qu be ob tio 2:3.	uizzes, assignn tained from a	nents, practical work a three-hour	
	Min Summative Assessm	ent mark for ex	am ao	mission (%)			40	
Accomment Weighting	Final mark =			% Summative Assessment Ma			ark 60	
Assessment weighting:	Filial Illark -			% Summative Asse	ssment	Mark	ırk 40	
	Min Final Assessment ma	ork to pass(%)					50	
		Paper 1		Paper 2	Pape	r 3	Paper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	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 Sele procedures.	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 Fit simple and multiple regression models. Select appropriate models. Test for adequacy of models. 								
Module Information:	SAQA Credits		ITS Co	ourse Level Code	e	CESM Cod	le (3 rd Order)		
	16			3		150)302		
Periods per Week:	Classes	Practicals		Tutorial	Semina	ars	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 a the theory of linear re	able to demon gression to re	strate tl al life p	hat s/he has a go roblems.	od knowled	ge of linear r	regression and can apply		
Assessment Methods:	A module mark will be and tests. Tutorials comprehensive writte	e obtained fro will be comp n examination	m continoulsory. and th	nuous assessme The final mark e module mark ir	nt based on will be ob the ratio 2	quizzes, as tained from :3.	signments, practical work a three-hour		
	Min Summative Asse	ssment mark	for exar	m admission (%)			40		
	Final mark -			% Summative Assess Mark			60		
Assessment Weighting:	Final mark =			% Summative A	ssess Mark		40		
	Min Final Assessmen	it mark to pas	s (%)				50		
		Paper 1		Paper 2	Paper 3	}	Paper 4		
Summative Assessment	Theory / Practical	Theory							
Paper:	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 com Understand mini- Know when to Analyze a multi-	 After successful completion of the module, the student should be able to 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 Co	urse Level Co	de	CESM Co	de (3 rd Order)			
	16			3		15	0302			
Periods per Week:	Classes	Practicals		Tutorial	Sem	inars	Independent Learning			
•	3	0.3		1		0	7			
Pre-requisite module/s:	MMTA022, MSTA02	1, MSTA022								
Co-requisite module/s:	None									
Assessment Criteria:	A student should be method, analyze a m	able to demonst nultivariate data	trate tha and writ	t s/he has the a e a report.	ability to sele	ect an appro	opriate multivariate			
Assessment Methods:	A module mark will t work and tests. Tuto comprehensive writt	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								
	Min Summative Asse	essment mark fo	or exam	admission (%)			40			
	Final mark -	_	%	% Summative Assessment Mark			60			
Assessment weighting:	Final mark -	-	%	Summative As	40					
	Min Final Assessme	nt mark to pass	(%)				50			
		Paper 1	Р	aper 2	Pape	er 3	Paper 4			
Summative Assessment	Theory / Practical	Theory								
Paper:	Duration	2 hrs								
	Sub minimum	40%								

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

Module Code:	MSTC032	MSTC032							
Module Name:	Sampling Theory								
Module Content:	Elements of Samplin Estimation, Differenc	g, Questionnair e and Regressi	e Desi ion Est	gn, Simple Rando imators, Systemat	m Sampling ic Sampling	, Stratified Ran	dom Sampling, Ratio		
Learning Outcomes:	After successful com Design a question Design a sample Estimate the pa Write a report.	 After successful completion of the module, the student should be able to Design a questionnaire Design a sample survey Estimate the parameters and standard errors Write a report. 							
Madula Information	SAQA Credits		ITS Co	ourse Level Code)	CESM Code (3 rd Order)		
module information:	16			3		150302			
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning		
	3	0.3		1		0	7		
Pre-requisite module/s:	MSTA021, MSTA022	2							
Co-requisite module/s:	None								
Assessment Criteria:	A student should be a survey, estimate the	able to demons parameters wit	trate th h their	hat s/he has the ab standard errors ar	oility to designd write a re	gn a questionna port.	aire, design a sample		
Assessment Methods:	A module mark will b and tests. Tutorials comprehensive writte	e obtained fron will be compu en examination	n contir ulsory. and th	nuous assessment The final mark v e module mark in t	t based on c will be obta the ratio 2:3	luizzes, assigni ained from a t	ments, practical work hree-hour		
	Min Summative Asse	essment mark for	or exar	n admission (%)			40		
	Final mark -			% Summative Ass	sess Mark	60			
Assessment weighting:	Final mark -			% Summative Ass	sess Mark	rk 40			
	Min Final Assessmer	nt mark to pass	(%)				50		
		Paper 1		Paper 2	Paper	3	Paper 4		
Summative Assessment	Theory / Practical	Theory							
Paper:	Duration	2 hrs							
	Sub minimum	40%							

