SCHOOL OF SCIENCE & TECHNOLOGY

POSTGRADUATE



2024 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 2023 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 2024

FIRST SEMESTER : 08 January 2024 - 26 July 2024

AUTUMN Recess(for students) : 02 April 2024 - 05 April 2024

WINTER Recess(for students) : 15 July 2024 - 26 July 2024

SECOND SEMESTER : 29 July 2024 - 13 Dec 2024

SUMMER Recess(University Recess) : 13 Dec 2024 - 06 Jan 2025

School Correspondence

All School correspondence to be addressed to:

The Dean

Sefako Makgatho Health Sciences University

School of Science & Technology

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Phumzile.zulu@smu.ac.za (P.A to the Dean)

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

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).
- 2. Research Institutes such as Agricultural Research Council (ARC), Botanical Institute, Zoological Gardens, Medical Research Council (MRC), Water Research Commission (WRC), Council for Scientific and Industrial Research (CSIR), National Research Foundation (NRF). All streams (Biology, 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).
- Telecommunications: Vodacom, Cell C, MTN. (ICT, Computer Science, Physics, Mathematics, Statistics, Biotechnology).
- 6. Mining:

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

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.

Dean - School of Science & Technology

UNIVERSITY VISION AND MISSION

VISION

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

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

MISSION

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

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

School Committees for Science & Technology

Board of the School

Chairperson: Prof CL Obi (Dean)

Members :

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

Executive Committee

Chairperson: Prof CL Obi (Dean)

Members :

All Heads of Academic Departments in the School

Community Engagement and Marketing Committee

Chairperson: Ms M Masethe

Members :

Departmental representatives Science outreach co-ordinator Marketing Department Student Representative

Examinations Committee

Chairperson: Prof CL Obi (Dean)

Members :

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

School Research and Innovation Committee

Chairperson: Prof SS. Gololo

Vice-Chairperson(s): Prof M. Aphane

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

Chairperson: Ms N Ntsoka

Members :

Departmental Representatives

Risk Management Committee

Chairperson: Dr T Ramarumo

Members :

Departmental Representatives

Marketing & Communications Chairperson

Marketing and Communication Committee

Chairperson: Ms EM Modise

Members :

Departmental Representatives

Work Integrated Committee

Chairperson: Prof L.L Mugivhisa

Members :

Departmental Representatives

DATES FOR SCHOOL BOARD MEETINGS = 2024

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

Wednesday 27 March 2024

Wednesday 29 May 2024

Tuesday 30 July 2024

MEMBERS OF STAFF

Office of the Dean

Dean Obi CL, Prof Zulu P, Ms Secretary Administrative Officer Nkobeni ML, Ms Administrative Officer Mashilwane RE, Ms Mobile Science Bus Seseng FC, Ms

Academic Departments

Academic Literacy and Science Communication

Head of Department Seleka ME, PhD (UNW)

Senior Lecturer Nair P, PhD (Univ of Kerala, India)

Senior Lecturer Hungwe V, PhD (UL) Senior Lecturer Marutla GB, PhD(UNW) Nkgadima GM, MA (UL) Lecturer Mamabolo JT MA (UL) Lecturer

Biochemistry and Biotechnology

Assoc. Prof /Acting HoD Gololo SS, PhD (SMU) Senior Lecturer Kgopa AH, PhD (SMU) Lecturer Thibane, V, PhD (UKZN) Lecturer Makhubela SD, MSc (WITS) Mathe EH, MSc (VENDA) Lecturer Lecturer Nemukula, M, MSc (SMU)

Vacant Lecturer

Laboratory Assistant Shikwambana MH, BSc (Hons) (SMU)

Natural Scientist Nthai, D, MSc (SMU)

Biology and Environmental Sciences

Professor & Head of Department King PH, PhD (UFS)

Professor Vacant

Welman J, PhD (STELLENBOSCH) Associate Professor

Associate Professor Mugivhisa L, PhD(SMU) Associate Professor Mkolo M. PhD (UP)

Senior Lecturer Moema EBE, PhD (MEDUNSA)

Buthelezi NMD, PhD(UKZN) Senior Lecturer Senior Lecturer Lebepe J, PhD(UL)

Lecturer Lion GN, MSc (UL) Lecturer Mavimbela C,MSc (UL) Modise EM, MSc (UL) Lecturer Lecturer Modise T, MSc (SMU) Aina OE, MSc (SMU) Lecturer Senior Technical Officer

Mnisi NML, BSc (Hons) (UL) Mooki KS,BSc (Hons) (UL) Senior Laboratory Assistant **Technical Officer** Mathole MC, MSc (SMU)

Chemistry and Chemical Technology

Acting Head of DepartmentRapulenyane N, PhD (NMU)Senior LecturerDebeila MA, PhD (WITS)Senior LecturerMolefe DM,PhD (UP)Senior LecturerNdawuni P,PhD (UNISA)LecturerMogane MG, PhD (UNISA)

Lecturer Makhubela NFH, MSc (MEDUNSA)

Mofokeng M L MSc (UEH)

Lecturer Mofokeng MJ, MSc (UFH)
Lecturer Mosebo B, MSc (NWU)
Lecturer Olivier MT,MSc (SMU)
Natural Scientist Masilela ZI,MSc (WSU)
Natural Scientist Sethoga LS, PhD (SMU)
Senior Technical Officer Semenya CJ,MSc (SMU)
Technical Officer Kgasi AN, B.Tech (TUT)

Laboratory Assistant Mokose R,

Computer Science and Information Technology

Head of DepartmentLecturer

Dandadzi TA, PhD (UL)
Hungwe T, PhD (SMU)

Lecturer Mathiba NS,MSc (Southern Univ. USA)
Lecturer Ndobe TV, Mcom(Information System (WITS)

Lecturer Masethe MA,M-Tech (TUT)
Junior Lecturer Sumbana V,BSc (Hons) (UNIVEN)
Junior Lecturer Masuku NS, BSc (Hons) (UNIZULU)

LaboratoryTechnician Nkosi MI, BSc (Hons)SMU

Mathematics and Applied Mathematics

Assos. Prof /HoD Aphane M,PhD (UNISA)

Senior Lecturer Adem K, PhD (North West Univ.)

Senior Lecturer
Senior Lecturer
Chin PWM, PhD (UP)
Tegegn TA, PhD (UP)
Senior Lecturer
Aremu K O, PhD (UKZN)
Lecturer
Thabane JL, PhD (SMU)
Lecturer
Bambe Moutsing CB, MSc (UP)

Lecturer Vijayasenan D, MSc (MAHATMA GANDHI)

Lecturer Fatlane MJ, MSc(SMU) Lecturer Maluleka R, MSc(SMU)

Lecturer Nkwanazana M, MSc(North West Univ)

Lecturer Bokodisa AT, MSc(SMU)
Junior Lecturer Kanyane MLS,BSc (Hons)(SMU)
Junior Lecturer Ndlovu PV, BSc (Hons)(SMU)
Junior Lecturer Medupe K, BSc(Hons) (SMU)
Junior Lecturer Ngwepe M.D,BSc (Hons) (SMU)

Physics

Acting Head of DepartmentMhlongo MR, PhD (SMU)Associate ProfessorSithole ME, PhD (UL)Senior LecturerMalevu TD, PhD (UFS)LecturerSelepe TL, MSc (SMU)LecturerBele A, MSc (SMU)

Junior Lecturer Moloi AN, B.ED (Hons) (UP)
Natural Scientist Ratlhagane CR, MSc (SMU)
Natural Scientist Rambevha TR,BSc (Hons) (UL)
Technical Officer 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

Vision

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

Mission

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

Sefako Makgatho Health Sciences University

Rules of the School of Science & Technology

School Rules in relation to the General Rules

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

Admission

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

Summative Assessment

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

Supplementary Assessment (For Undergraduate Studies Only)

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

Progression and Admission to subsequent Modules SST4

SST4.1 Where a student fails a first semester module he/she will be allowed (a) to proceed with the second semester module in the subject and (b) to repeat the first semester module 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.

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Postgraduate Degree Programme	ABBREVIATION	CODE	PAGI
Honours Degree (Honours Baccalaureus Scie	entiae)		13 - 6
Admission Criteria			
Honours Degree - Applied Mathematics	BSc	HSCT01	
Honours Degree – Biochemistry	BSc	HSCP01	
Honours Degree - Biology	BSc	HSCR01	
Honours Degree – Chemistry	BSc	HSCN01	
Honours Degree – Computer Sciences Information & Technology	BSc	HSCNCIT	
Honours Degree - Mathematics	BSc	HSCU01	
Honours Degree - Physics	BSc	HSCO01	
Honours Degree – Statistical Science	BSc	HSCV01	
Masters of Science (Magister Scientiae)			69 - 7
Admission Criteria			
Master of Science – Applied Mathematics	BSc	MAMA090	1
Master of Science – Biochemistry	BSc	MBIA090	-
Master of Science – Botany	BSc	MBOA090	=
Master of Science - Chemistry	BSc	MCHA090	
Master of Science - Computer Science & Information Technology	BSc	CSIT800	
Master of Science - Mathematics	BSc	MPCB090	1
Master of Science - Physics	BSc	MPHA090	1
Master of Science - Statistical Sciences	BSc	MSTA090	
Doctor of Philosophy (Philosophiae Doctor)			78 - 8
Admission Criteria			
Doctor of Philosophy – Applied Mathematics	BSc	MAMA100]
Doctor of Philosophy – Biochemistry	BSc	MBIA100	
Doctor of Philosophy – Botany	BSc	MBOA100	
Doctor of Philosophy – Chemistry	BSc	MCHA100]
Doctor of Philosophy – Mathematics	BSc	MMAA100	
Doctor of Philosophy – Physics	BSc	MPHA100	
Doctor of Philosophy – Statistical Sciences	BSc	MSTA100	

Bachelor of Science (Honours)

Rules for the Honours Degree

The General rules for honours degree apply

Admission into the BSc honours programme

SSTH1 For admission into honours degree, a candidate must have

- A Bachelor of Science (or equivalent) degree
- At least 60% obtained as an average final mark in the appropriate academic third-year level major module or course which is the prerequisite for access to the honours programme

SSTH2 For admission into honours in Statistics

- At least 60% pass in Statistics is required, and
- A pass in Mathematics

Programmes Offered

The School offers the following *BSc Honours Programmes*

BIOLOGY (Qualification: HSCR01)				
MZOO080	Research Project (Zoology)			
MZOA081	Environmental Biology			
MZOA082	Tick Biology			
MZOB081	Palaeontology and Philosophy of Biological Science			
MZOB082	Parasitology			

BIOCHEMISTRY	(Qualification: HSCP01)
MBIC080	Research Project (Biochemistry)
MBIA081	Research Methodology
MBIB081	Medical Biochemistry
MBIA082	Advanced Protein Chemistry
MBIB082	Applied Molecular Biology
APPLIED MATHE	EMATICS (Qualification: HSCT01)
MAPA080	Research Project (Applied Mathematics)
MAPB080	Mathematical Modelling with ODEs
MAPC080	Hydrodynamic Stability
MAPD080	Financial Mathematics
MAPE080	Advanced Mathematical Programming
MAPF080	General Theory of Relativity

MCHM080 Research Project (Chemistry) MCHA081 Advanced Organic Chemistry MCHB081 Advanced Inorganic Chemistry MCHA082 Advanced Physical Chemistry MCHB082 Advanced Analytical Chemistry COMPUTER SCIENCES (Qualification: HONCIT) CSIT700 Research Project (Computer and Information Technology) CSIT701 Advanced Database Systems Development
MCHB081 Advanced Inorganic Chemistry MCHA082 Advanced Physical Chemistry MCHB082 Advanced Analytical Chemistry COMPUTER SCIENCES (Qualification: HONCIT) CSIT700 Research Project (Computer and Information Technology)
MCHA082 Advanced Physical Chemistry MCHB082 Advanced Analytical Chemistry COMPUTER SCIENCES (Qualification: HONCIT) CSIT700 Research Project (Computer and Information Technology)
MCHB082 Advanced Analytical Chemistry COMPUTER SCIENCES (Qualification: HONCIT) CSIT700 Research Project (Computer and Information Technology)
COMPUTER SCIENCES (Qualification: HONCIT) CSIT700 Research Project (Computer and Information Technology)
CSIT700 Research Project (Computer and Information Technology)
CSIT701 Advanced Database Systems Development
,
CSIT703 Artificial Intelligence
CSIT705 Health Informatics (Object-Oriented Approach)
CSIT706 Computer Networks
CSIT708 Computer Security
CSIT709 Mobile Application Development (Intermediate)
CSIT710 Special Topics
MATHEMATICS (Qualification: HSCU01)
MMTH080 Research Project (Mathematics)
MMTA081 Group and Field Theory
MMTB081 General Topology
MMTC081 Complex Analysis
MMTD081 Measure Theory and Integration
MMTD082 Functional Analysis
MMTE082 Category Theory
MMTG082 Number Theory
MMTH082 Ring Theory
PHYSICS (Qualification: HSCO01)
MPHS080 Research Project (Physics)
MPHA081 Quantum Mechanics
MPHB081 Statistical Mechanics
MPHA082 Electrodynamics
MPHB082 Solid State Physics
STATISTICS (Qualification: HSCV01)
MSTS080 Research Project (Statistics)
MSTA081 Probability Theory
MSTA082 Statistical Inference
MSTB081 Sampling Theory
MSTC081 Biostatistics
MSTB082 Nonparametric Statistical Inference
MSTD081 Multivariate Analysis
MSTC082 Stochastic Processes
MSTE081 Categorical Data Analysis

DEPARTMENT: APPLIED MATHEMATICS

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)? NO	If YES, give the module codes:				

Module Code:	MAPA080M							
Module Name:	Research Project							
Module Content:		The student, in consultation with supervisor, selects a research topic in applied mathematics, does independent research and writes a report.						
Learning Outcomes:	Select a researcDo independentWrite a research	After successful completion of the module, the student should be able to Select a research topic. Do independent research. Write a research report.						
Module Information:	SAQA C	redits	ITS Course Lev	el Code	CESM	l Code (3 rd Order)		
wodule information:	40		6			150201		
Periods per Week:	Classes	Practicals	Tutorial	Seminars		Independent Learning		
	0	Res Project	0	1		Res Project		
Pre-requisite module/s:	None	None						
Co-requisites module/s:	None	None						
Assessment Criteria:	A student should be mathematics.	A student should be able to demonstrate that he has the ability to do independent research in applied mathematics						
Assessment Methods:	The final mark will b	e obtained from an	extended project es	say or resear	ch pape	er		
	Min Formative Asse	ssment mark for ex	am admission (%)			N/A		
A	F1 1 N	1	% Formative Assessment Mark			60		
Assessment Weighting:	Final M	iark =	% Summative Assessment Mark			40		
	Min Final Assessme	Min Final Assessment mark to pass (%)						
		Paper 1	Paper 2	Papei	r 3	Paper 4		
Summative Assessment	Theory / Practical	Research Project						
Paper:	Duration	Year						
	Sub minimum	N/A						

CURRICULUM INFORMATION						
Department:	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:	AMAT701			

Module Code:	MAPB080						
Module Name:	Mathematical Modelling with ODEs						
Content:	Linear systems, Non-Hermitian systems, Non-homogeneous systems, Qualitative systems and stability; Modelling population dynamics, Modelling infectious diseases: the SIR model: (1) recurrent diseases and (2) recruitments.						
Learning Outcomes:	At the end of the module students should be able to: Define and distinguish between linear and non-linear systems, Define and distinguish between Hermitian and non-Hermitian systems, Explain and draw phase diagrams for qualitative systems, Conceptualise apply the concept of stability, Explain the concepts used in modeling problems in population dynamics, Design and solve the SIR epidemiological model						
Module Information:	SAQA Cred	dits		ITS Course Level Co	ode	CESM	Code (3 rd Order)
Module information.	20			6			150201
Periods per week:	Classes	Practicals		Tutorial	Seminars		Independent Learning
-	4 x 45 min	0		0		0	10 hrs
Pre-requisite module/s:	None						
Co-requisites module/s:	None						
Assessment Criteria:		Continuous formative assessment based on Quizzes, 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 1:1 respectively, to get the final mark. There will be no supplementary assessment						
	Min Formative Asse	ssment mark fo	or exa	am admission (%)			40
A	Fig. 1 M	l =l		% Formative Assess	ment M	lark	60
Assessment Weighting:	rinai w	Final Mark =			% Summative Assessment Mark		
Min Final Assessment mark to pass (%)						50	
	-	Paper 1		Paper 2	F	Paper 3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

CURRICULUM INFORMATION						
Department:	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:	AMAT702			

Module Code:	MAPC080						
Module Name:	Hydrodynamic Stability						
Content:	The stability theory: Absolute instability and convergence instability, Thermal instability; Linearised stability equations: Tollmien-Schlichting waves, Parallel instability, Orr-Sommerfeld equation; Spatia and temporal stability theories: Rayleigh equation, Rayleigh criterion for instability; Stability analysis o pipe flow.						
Learning Outcomes:	At the end of the module students should be able to: Explain the concept of stability Define and differentiate between absolute, convergence, thermal and parallel instabilities, Linearise non-linear stability equation Derive Orr-Sommerfeld and Squires equations Derive Tollmien-Schlichting's wave equation Derive the Rayleigh equation Apply the Rayleigh criterion for instability to solve problems						nstabilities,
	SAQA Credits ITS Course Level Code CESM Code (3rd Ord						I Code (3 rd Order)
Module Information:	20	uite	- ''	6			150201
Periods per week:	Classes	Practica	als	Tutorial	Seminars		Independent Learning
•	4 x 45 min	0		0		0	10 hrs
Pre-requisite module/s:	None						
Co-requisites module/s:	None						
Assessment Criteria:	Continuous formativ Summative assessn					gnments, Pra	cticals and Tests.
Assessment Methods:	A module mark will I assessment in the ra						
	Min Formative Asse	ssment mark t	for exar	m admission (%)			40
Accomment Weightings	Final	Mark =		% Formative Assessment Mark			60
Assessment Weighting:	rinai i	viark –		% Summative Assessment Mark			40
	Min Final Assessme	ent mark to pas	ss (%)				50
		Paper	1	Paper 2	F	Paper 3	Paper 4
Summative Assessment	Theory / Practical	Theory	/				
Paper:	Duration	3 hrs					
	Sub minimum	40%					