DEPARTMENT: HUMAN PHYSIOLOGY

CURRICULUM INFORMATION							
epartment: 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:	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, attemptical output, blood vessels, blood flow and arterial pressure, lymphatics, blood setting and blood vessels.						
Learning Outcomes:	 Define Physiology 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:	20			3		130801	
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	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%).						
	Min Summative Assess	ment mark for e	exam a	admission (%)			40
Accocomont Waighting	Final Mark -			% Summative Asses	sment l	Mark	60
mooresoment weighting:				% Summative Asses	sment l	Mark	40
	Min Final Assessment r	mark to pass (%)				50

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

CURRICULUM INFORMATION							
Pepartment: 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	Systems Physiology II							
Module Content:	 Respiration: Functional characteristics, volumes and capacities, gas exchange, transport of gasses, regulation, and pathophysiology Filtration: Formation of urine, regulation of body fluids, acid-base balance and micturition, clinical abnormalities and renal disease Digestive system: Structure and function, alimentary canal, accessory organs, movements, digestive juices, absorption Nutrition: Digestion and metabolism, fat and water soluble vitamins, minerals Exercise: Performance, energy, training and recovery, body systems, in exercise, drugs Endocrine system: Hormones, hypothalamus, pituitary, thyroid, parathyroid, pineal and adrenal glands, pancreas, endocrine kidney Male reproductive system: Testes, duct system, accessory glands, external genitalia, semen Female reproductive system: anatomy, menstrual, uterine, vaginal and ovarian cycle Sexual health: STD's and HIV, methods of contraception, pregnancy, sexual dysfunction 								
Learning Outcomes:	 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 								
Module Information:	SAQA Credits		ITS C	ourse Level Code		CESM Code	e (3 rd Order)		
	20			3			130801		
Periods per Week:	Classes	Practicals		Tutorial	Semina	ars	Independent Learning		
Pro-requisite module/s:	4 X 45 mm	2 X 3 1 10015		0		0	5110015		
Co-requisite module/s.									
oo-requisite module/s:	Combination of all	ee toete/auizz	00 01	immative theory	accocomon	e chart a	ummative practical		
Assessment Methods:	assessments, practic	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 summative theory as	nark is calculated as follows: Average of summative theory and practical assessments (60%) and summative theory assessment (40%)							
	Min Summative Asse	Min Summative Assessment mark for exam admission (%)							
A	Final Mark -			Assessment Mark	60				
Assessment weighting:	Final Mark =		% Summative	Assessment Mark	40				
	Min Final Assessmen	it mark to pass (%)		50				
		Paper 1	Paper 2	Paper 3	Paper 4				
Summative Assessment	Theory / Practical	Theory							
Paper:	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:	MPLC031								
Module Name:	Pathophysiology								
Module Content:	Chronic diseases of lifestyle: Mortality patterns, hypertension, smoking, drugs and alcohol, dyslipidemia, obesity, diabetes mellitus, lifestyle induced cancers, stroke, exercise, diet Sexual health: PCOS, endometriosis, contraception; risk behaviour; PID and sexual dysfunction Introduction to occupational health and hygiene Anthropometry Ergonomics								
Learning Outcomes:	 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 hand tools 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 (3 rd Order)						
	32	3	130801						
Module Code:	MPLC031	MPLC031							
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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	MBIA021							
Co-requisite module/s:	MPLCO32								
Assessment Methods:	Combination of class assessments, practic mark is calculated as summative theory as	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%)							
	Min Summative Assessment mark for exam admission (%) 40								
Accessment Weighting	Einal Mark -	Final Made a		% Summative Assessment Mark					
Assessment weighting.			% Summative As	% Summative Assessment Mark					
	Min Final Assessment mark to pass (%) 5								
		Paper 1	Paper 2	Paper 3	Paper 4				
Summative Assessment	Theory / Practical	Theory							
Paper:	Duration	3 hrs							
	Sub minimum	40%							