CURRICULUM INFORMATION							
Department:	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:	AMAT703				

Module Code	MAPD080								
Module Name:	Financial Mathematics								
Content:	Probability; Normal F Brownian Motion a Numerical Schemes	nd ITO Form	nula; Ar	neory of Interest Rates bitrage Pricing; The	and F Black	Present Value x-Scholes For	Analysis; Geometric rmula and Markets,		
Learning Outcomes:	 Explain the conc Understand and Define and differ Distinguish betw Define stocks an Valuate options of the concept of	 Understand and use random variables and probability distributions, Define and differentiate between simple and compound interest, Distinguish between the present value and the future value, Define stocks and options, Valuate options using the binomial tree and the Black-Scholes formula, Discuss the Geometric Brownian Motion, Explain and apply Ito's formula, Understand Arbitrage pricing, 							
Module Information:	SAQA Cred	dits	IT:	ITS Course Level Code CESM Code (3rd Order)					
Module information.	20			6			150201		
Periods per week:	Classes	Practica	ıls	Tutorial	S	Seminars	Independent Learning		
	4 x 45 min	0		0		0	10 hrs		
Pre-requisite module/s:	None								
Co-requisites module/s:	None								
Assessment Criteria:				on Quizzes, Tutorials, e end of the module.	Assig	ınments, Prac	cticals and Tests.		
Assessment Methods:				ntinuous assessment and get the final mark. T					
	Min Formative Asse	ssment mark f	for exan	n admission (%)			40		
A	F:11	Ml		% Formative Assess	sment	Mark	60		
Assessment Weighting:	Finai i	Mark =		% Summative Asses	ssmer	it Mark	40		
	Min Final Assessme	nt mark to pas	ss (%)				50		
	-	Paper	1	Paper 2		Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory				-			
Paper:	Duration	3 hrs							

	CURRICULUM INFORMATION							
Department:	Department: Mathematics and Applied Mathematics School: Science & Technology							
Last Revision date:	2011	First Year Offered (New):	2013					
Replace this Module	Replace this Module existing module(s)? YES If YES, give the module codes: AMAT704							

Module Code:	MAPE080								
Module Name:	Advanced Mathematical Programming								
Content:		Optimization of 1-D functions, Multidimensional unconstrained optimization, Non-linear constrained optimization; Essence of mathematical programming.							
Learning Outcomes:	At the end of the module students should be able to: Design a simplex algorithms for linear equations with three variables Apply the simplex algorithm to solve problems Design the dual simplex algorithm Apply the dual simplex algorithm to solve problems Distinguish between various integer programming problems Formulate Integer programming problems Use the branch-and-bound methods to solve integer programming problems Construct the objective function and the decision variables for a goal programming problem Learn about advanced topics in linear programming Differentiate between concave and convex functions Solve non-linear programming problems in one variable Solve unconstrained maximization and minimization problems with several variables Understand and apply the Kuhn-Tucker conditions to solve problems Learn about more advanced topics on non-linear programming								
Module Information:	SAQA Cred	dits	ITS Course Level Code			CESM	l Code (3 rd Order)		
module illiorillation.	20			6			150201		
Periods per week:	Classes	Practicals		Tutorial	S	Seminars	Independent Learning		
B 1.14.	4 x 45 min	0		0		0	10 hrs		
Pre-requisite module/s:	None								
Co-requisites module/s:	None								
Assessment Criteria:	Continuous formativ Summative assessn					ınments, Pra	cticals and Tests.		
Assessment Methods:	A module mark will the assessment in the rates assessment.								
	Min Formative Asse	ssment mark for	exam adm	ission (%)			40		
Annual Martin Latin	Fig. 11	Maris =	% F	% Formative Assessment Mark			60		
Assessment Weighting:	Finai i	Mark =	% S	% Summative Assessment Mark			40		
	Min Final Assessme	nt mark to pass	(%)				50		
		Paper 1		Paper 2		Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory			1	-			
oullillative Assessifietti									
Paper:	Duration	3 hrs							

	CURRICULUM INFORMATION								
Department:	Department: Mathematics and Applied Mathematics School: Science & Technology								
Last Revision date:	Last Revision date: 2011 First Year Offered (New): 2013								
Replace this Module	Replace this Module existing module(s)? YES If YES, give the module codes: AMAT705								

Module Code:	MAPF080								
Module Name:	General Theory of Relativity								
Content:	Schwarzschild solu	Riemannian Geometry; Einstein equations; Weak field approximation of the field equations; The Schwarzschild solutions of Einstein's equation and its consequences; The Tolman solution; The Kern solution; The cosmological principle; The effects of the non-causal bulk viscosity.							
Learning Outcomes:	 Define the conce Derive Einstein Apply the Weak Derive the Schw Derive the Tolm Define the conce 	At the end of the module students should be able to: Define the concept of Riemannian Geometry Derive Einstein Equations Apply the Weak field approximatio Derive the Schwarzschild solution to the Einstein equation Derive the Tolman and the Kerr solutions							
Module Information:	SAQA Cre	dits	ITS C	ourse Level Code	CESM Co	de (3 rd Order)			
module information.	20			6	15	0201			
Periods per week:	Classes	Practica	ls	Tutorial	Seminars	Independent Learning			
	4 x 45 min	0		0	0	10 hrs			
Pre-requisite module/s:	None								
Co-requisites module/s:	None								
Assessment Criteria:				on Quizzes, Tutorials e end of the module.	s, Assignments, Prac	cticals and Tests.			
Assessment Methods:				ntinuous assessment o get the final mark.					
	Min Formative Asse	essment mark t	for exan	n admission (%)		40			
Assessment Weighting:	Einal	mark =		% Formative Asses	ssment Mark	60			
Assessment weighting.	Filiai	IIIaik –		% Summative Asse	essment Mark	40			
	Min Final Assessment mark to pass (%) 50								
		Paper '	1	Paper 2	Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory	1						
Paper:	Duration	3 hrs							
	Sub minimum	40%							

DEPARTMENT: BIOCHEMISTRY & BIOTECHNOLOGY

	CURRICULUM INFORMATION							
Department:	Department: Biochemistry & Biotechnology School: Science & Technology							
Last Revision date:	ast Revision date: 2011 First Year Offered (New): 2013							
Replace this Module	eplace this Module existing module(s)? YES If YES, give the module codes: ABIO600							

Module Code:	MBIC080								
Module Name:	Research Project								
Module Content:		Conduct a supervised research project and write a mini-dissertation. Students are expected to present/discuss at least three research publications from reputable scientific journals during seminar sessions							
Learning Outcomes:	Construct a reseaConduct experimeWrite a mini-dissePresent the resea	After successfully completing the module, the student should be able to: Construct a research project in Biochemistry Conduct experiments, compile data and analyse the data constructively Write a mini-dissertation on research performed in the laboratory Present the research results obtained using Power Point Present SAPSE accredited publications during seminar presentations							
Module Information:	SAQA Credits		ITS Course	Level Code		CESM Cod	de (3 rd Ord	der)	
Module illiorination.	40			6		1302	01		
	Classes	Practicals		Tutorial			Indeper Learn		
Periods per Week:	0	Research Proj	ect	0	0		Research Project	n	
Pre-requisite module/s:	None								
Co-requisites module/s:	None								
Assessment Methods:	Combination of quizz assessment in the fo								
	Min Summative Asse	essment mark fo	or exam admi	ssion (%)			N	N/A	
A (184) 1 (1	<u>-</u>		% Summative Assess Mark				(60	
Assessment Weighting:	Final mark =		% Summ		4	40			
	Min Final Assessmer	nt mark to pass	(%)					50	
		Paper 1		Paper 2	Pa	per 3	Pa	aper 4	
Summative Assessment Paper:	Theory / Practical	Research Proj	ect						
·	Duration	Y							
	Sub minimum	N/A						·	

	CURR	ICULUM	INFOR	MATION			
Department: Biochemis	try & Biotechnology			School: S	Science & Te	chnology	
Last Revision date: 2011				First Year	Offered (Ne	w):	2013
Replace this Module existing	module(s)? YES			If YES, giv	e the modul	e codes:	ABIO604
Module Code:	MBIA081						
Module Name:	Research Methodology						
Module Content:	Basic research concepts interpretation, statistical a						n and
Learning Outcomes:	To acquire an in deptTo acquire the skills f						
Madula Infansation	SAQA Credits		ITS Co	urse Level Co	ode	CESM Code	e (3 rd Order)
Module Information:	20			6		13020	1
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning
·	9	continuous				2	5 hrs
Pre-requisite module/s:	None						
Co-requisites module/s:	None						
Assessment Criteria:	To test if all the skills as	required by	the outo	omes set for t	his module a	re in place	
Assessment Methods:	Summative theory asses summative theory assess		tten and	power point p	resentation o	of assignment	s; seminars;
	Min Continuous Assessn	nent mark fo	r exam	admission (%))		40
Assessment Weighting:	Final mark =			% Continuou	s assessmer	nt	60
Assessment Weighting.				% Summativ	e assessmer	it	40
	Min Final Assessment m	ark to pass	(%)				50
	N/A	Paper 1		Paper 2	Paper	3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

	CURR	ICULUM IN	FORMA	TION				
Department: Biochemistry	& Biotechnology			School: Sci	ence & Tec	hnology		
Last Revision date: 2011				First Year O	ffered (Nev	v):	2013	
Replace this Module existing module(s)? YES				If YES, give	the module	e codes:	ABIO603	
Module Code	MBIA082							
Module Name:	Advanced Protein (Chemistry						
Module Content:	Protein purificat dialysis, proteinProtein sequence	precipitation,	column c	hromatography,	electropho	resis.		
Learning Outcomes:	In depth knowledge module	of the theory	and tech	niques of Advan	ced Protein	Chemistry in	ncluded in this	
Module Information:	SAQA Credits	_	ITS Cou	rse Level Code		CESM Cod	e (3 rd Order)	
Module Illiorillation.	20			6		130201		
Periods per Week:	Classes	Practicals		Tutorial	Semin	nars	Independent Learning	
	9	9 continuous				2	5 hrs	
Pre-requisite module/s:	None							
Co-requisites module/s:	None							
Assessment Criteria:	To test a sound kno	owledge all the	e theory a	ind techniques ir	nvolved in t	his module		
Assessment Methods:	Summative theory a seminars; summative			nd power point p	resentation	of assignme	ents;	
	Min Summative Ass	sessment mar	k for exar	m admission (%)			40	
Assessment Weighting:	Final mark :	_	%	% Continuous assessment			60	
Assessment Weighting.	i iliai iliai k		%	Summative as	sessment		40	
	Min Final Assessmo	ent mark to pa	ass (%)				50	
		Pa	per 1	Paper :	2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Th	eory					
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)? YES	If YES, give the module codes: ABIO603						

Module Code:	MBIB081								
Module Name:	Medical Biochen	nistry							
Module Content:		Structure and function of peptide hormones and steroids, antibody production and applications, enzymes as diagnostic tools, cancer biochemistry.							
Learning Outcomes:	In depth knowled	In depth knowledge of the theory and techniques of Medical Biochemistry included in this module							
M. I. I. I. C C	SAQA Credits		ITS Course Le	vel Code	CESM Co	ode (3 rd Order)			
Module Information:	20			6		130204			
Periods per Week:	Classes	Practicals	Tutoria	I Se	minars	Independent Learning			
·	9	continuous			2	5 hrs			
Pre-requisite module/s:	None		•	•					
Co-requisites module/s:	None								
Assessment Criteria:		d knowledge all th outcomes set for tl	•	hniques involve	d in this modu	lle is in place as			
Assessment Methods:	Summative theo Written and pow Seminars Summative theo	er point presentat	ion of assignmer	nts					
	Min Summative	Assessment mark	for exam admis	sion (%)		40			
A	Fire -1		%	% Continuous assessment		60			
Assessment Weighting:	Final m	nark =	%	% Summative assessment 40					
	Min Final Assess	sment mark to pas	ss (%)			50			
Summative Assessment		Paper 1	Paper 2	P:	aper 3	Paper 4			

	CURRICULUM INFORMATION							
Department:	Department: Biochemistry & Biotechnology School: Science & Technology							
Last Revision date:	ast Revision date: 2011 First Year Offered (New): 2013							
Replace this Modul	eplace this Module existing module(s)? YES If YES, give the module codes: ABIO602							

Module Code:	MBIB082	MBIB082					
Module Name:	Applied Molecular Biology						
	Recombinant DNA n	nolecules, PC	R, isolation of cloned હ	genes, in vitro	mutagenes	sis, introduction of	
Module Content:	0 0		nesis of oligonucleotid				
Module Content.	_	and molecular biology of cancer, generation of agriculturally important plants, animal bio					
		_	NA –based diagnosis				
Learning Outcomes:	In depth knowledge	of the theory a	and techniques of App	lied Molecular	Biology ind	cluded in this module	
Module Information:	SAQA Credits		ITS Course Level Co	ode	CESM Co	de (3 rd Order)	
Module information.	20		6		130)203	
Periods per Week:	Classes	Practicals	Tutorial	Semin	ars	Independent Learning	
	9	continuous	0		2	5 hrs	
Pre-requisite module/s:	None	None					
Co-requisites module/s:	None						
Assessment Criteria:	To test if a sound kn	owledge all th	e theory and techniqu	es involved in	this module	e is in place as	
Assessment Criteria:	required by the outco	omes set for th	nis module				
	Summative theory as	ssessments					
Assessment Methods:	Written and power point presentation of assignments Seminars						
	Summative theory assessment.						
	Min Commenting Asset		for every adminsion (0/\		40	
	iviin Summative Asse	essment mark	for exam admission (40 60	
Assessment Weighting:	Final mark =	1		% Continuous assessment% Summative assessment			
	Min Final Assassma	nt mark to no		e assessment		40 50	
	Min Final Assessme		· ′ .	ln.			
	H. 15	Paper 1	Paper 2	Pape	r 3	Paper 4	
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
	Sub minimum	40%					

DEPARTMENT: BIOLOGY & ENVIRONMENTAL SCIENCES

CURRICULUM INFORMATION				
Department: Biology & Environmental 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: BLGY700 MZOO070			

Module Code:	MZOO080					
Module Name:	Research Project					
Module Content:		Students will undertake a research project of original research of the student's own choice from a list of suggested topics within the research scope of one of the modules presented.				
Learning Outcomes:	To perform, write up and	present inde	pendent research			
Madula lufammatian	SAQA Credits		ITS Course Level (Code	CESM C	ode (3 rd Order)
Module Information:	40		6		13	0601
Daviada way Washy	Classes	Practicals	Tutorial	Semi	nars	Independent Learning
Periods per Week:	1 day/week & 5 weeks in 2 nd semester	Research project	Per arranger	ment	2	Research Project
Pre-requisite module/s:	None					
Co-requisites module/s:	None					
Assessment Criteria:	The research project has Written publication fo Poster format to be e	rmat to be ev	aluated by the relev		rs	
Assessment Methods:	Research Project to be c	ompleted. pr	esented in publication	on format and	d a poster p	oresentation
	Min Continuous Assessn	nent mark for	exam admission (%	6)		N/A
A 4 \ \ \ \ - \ \ - \ \ \ \	Final mark =		% Publication written format % Poster & Presentation			60
Assessment Weighting:	rmai mark –					40
	Min Final Assessment mark to pass (%) 50					50
		Paper 1	Paper 2	Pape	r 3	Paper 4
Summative Assessment	Theory / Practical					
Paper:	Duration					
	Sub minimum					

CURRICULUM INFORMATION				
Department:	Biology & Environmental 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:	BLGY701 MZOO071	

Module Code:	MZOA081						
Module Name:	Environmental Biology						
Module Content:	The understanding of different environmental factors that affects animals and plants. The study will also focus on various forms of pollution and the general effects on plants and animals. Relationship between populations, natural resources, land use, agriculture, biodiversity, industrialization and pollution will be examined. A bio-monitoring approach will be used to understand and evaluate the impact of pollution on the environment.						
Learning Outcomes:	Environmental (inRelationships bet	In depth knowledge of: Environmental (including pollution) factors affecting life Relationships between man & nature To get accustomed to all techniques pertaining to this field of study					
Module Information:	SAQA Credits		ITS Co	ourse Level Cod	de	CESM Cod	e (3 rd Order)
wodule information:	20			6		1306	05
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning
•	9 for 5 weeks	continuous				2	5 hrs
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	Determine if the know	vledge obtained	compli	es with the outco	mes set		
Assessment Methods:	Summative theory as summative theory as		ten, po	wer point and po	ster preser	ntation of as	signments;
	Min Continuous Asse	essment mark fo	r exam	admission (%)			40
A 4 \ \ \ \ - \ \ - \ \ \ \	Final mark =			% Continuous assessment			60
Assessment Weighting:	Finai mark =	i		% Summative a	assessmen	ent 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: Biology & Environmental 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:	BLGY703 MZOO072