CURRICULUM INFORMATION					
epartment: 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 C	Environmental and Occupational Physiology					
Module Content:	Occupational toxic testing and risk asse Environmental toxi	Occupational toxicology: introduction to occupational toxicology, toxicokinetics, toxicodynamics, toxicity testing and risk assessments Environmental toxicology: radiation pollution, water pollution, air pollution					
Learning Outcomes:	 Demonstrate an I Describe toxici agents Explain the bas Demonstrate a Define air pollu Discuss the atr loss List and shortly d Demonstrate a principles and 	 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 (3 rd Order)		
	32		3		130906		
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning
	4 x 45 min	2 x 3 hrs		0		0	10 hrs

Module Code:	MPLC032							
Module Name:	Environmental and Oco	Environmental and Occupational Physiology						
Pre-requisite module/s:	MBIA021	MBIA021						
Co-requisite module/s:	MPLC031	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%)							
	Min Summative Assess	40						
	Final Mark -	Final Mark =		Assessment Mark	60			
Assessment weighting:	Final Wark =			Assessment Mark	40			
	Min Final Assessment mark to pass (%) 50							
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	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:	ntroduction to Psychology					
Module Content:	Foundations of Psychology Learning Theories Developmental Psychology Personality, Emotions, Motivation & Stress Psychophysiology					
Learning Outcomes	 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 (3 rd Order)			
	12	3	180101			

Module Code:	MPCL011								
Module Name:	Introduction to Psycholo	ogy							
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning				
	5	0	2	0	1 hour				
Pre-requisite module/s:	None	None							
Co-requisite module/s:	None								
ASSESSMENT	Assessment will com guidelines for validity	Assessment will comply in all respects with the University of Limpopo Assessment Policy and the NQF quidelines 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							
	Minimum Form Asses	ssment Mark for exan	n admission (%)		40				
Assessment Weighting:	Final Mark -		% Summative Asses	60					
			% Summative Asses	40					
	Min Final Assessmen	nt mark to pass (%)			50				
		Paper 1	Paper 2	Paper 3	Paper 4				
Summative Assessment	Theory / Practical	Theory							
Paper:	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	MPCL012						
Module Name:	Research, Interpe	Research, Interpersonal Skills and Social Psychology						
Content:	Interpersonal Skill Psychology Introd to Research Cognitive Process	nterpersonal Skills Social 'sychology Introduction o Research Cognitive Processes (Human memory, perception & Sensation)						
Learning Outcomes	Students musStudents musStudents mus	 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. 						
Madula Information.	SAQA Credits	SAQA Credits		ITS Course Level Code			CESM Code (3 rd Order)	
module information:	12			3		180101		
Periods per week:	Classes	Practicals	1	futorial	Semin	ars	Independent Learning	
· · · · · · · · · · · · · · · · · · ·	5	0		2		0	1 Hour	
Pre-requisite module/s:	None	None						
Co-requisite module/s:	None							
ASSESSMENT	Assessment will c guidelines for valio	omply in all respe dity, reliability, fai	ects with the rness and pra	University c acticability	f Limpopo A	ssessment	Policy and the NQF	