Module Code:	MZOA082					
Module Name:	Tick Biology					
Module Content:	Identification and description of different tick species; the medical and economic importance of ticks; vector capacity of ticks; tick physiology and tick control. Techniques related to tick breeding, field collection of ticks, laboratory tick incubation, tick-host interaction and tick control.					
Learning Outcomes:			of all aspects of Aca ues pertaining to this			
Module Information:	SAQA Credits		ITS Course Leve	el Code	CESM Code (3rd Order)	
wodule information:	20			6	130504	
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning	
	9 for 5 weeks	continuous	0	2	5 hrs	
Pre-requisite module/s:	None					
Co-requisite module/s:	None					
Assessment Criteria:	Determine if the kn	owledge obtained	complies with the o	utcomes set		
Assessment Methods:	Summative theory summative theory		ritten, power point	and poster pres	entation of assignments,	
	Min Summative As	sessment mark fo	or exam admission (%	%)	40	
A	Final man		% Cont	nt 60		
Assessment Weighting:	Final mark =		% Sum	% Summative assessment		
	Min Final Assessm	ent mark to pass	(%)		50	
		Paper 1	Paper 2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Theory				
Paper:	Duration	3 hours				
	Sub minimum	40%				

MODULE INFORMATION					
Department: Biology & Environmental 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:		BLGY704 MZOB071		

Module Code:	MZOB081	MZOB081						
Module Name:	Palaeontology a	Palaeontology and Philosophy of Biological Science						
Module Content:	anatomical and of remains of homin ins found in Sour module prepares	Understanding of the principles of vertebrate evolution by integrating palaeontological, comparative anatomical and embryological information. Application of cladistics to the diversity of fossils, including remains of homin ins found in South Africa and the identification of the strata where these fossils are found. The module prepares the student to do independent research and to think and present his thoughts scientifically.						
Learning Outcomes:	evolution	·	Ū	oout vertebrate evo		and specifical	ly human	
Module Information:	SAQA Credits		ITS Co	urse Level Code		CESM Code	e (3 rd Order)	
Module information.	20			6		131203	}	
Periods per Week:	Classes	Practicals		Tutorial	Seminars		Independent Learning	
	9 for 5 weeks	continuous			2		5 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	Determine if the	knowledge o	btained	complies with the	outcomes set			
Assessment Methods:	Written, power p	Summative theory assessments, Written, power point and poster presentation of assignments Summative theory assessment.						
	Min Summative	Assessment	mark fo	r exam admission (%)		40	
Assessment Weighting:	Final mark	_		% Continuous assessment			60	
Assessment Weighting.	i iliai iliaik			% Summative	assessment	40		
	Min Final Assessment mark to pass (%)				n/a			
	#\ /	Paper 1		Paper 2	Paper 3	F	aper 4	
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hours						
	Sub minimum	40%						

CURRICULUM INFORMATION				
Department: Biology & Environmental 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: BLGY705 MZO0072			

Module Code:	MZOB082						
Module Name:	Parasitology						
Module Content:	protozoan, trematod sampling techniques	Fish as host for parasites. The classification, identification, morphology and life cycles of different protozoan, trematode, cestode and arthropod parasites occurring on fish. The course also includes sampling techniques and techniques required to fix, stain and mount these parasites for light microscopy as well as techniques to study these parasites using the scanning electron microscope.					
Learning Outcomes:	on/in fish		of protozoan, trema		·	parasites occurring	
Module Name:	Parasitology						
	SAQA Credits		ITS Course Level (Code	CESM Code	(3 rd Order)	
Module Information:	20		6		1305	04	
Periods per Week:	Classes	Practicals	Tutorial	Semir	nars	Independent Learning	
р.	9 for 5 weeks	continuous			2	5 hrs	
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	Determine if the kno	wledge obtaine	ed complies with the	outcomes set			
Assessment Methods:	Summative theory a summative theory as		ritten, power point a	and poster pres	entation of as	signments,	
	Min Summative Ass	essment mark	for exam admission	(%)		40	
Accoment Weighting	Final mark =		% Continuous assessment			60	
Assessment Weighting:	Filiai Iliaik -		% Summative assessment			40	
	Min Final Assessme	nt mark to pas	s (%)			50	
		Paper 1	Paper 2	Pape	er 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 & Information Technology	School: Science and Technology			
Last Revision date: 2011	First Year Offered (New): 2017			
Is this Module replacing existing module(s)? No	If YES, give the module codes:			

Module Code:	CSIT700	CSIT700								
Module Name:	Research Proj	ect								
Module Content:		A research topic from one of several computer science specializations offered in the Department i chosen in consultation with the academic staff member responsible						epartment is		
Learning Outcomes:	demonstrate kr	After successful completion of the module, the student should be able to demonstrate knowledge of different types of research methods, research framework, acquisition of research skills and methodologies required for the research report							acquisition of	
Module Information:	SAQA Credits ITS Course Level Code CESM Code (3rd O					Order)				
Module Information.	40			8	3			060101		
Delivery Information:	Camp	us		Full/Pa	rt Time			Period (1st/2nd	Sem)	
Delivery illiorillation.	SMU			Contact,	Full Tim	е	1 st & 2 nd Semes		ester	
Periods per Week:	Classes	Practica		Tuto	rial	Semi	nars	Independent Learnin		
Terious per Week.	0	Research P	roject	0		1	1 Resear		n Project	
Pre-requisite modules for this module:	None									
Co-requisites modules for module:	None									
ASSESSMENT:										
Assessment Criteria:	A student shoul of a given res				s/he has	s the ability	to deve	lop a relevant re	search report	
Assessment Methods:	The final mark	will be obtair	ned from	n the rese	earch pro	ject repor	and pre	sentation.		
	Min Formative	Assessment	mark fo	or exam a	dmissior	า (%)			N/A	
Assessment Weighting:	Final mark =	% For	6 Formative Assess Mark						N/A	
Assessment Weighting.		% Sur	6 Summative Assess Mark						100%	
	Min Final Asses	al Assessment mark to pass (%) 50%							50%	
Summative Assessment			Paper 1 Paper 2 Paper 3				Paper 4			
Paper:	Theory / Praction	cal Res	earch P	roject						
	Duration		Year							
	Sub minimum		N/A							

CURRICULUM INFORMATION						
Department: Computer Science & Information Technology	School: Science and Technology					
Last Revision date: 2011	First Year Offered (New): 2017					
Is this Module replacing existing module(s)? No	If YES, give the module codes:					

Module Code:	CSIT701 S1(T1	CSIT701 S1(T1 & T2)						
Module Name:	Advanced Database Systems Development							
Module Content:	 LAMP (Linux, Ar Server-side prog Knowledge of Ar Database design Integrating PHP 	Web page development including HTML and CSS						
Learning Outcomes:	 Apply skills for w Query the datab Apply knowledge Apply knowledge Extract hidden k 	After successful completion of the module, the student should be able to Apply skills for web-based development and implementation of a database system Query the database and retrieve decision making information. Apply knowledge of XML and XSLT Apply knowledge of styles using CSS in professional designs Extract hidden knowledge from unstructured data						
Module Information:	SAQA Credits		ITS Co	urse Lev	el Code		Code (3 rd Order)	
module information.	20			8			061002	
Delivery Information:	Campus			Full/Part Time			d (1st/2ndSem)	
Zenrery intermediation	SMU					t Semester		
Periods per Week:	Classes 5	Practica 2	als Tut	orial	Seminars 0	<u>Indep</u>	endent Learning 10 Hours	
Pre-requisite modules for this module:	COSC311			ı	0		TO HOUIS	
Co-requisites modules for module:	None							
ASSESSMENT:								
Assessment Criteria:	measures, run trans business.	sactions, ar	nd provide sto	ored info	rmation neede	ed by the organi	apply access control zation to carry out its	
Assessment Methods:		final mark					assignments, practical on and the continuous	
	Min Formative Asse	ssment ma	rk for exam a	dmission	ı (%)		40%	
Accomment Maighting	Final mark =	% Format	tive Assess M	lark			60%	
Assessment Weighting:	Final mark =	% Summa	ative Assess	Mark			40%	
	Min Final Assessme	ent mark to	pass (%)				50%	
		Pa	per 1	Р	aper 2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Th	ieory		-	•	·	
Paper:	Duration	3 H	Hours					
	Sub minimum	4	.0%					

CURRICULUM INFORMATION						
Department Computer Science & Information Technology	School: Science and Technology					
Last Revision date: 2011	First Year Offered (New): 2017					
Is this Module replacing existing module(s)? No	If YES, give the module codes:					