Module Code:	MPCL012	MPCL012						
Module Name:	Research, Interperso	Research, Interpersonal Skills and Social Psychology						
Assessment Criteria	Students must be ab Students must be ab Students must be ab research and be able	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	Examinations, Tests and Assignments						
	Minimum Form Asse	40						
Assessment Weighting:	Final Mark -	Final Mark =		Assessment Mark	60			
	Filiai Wark -			% Summative Assessment Mark				
	Min Final Assessme	50						
		Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory						
Paper:	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	Research, Assessment and Developmental Psychology						
Content:	Research Methods F Assessment Developmental Psyc	Research Methods Psychological Assessment Developmental Psychology (Child)						
Learning outcomes	 At the end of the module the student will: 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 Co	ourse Level Code		CESM Code	(3 rd Order)	
	20			3		18010	1	
Periods per week:	Classes	Practicals		Tutorial	Seminars		Independent Learning	
	5	1		2		0	2 hrs	
Pre-requisite module/s:	MPCL011, MPCL012	2						
Co-requisite module/s:	None							
Assessment criteria	 At the end of the module you will: 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, sum (examination) assess allocated case studie	nmative (includ sment will be u es relevant to th	es grou sed. Pr ne thrus	up and individual ass actical work semina st of the degree will	signment rs, as we also be u	s, and tests) a Il as the prese sed.	nd summative ntation of specific	

Module Code:	MPSA021	MPSA021							
Module Name:	Research, Assessmen	Research, Assessment and Developmental Psychology							
	Minimum Form Asse	ssment Mark for	exam admission (%)	40				
Assessment Weighting:	Final marks			Assessment Mark	60				
	Final mark =		% Summative	40					
	Minimum final mark	50							
		Paper 1	Paper 2	Paper 3	Paper 4				
Summative Assessment	Theory / Practical	Theory							
Paper:	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, Medica	al and Social	Psycho	ology				
Model Content:	Social Psychology Personality Theories Medical Psychology							
Learning outcomes	 At the end of the module the student will: 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 Co	urse Level Code		CESM Code	(3 rd Order)	
	20	1		3		18010	1	
Periods per week:	Classes	Practicals		Tutorial Semin		ars	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: 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, sum (examination) assess allocated case studie	imative (includ sment will be u s relevant to th	es grou sed. Pra ne thrus	p and individual assi actical work seminars t of the degree will a	gnments s, as wel lso be us	s, and tests) a Il as the prese sed.	nd summative ntation of specific	

Module Code:	MPSA022	MPSA022							
Module Name:	Personality, Medic	Personality, Medical and Social Psychology							
	Minimum Form Asse	Minimum Form Assessment Mark for exam admission (%)							
Assessment Weighting:	Final mark -	First and F		Assessment Mark	60				
	Final mark =		% Summative	Assessment Mark	40				
		50							
		Paper 1	Paper 2	Paper 3	Paper 4				
	Theory / Practical	Theory							
Summative Assessment Paper:	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 Psych	ology and Mar	nageme	ent skills			
Model Content:	 I he 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. Explore management principals Planning, setting objectives and the benefits of good organisational skills Organising 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 – maximising effective communication Leading successful teams – motivation and the importance of trust Implementing skills and strategies to manage and resolve conflict 						
Learning outcomes	 The student must be able to define the basic concepts of Environmental Psychology. The student must be able 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 						
Module Information:	SAQA Credits		ITS Co	Course Level Code		CESM Code (3 rd Order)
	20			3		1302	01
Periods per week:	Classes	Practicals		Tutorial	Semin	ars	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 Psych	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 assessments, practic	Combination of class tests/quizzes, summative theory assessments, short summative practical assessments, practical reports and summative theory assessment at the end of the module						
	Minimum Form Asses	%)	40					
Assessment Weighting:	Final mark =		% Summative % Summative	e Assessment Mark e Assessment Mark	60 40			
	Minimum final mark to		50					
	•	Paper 1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory/Practical	Theory						
Paper:	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, Re	Psychopathology, Research and Community Psychology						
Content:	Research Methodolo	gy 2; Commun	ity Psy	chology; Psychop	athology			
Learning Outcomes	 Students should collection (scale community-cent report. Students must h the emergence the South Afr multidisciplinary critically analyse Students must h clinical assessm well mood disor personality diso disorders. Students must h community psyce 	 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 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 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 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. 						
Module Information:	SAQA Credits		ITS Co	ITS Course Level Code		CESM Code	(3 rd Order)	
	32			3		180	101	
Periods per week:	Classes	Practicals		Tutorial	Seminar	'S	Independent Learning	
-	5	1		2		0	3 hour	
Pre-requisite modules:	MPSA021,MPSA022							