	, , , , , , , , , , , , , , , , , , ,								
Module Code:	CSIT703 S1(T1 &	T2)							
Module Name:	Artificial Intelligence								
Module Content:	Basic Components an Games; Real-Time Str Platform Games; Shoo	Basic Definitions and Concepts of Artificial Intelligence (AI) game engine programming; An AI Engine: the Basic Components and Design; Alsteroids: Our AI Test Bed; Role-Playing Games (RPGs); Adventure Games; Real-Time Strategy (RTS) Games; First-Person Shooters/Third-Person Shooters (FTPS); Platform Games; Shooter Games; Sports Games; Racing Games; Classic Strategy Games; Fighting Games; Miscellaneous Genres of Note; Finite-State Machines; Fuzzy-State Machines (FuSMs);							
Learning Outcomes:	Knowledge of the t Knowledge of the t Knowledge of the f Acquiring of actual used. Knowledge of the contract of the game of the game of the game of the game and examinate optimized in the fut	ools and ir our princip game dev common te Al engine. rations, sol ning concre actual code al-world ex	nformation of le elements elopment s rminology, lutions, and ete example e implemen	levelopers not of game art wills going be the underlying even comments of Al used ations for earth	eed to create moificial intelligence yond merely dis g concepts of A on pitfalls, cover in actual comm ch Al technique	odern game AI engine cussing how a tech I, and discovery of ing the majority of itercial games. presented, both in	nique might be the different modern game skeletal form		
Module Information:	SAQA Credits	S	ITS C	ourse Level	Code	CESM Code (
module illiorillation.	20			8		060102	2		
Delivery Information:	Campus		Full/Part Time			Period (1st/2			
Denvery information.	SMU			Contact, Full Time		1st Semes	ster		
Periods per Week:	Classes 5	Pract		Tutorial	Seminars 0	Independent Learni 10 Hours			
Pre-requisite modules for this module:	COSC211				0	10110	ouis		
Co-requisites modules for module:	None								
ASSESSMENT:									
Assessment Criteria:	A student should be intelligence and can a						pts of artificial		
Assessment Methods:	A module mark will be and tests. The final rassessment module m	mark will b nark.	oe obtained	I from a thr	ee-hour written		the continuous		
	Min Formative Assess)		40%		
Assessment Weighting:	Final mark =		tive Assess				60%		
Assessment Weighting.			ative Asses	s Mark			40%		
	Min Final Assessment	mark to pa	ass (%)				50%		
			per 1	Pa	per 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical		neory						
Paper:	Duration		Hours						
	Sub minimum	4	10%						

CURRICULUM INFORMATION						
Computer Science & Information Department Technology	School: Science and Technology					
Last Revision date: 2011	First Year Offered (New): 2017					
Is this Module replacing existing module(s)? No	If YES, give the module codes:					

Module Code:	CSIT705 S2(T3 8	ֆ T4)						
Module Name:	Health Informatics	Health Informatics (Object-Oriented Approach)						
Module Content:	IT Operations; Medic	Introduction to Healthcare IT; Healthcare Organization and Operations; Desktop IT Operations; Network T Operations; Medical Business Operations; Document Imaging and Problem Solving; Basic Healthcare Security; Advanced Healthcare Security.						
Learning Outcomes:	 Appreciate the ra Understand the n increase. Understand the ir healthcare regula Learn about the f 							
Module Information:	SAQA Credit	s	ITS C	ourse Leve	l Code	CESM Code (·	
module information.	20			8		06100		
Delivery Information:	Campus			ull/Part Tim	_	Period (1st/2ndSem)		
Delivery information.	SMU			ntact, Full T	ime	2 nd Semester		
Periods per Week:	Classes	Pract		Tutorial	Seminars	Independer		
Pre-requisite modules for this module:	5 None	2	<u>'</u>	1	0	10 H	ours	
Co-requisites modules for module:	None							
ASSESSMENT:								
Assessment Criteria:	A student should be content and outcome			nat s/he has	understood the	e concepts as outline	ed in the module	
Assessment Methods:	A module mark will to tests. The final manassessment module	rk will be						
	Min Formative Asses		rk for exan	admission	(%)		40%	
		60%						
Assessment Weighting:	Final mark =	% Summa	ative Asses	s Mark			40%	
	Min Final Assessmer						50%	
			per 1	Pa	per 2	Paper 3	Paper 4	
Summative Assessment	Theory / Practical		eory		•	•	•	
Paper:	Duration	3 H	Hours					
	Sub minimum	4	0%					

CURRICULUM INFORMATION						
Department	Computer Science & Information Technology	School: Science and Technology				
Last Revision da	te: 2011	First Year Offered (New): 2017				
Is this Module re	placing existing module(s)? No	If YES, give the module codes:				

Module Code:	CSIT706 S2 (T3	& T4)								
Module Name:	Computer Networks									
Module Content:	Hands-on analysis of packets from different protocols; Client-server operations; Protocol analysers to filter and analyse data packets; Different network architectures (tiered); Stand-alone and client-server computing; Static and dynamic routing; Shortest path routing; Network Subnetting; Cloud computing									
Learning Outcomes:	 Understand and operations Use Open-Source and NetworkMin Understand the control Distinguish between Design networks Appreciate the p 	 Use Open-Source and free protocol analysers available: Wireshark, NAST, Zenmap, Capsa, Zenoss, and NetworkMiner 								
Module Information:	SAQA Credit	S	ITS (Level Code		CI		e (3 rd Order)	
	20		8		000002					
Delivery Information:	Campus				rt Time		F	Period (1s		
,	SMU		C	ontact,	Full Time		2 nd Semester			
Periods per Week:	Classes		Practica	S	Tutorial			Learnin		
	5		2		1	0		1() Hours	
Pre-requisite modules for this module:	None									
Co-requisites modules for module:	None									
ASSESSMENT:										
Assessment Criteria:	A student should be content and outcome		emonstrate tha	t s/he ι	ınderstands tl	he conce	epts of a	s outlined	in the module	
Assessment Methods:	A module mark will work and tests. The assessment module	final mar								
	Min Formative Asse	ssment m	nark for exam a	dmissio	on (%)				40%	
Assessment Weighting:	Final mark =		ative Assess M						60%	
Assessment Weighting.	Filiai IliaiK -	% Sumr	mative Assess	Mark					40%	
	Min Final Assessment mark to pass (%)							50%		
			aper 1		Paper 2		Paper	3	Paper 4	
Summative Assessment	Theory / Practical		Theory							
Paper:	Duration	3	3 Hours							
	Sub minimum		40%							

SECTION F: MODULAR INFORMATION REQUIRED						
Computer Science & Information Department: Technology	School: Science and Technology					
Last Revision date: 2011	First Year Offered (New): 2017					
s this Module replacing existing module(s)? No If YES, give the module codes:						

Module Code:	CSIT708 S2(T3 &	T4)							
Module Name:	Computer Security								
Content::	Public-key Cryptograp security applications (Network security fundamentals (common attacks and defense mechanisms); Data Encryptions Algorithms; Public-key Cryptography and key management; Data Authentication; Network security protocols; Network security applications (Kerberos, web security (SSL/TLS)); Wireless network security; Cloud security; Intrusion detection and risk management							
Module Outcomes:	 Demonstrate an u Identify network so Implement commo Analyse and design 	Demonstrate knowledge of information security governance and the associated legal and regulatory							
Module Information:		SAQA Credits ITS Course Level Code CESM C							
Delivery Information:	Ca SMU	Full/Part		060903 Period (1st/2ndSem) 2nd Semester					
	Classes Practicals		Tutorial	Seminars		lent Learning			
Periods per week:	5	0	1	0		Hours			
Pre-requisites for this module:	None			l	•				
Co-requisites modules for module:	None								
ASSESSMENT:									
Assessment Criteria:		able to demonstrate appli							
Assessment Methods:		A module mark will be obtained from continuous assessment based on quizzes, assignments, presentations and tests. The final mark will be obtained from a three-hour written examination and the continuous							
	Min Formative Assessment mark for exam admission (%)								
Assessment Weighting:	Final mark =	% Formative Assess Mark							
	Min Final Assessmen	t mark to pass (%)				50%			
		Paper 1	Paper 2		Paper 3	Paper 4			
Summative Assessment	Theory / Practical	Theory	•		•	•			
Paper:	Duration	3 Hours							
	Sub minimum	40%							

SECTION F: MODULAR INFORMATION REQUIRED				
Computer Science & Information Department: Technology	School: Science and Technology			
Last Revision date: 2011	First Year Offered (New): 2017			
Is this Module replacing existing module(s)? No	If YES, give the module codes:			

Module Code:	CSIT709 S2(T3 & T	Γ4)					
Module Name:	Mobile Application De	Mobile Application Development (Intermediate)					
Module Content::	Part I: OBJECTIVE C Introduction to the fundamentals: Variables, Constants, and Data Types; Decisions and Conditions; Looping; Functions; Foundation Framework; Object-Oriented Programming Part II: PROGRAMMING Understanding and Implementing Open Source Environments; Understanding and Creating User Interfaces; Passing Data Between View Controllers, Delegates, and Protocols; Table Views; Tab Bar View and Picker View Controls; Multimedia: Images and Sound; Data Persistence						
Module Outcomes:	Acquire thorough kr Objective-C progranAcquire practical ap	, toquire producer draine in developing and part priorite appe					
Module Information:	SAQA C	redits	ITS Course L	evel Code	CESM Co	de (3 rd Order)	
module information:	20)	8		06	0799	
Delivery Information:	Cam	pus	Full/Part	ull/Part Time Period (1		I st /2 nd Sem)	
Delivery information.	SMU		Contact, F	-ull Time	2 nd Se	2 nd Semester	
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learnin		
relious pei week.	5	2	1	0	10	Hours	
Pre-requisites for this module:	COSC321						
Co-requisites modules for module:	None						
ASSESSMENT:							
Assessment Criteria:	A student should be abl						
Assessment Methods:	A module mark will be obtained from continuous assessment based on quizzes, assignments, presentations and tests. The final mark will be obtained from a three-hour written examination and the continuous assessment module mark.						
	Min Formative Assessment mark for exam admission (%) 40%						
A	9)	6 Formative Assess Ma	ark			60%	
Assessment Weighting:	Final mark =	6 Summative Assess N	/lark			40%	
	Min Final Assessment r	mark to pass (%)				50%	
		Paper 1	Paper 2		Paper 3	Paper 4	
Summative Assessment	Theory / Practical	Theory				'	
Paper:	Duration	3 Hours					
•	Sub minimum	40%				+	

SECTION F: MODULAR INFORMATION REQUIRED				
Computer Science & Information Department: Technology	School: Science and Technology			
Last Revision date: 2011	First Year Offered (New): 2017			
Is this Module replacing existing module(s)? No	If YES, give the module codes:			

Module Code:	CSIT710 S1 or \$	CSIT710 S1 or S2						
Module Name:	SPECIAL TOPICS	SPECIAL TOPICS						
Content::	The content will be gless than a term.	The content will be generic based on the expertise of visiting lecturer or researcher over a period of not ess than a term.						
Module Outcomes:		urse students are expect siting lecturer or research		ered the concep	ots covered bas	ed on the field		
Module Information:	SAQA	A Credits	ITS Course I	Level Code	CESM Cod	e (3 rd Order)		
module information:		20	8		0699	999		
Delisses Informations	С	ampus	Full/Par	t Time	Period (1s	t/2 nd Sem)		
Delivery Information:	SMU	•	Contact, I	Full Time	Seme			
Davida da manuscales	Classes	Practicals	Tutorial	Seminars	Independe	nt Learning		
Periods per week:	5	2	1	0	10 H	ours		
Pre-requisites for this module:	None	·						
Co-requisites modules for module:	None							
ASSESSMENT:								
Assessment Criteria:	A student should be expert.	able to demonstrate app	ication of informa	ation technology	y aspects as pre	esented by the		
Assessment Methods:	and tests. The final	A module mark will be obtained from continuous assessment based on quizzes, assignments, presentations and tests. The final mark will be obtained from a three-hour written examination and the continuous assessment module mark.						
	Min Formative Assessment mark for exam admission (%)							
Assessment Weighting:	Final mark =	% Formative Assess M	Mark			60%		
Assessment weighting.	Filiai Iliaik –	% Summative Assess I	Mark			40%		
Min Final Assessment mark to pass (%)						50%		
		Paper 1	Paper 2	Paper 2 Paper 3		Paper 4		
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 Hours						
	Sub minimum	40%						

DEPARTMENT: CHEMISTRY & CHEMICAL TECHNOLOGY

CURRICULUM INFORMATION				
Department: Chemistry & Chemical Technology	School: Science & Technology			
Last Revision date: 2011	First Year Offered (New): 2013			
Replace this Module existing module(s)? YES	If YES, give the module codes: CHEM750			

Module Code:	MCHM080	мснмово						
Module Name:	Research Project							
Module Content:	skills taught will depe	tudents will be introduced to many of the skills required to carry out independent research. The exact kills taught will depend on the type of research project to be undertaken. However, the skills will clude laboratory techniques, word processing, literature searching, and oral presentation.						
Learning Outcomes:	Acquired laboratoDeveloped furtheDeveloped composition	y the end of this module students will have: Acquired laboratory skills necessary for independent research Developed further skills in operating different types of instrumentation. Developed computational and data-processing skills related to chemical information and data. Be aware of the techniques required for successful information retrieval from primary and secondary sources.						
Module Information:	SAQA Credits		ITS Co	urse Level Co	de		ode (3 rd Order)	
modulo informationi	40			06		1.	140499	
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning	
•		Res Project				3	Res Project	
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Methods:	A combination of sen project presentation.	ninar presenta	itions, m	nini desertation	and summa	tive asses	ssment in the form of a	
	Min Summative Asse	essment mark	for exar	m admission (%	6)		N/A	
	Final manules			% Summative Assessment Mark			60	
Assessment Weighting:	Final mark =			% Summative Assessment Mark			40	
	Min Final Assessment mark to pass (%) 50						50	
	-	Paper '	1	Paper 2	Pape	er 3	Paper 4	
Summative Assessment	Theory / Practical	Research P	roject					
Paper:	Duration	Year						
	Sub minimum	N/A						

CURRICULUM INFORMATION					
Department:	Department: Chemistry & Chemical Technology School: Science & Technology				
Last Revision date	e: 2011		First Year Offered (New):	2013	
Replace this Modu	lle existing module(s)?	YES	If YES, give the module codes:	CHEM711	

Module Code:	MCHA081	MCHA081					
Module Name:	Advanced Organic Chemistry						
Module Content:	Functional Group Interconversion. Retrosynthetic analysis. Advanced Organic Synthesis: Strategy and Control. Advanced Organic Spectroscopy. Miscellaneous Topics: Heteroatom-stabilised carbanions, neighbouring participation, peptide synthesis, natural products.						
Learning Outcomes:	 Students should have a coherent and critical understanding of the use in organic synthesis of a range of chemical transformations which exploit reactions involving main group elements and transition metal complexes and be able to device syntheses of molecules of varying structural complexity using this knowledge. Design strategies for the efficient synthesis of a range of organic molecules, including the use of suitable reagents to effect chemo-, regio- and stereoselective reactions. Know the principles that govern chemical reactivity and use them to make predictions about the mechanisms and outcomes of chemical reactions. Determine molecular structures from Nuclear Magnetic Resonance (NMR) and other organic spectroscopic techniques. 						
Module Information:	SAQA Credits ITS		ITS Co	ourse Level Code		CESM Code (3rd Order)	
	20	20		06		140404	
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning
•	2 × 90 min	None		None	No	ne	12.9 hrs
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	Demonstrate proficiency Functional Group Interco Control. Advanced Orgar	nversion. R	etrosynt				
Assessment Methods:	Summative (60%): Tests	, Tutorials a	ind/or A	ssignments. Sumn	native (40	%): 1 × 3 h v	written examination.
	Min Summative Assessm	nent mark fo	r exam	admission (%)			40
A a a a a a m a m t NA/a i m latim m .	Final mark =			% Summative Assessment Mark 60			60
Assessment Weighting:	rinai mark –			% 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:	Department: Chemistry & Chemical Technology School: Science & Technology				
Last Revision date	e: 2011	First Year Offered (New):	2013		
Replace this Modu	ule existing module(s)?	If YES, give the module codes:	CHEM721		

Module Code:	MCHB081						
Module Name:	Advanced Inorganic Ch	Advanced Inorganic Chemistry					
Module Content:	Inorganic reaction med Clusters; Further Orga industrial reactions suc Tropsch synthesis and	Electronic Spectra of Transition Metal Complexes; Magnetic Properties of Transition Metal Complexes; Inorganic reaction mechanisms; Advanced Main Group Chemistry; Inorganic chains, cages and Metal Clusters; Further Organometallic Chemistry [including key reactions in catalysis and some important industrial reactions such as olefin polymerization, olefin metathesis (ROMP and SHOP), Fischer-Tropsch synthesis and water-gas shift reactions]. Miscellaneous Topics : Aqueous and non-aqueous solutions; Nanomaterials, nanoscience and nanotechnology.					
Learning Outcomes:	 Students should be solutions. Know and apply ke On the basis of electomplexes Demonstrate a clear industrial reactions Be familiar with the 	 Know and apply key reactions in catalysis On the basis of electronic structure, interpret electronic spectra and magnetic properties of d-metal complexes Demonstrate a clear understanding of Organometallic Chemistry and its application to important 					
Module Information:	·		ITS Cou	Course Level Code		l Code (3 rd Order)	
	20			06		140403	
Periods per Week:	Classes	Practicals		Tutorial	Seminars	Independent Learning	
	2 × 90 min	None		None N		12.9 hrs	
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	and magnetic propertie reactions, inorganic ch nonotechnology.	eous solutions es of d-metal c ains, cages ar	, key reacomplexed	ections in catalys s, organometalli rs; nanomaterial	is; electronic struct c chemistry and i s, nanoscience a	cture, electronic spectra, ndustrially- important nd	
Assessment Methods:	Summative (60%): Tes examination.	sts, Tutorials a	nd/or As	signments. Sum	mative (40%): 1 >	< 3 h written	
	Min Summative Assessment mark for exam admission (%) 40						
Accomment Weighting	Final mark =			% Summative A	ssessment Mark	60	
Assessment Weighting:	i illai illaik –			% Summative A	ssessment 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 h					
	Sub minimum	40					