Module Code:	MPSA031						
Module Name:	Psychopathology, Re	Psychopathology, Research and Community Psychology					
Co-requisite modules:	None	None					
Assessment criteria	 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, critisise, 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	 diagnosis, anxie suicide. They midisorders, schize Students must b research, comm 	 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, sum (examination) assess allocated case studies	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.					
	Minimum Form Asses	Minimum Form Assessment Mark for exam admission (%) 40					
	Final mark -		% Summative Asse	essment Mark	60		
Assessment weighting	Final mark -		% Summative Asse	essment Mark	40		
	Minimum final mark to	o pass (%)			50		
		Paper 1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory					
Paper:	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	MPSA032							
Module Name:	Statistics, Therapeut	tic and Develop	ment P	sychology					
Content:	Behavioural Statistic Adulthood)	Behavioural Statistics; Therapeutic Psychology; Developmental Psychology (Adolescence and Adulthood)							
Learning Outcomes	Students shou variables and I measures of ce	 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	 Students must following conc counseling rel process. They discovering ski Students must They must also appl and understating of 	 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. hey must also apply and critically analyse theories of development. They must further have knowledge ind understating of middle childhood, adolescence and social development. 							
Module Information:	SAQA Credits		ITS Co	urse Level Code		CESM Code	(3 rd Order)		
	32			3		18010	1		
Periods per week:	Classes	Practicals		Tutorial	Seminars		Independent Learning		
	5	1		2	0		3 Hour		
Pre-requisite module/s:	MPSA021, MPSA02	2							
Co-requisite module/s:	None								
Assessment methods	Comprehensive, sur (examination) asses allocated case studie	nmative (include sment will be us es relevant to th	es grou ed. Pra e thrus	p and individual assign actical work seminars t of the degree will al	gnments s, as wel lso be us	, and tests) a l as the prese ed.	nd summative ntation of specific		
	Minimum Form Assessment Mark for exam admission (%) 40								
Assessment Weighting:	Final mark =		%	% Summative Assessment Mark			k 60		
Assessment weighting.			%	Summative Assessm	nent Mar	k	40		
	Minimum final mark	to pass (%)			1		50		
		Paper 1		Paper 2	Paper 3	3	Paper 4		
Summative Assessment	Theory/Practical	Theory							
Paper:	Duration	3 hrs							
	Sub minimum	40%							
Module Information:	SAQA Credits		ITS C	ourse Level Code		CESM Code	(3 rd Order)		
	20			06	1404		3		
Periods per Week:	Classes	Practicals		Tutorial	Seminars		Independent Learning		
	2 × 90 min	None		None	No	one	12.9 hrs		
Pre-requisite module/s:	None								
Co-requisite module/s:	None	lone							

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 nonotechnology.				
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
	-	Paper 1	Paper 2	Paper 3	Paper 4
Summative Assessment Paper:	Theory / Practical	Theory			
	Duration	3 h			
	Sub minimum	40			