CURRICULUM INFORMATION					
Department:	Department: Chemistry & Chemical Technology School: Science & Technology				
Last Revision date:	2011		First Year Offered (New):	2013	
Replace this Module	e existing module(s)?	YES	If YES, give the module codes:	CHEM732	

Module Code:	MCHA082						
Module Name:	Advanced Physical (Advanced Physical Chemistry					
Module Content:	Catalysis in solution; techniques and appli	Catalysis on surface (Surface chemistry); Statistical Thermodynamics; Miscellaneous Topics: Kinetics; Catalysis in solution; Macromolecular catalytic applications; Crystallography; [molecular symmetry, techniques and applications of quantum chemistry, the atomic structure and atomic spectra, molecular structure, molecular spectroscopy].					
Learning Outcomes:	 At the end of this module, students should be able to: Describe the structure, electronic and mechanical properties of polymers. Describe colloidal systems and how different types of micelles are formed. Be familiar with techniques used in the study of material properties. Describe the structures of solids in terms of crystal lattices and unit cells. Master the techniques for studying crystal structures. Describe the Bragg method and the Debye-Scherrer method of X-ray structural analysis. Index reflections and identify the unit cell from X-ray diffraction patterns. Understand and satisfactorily describe the dynamics of molecular motion, particularly in the gas phase. Be able to derive the rate laws, and apply the steady state approximation to derive rate laws for complex reactions. 						
Module Information:	SAQA Credits		ITS Course Level Co	de CESM C	ode (3 rd Order)		
	20		06	1-	40405		
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning		
	2 × 90 min	None	None	None	12.9 hrs		
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	substitution and elim derivatives, organic s	ination reactio spectroscopy,		, the chemistry of carb	ooxylic acids and their		
Assessment Methods:	examination. ´	· 	and/or Assignments. S	. ,	3 h written		
	Min Summative Asse	essment mark	for exam admission (%	. ,			
Assessment Weighting:	Final mark =			% Summative Assessment Mark			
Assessment Weighting.	i iliai iliaik –		% Summative A	% Summative Assessment Mark			
	Min Final Assessme	nt mark to pas	s(%)		50		
		Paper 1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory					
		, ,					
Paper:	Duration	3 hrs					

DEPARTMENT: MATHEMATICS & APPLIED MATHEMATICS

CURRICULUM INFORMATION							
Department:	Department: Mathematics & Applied Mathematics School: School of Technology						
Last Revision date	e: 2011		First Year Offered (New):	2013			
Replace this Modu	Replace this Module existing module(s)? NO If YES, give the module codes:						

Module Code:	MMTH080							
Module Name:	Research Project							
Module Content:		The student, in consultation with supervisor, selects a research topic in mathematics, does independent research and writes a report.						
Learning Outcomes:	Select a researcDo independentWrite a research	After successful completion of the module, the student should be able to Select a research topic. Do independent research. Write a research report. Give a presentation to the Department.						
Module Information:	SAQA Credits		ITS Co	urse Level Code	CESM Code (3rd C	Order)		
wodule information:	40			6	150101			
Periods per Week:	Classes	Practicals		Tutorial	Seminars	Independent Learning		
	0	Res Project		0	1	Res Project		
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	A student should be mathematics.	able to demor	strate th	nat s/he has the abil	lity to do independer	nt research in		
Assessment Methods:	The final mark will b	e obtained fror	n an ex	tended project ess	ay or research pape	er		
	Min Summative Ass	essment mark	for exar	m admission (%)		N/A		
A	Final mark	_	% Summative Assessment Mark			60		
Assessment Weighting:	Finai mark			% Summative Asse	essment Mark	40		
	Min Final Assessme	ent mark to pas	s (%)			50		
		Paper 1		Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Research Pro	ject					
Paper:	Duration	Semester						
	Sub minimum	N/A						

CURRICULUM INFORMATION					
Department: Mathematics & 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:	MATH710			

Module Code:	MMTA081								
Module Name:	Group and Field The	Group and Field Theory							
Module Content:	Groups: Review of g								
Module Content:	Holder theorem, solution groups.	Fields: Field extensions, splitting fields, Main Theorem of Galois, solution of polynomial Equations by							
Learning Outcomes:	A clear understaAble to determinA good understa	After successful completion of the module, the student should have/be: A clear understanding of groups. Able to determine whether a group is cyclic or not. A good understanding of free groups. A good understanding of Galois's theory.							
Module Information:	SAQA Credits		ITS Co	ourse Level Code		CESM Code	(3 rd Order)		
Module information:	16			6		15010)1		
Periods per Week:	Classes	Practicals		Tutorial Semina		nars	Independent Learning		
•	3 x 1 hrs	0		1		0	10 hrs		
Pre-requisite module/s:	None								
Co-requisite module/s:	None								
Assessment Criteria:	Continuous summat assessment will be				rials, Ass	ignments, and	Tests. Summative		
Assessment Methods:		A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary							
	Min Summative Assessment mark for exam admission (%)						40		
A + \	Final mark =	_		% Summative Ass	essment	Mark	60		
Assessment Weighting:	Finai mark -	-		% Summative Ass	Mark	40			
	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: Mathematics & 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:	MATH720			

Module Code:	MMTB081								
Module Name:	General Topology								
Module Content:	Metric spaces, topological spaces, continuous functions, weak topologies, quotient spaces, convergent sequences, separation axioms, normal spaces, countability, compact spaces, metrization,								
	connectedness and	connectedness and uniform spaces.							
Learning Outcomes:	 Construct, indep Verify whether a To investigate from spaces. 	 After successful completion of the module, the student should be able to Construct, independently, non-routine mathematical proofs. Verify whether a given collection of subsets of a set X forms a topology on X. To investigate from third mathematics which results in metric spaces are translatable to topological spaces. Justify why some examples do not satisfy certain properties. 							
Learning Outcomes:	Determine whethUnderstand the of	 To construct a subspace topology. Determine whether a topological space is connected, compact, normal Understand the concepts of separation axioms, and how these axioms relate to one another Have a sound understanding of nets and filters in a topological space. 							
Module Information:	SAQA Credits		ITS Co	urse Level Code	CESM Code (3rd Order)				
Module information:	16			6	150105				
Periods per Week:	Classes	Practicals		Tutorial	Seminars	Independent Learning			
•	3 x 1 hours	0		1	0	10 hrs			
Pre-requisite module/s:	None								
Co-requisite module/s:	None								
Assessment Criteria:	Continuous summat assessment will be o				ls, Assignments, ar	nd Tests. Summative			
Assessment Methods:	A module mark will to assessment in the rates assessment.								
	Min Summative Ass		40						
	Final manks			% Summative Asse	ssment Mark	60			
Assessment Weighting:	Final mark =			% Summative Asse	ssment Mark	40			
	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: Mathematics Applied Mathematics	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:	MMTC081							
Module Name:	Complex Analysis							
Module Content:	Products; Entire Fu	Maximum Modulus Principle; Residue Calculus; Argument Principle; Uniform Convergence & Infinite Products; Entire Functions; Weierstrass' Theorem; Approximation by Rational Functions & Polynomials; Conformal Mappings; Riemann's Mapping Theorem						
Learning Outcomes:	 Students should be able to independently construct non-routine mathematical proofs and to reconstruct known mathematical proofs in a way that exhibit profound understanding on the material listed in the module content. Students should be able to critique given mathematical proofs on complex analysis and affirm their validity or invalidity. Students should be able to use complex methods to evaluate real definite integrals. Students should be able to prove the relationship between infinite products and uniform convergence. Students should be able to apply complex analysis' techniques in other branches of mathematics like Number Theory. 							
Module Information:	SAQA Credits		ITS Co	TS Course Level Code		SM Code (3 rd Order)		
modulo illiorinationi	16			6		150199		
Periods per Week:	Classes	Practicals		Tutorial Semi		Independent Learning		
•	3 x 1 hrs	0		1		10 hrs		
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	assessment will be	Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module. Continuous summative assessment based on Quizzes, Tutorials, Assignments, 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 1:1 respectively, to get the final mark. There will be no supplementary assessment.							
	Min Summative Assessment mark for exam admission (%) 40							
A a a a a a un a unt Mai subtimus	Final mark	_		% Summative Asse	ssment Mark	k 60		
Assessment Weighting:	Final mark	_		% Summative Asse	ssment Mark	k 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%						

	Cl	JRRICULUI	M INFORI	NATION				
Department: Mathema	tics and Applied Ma	thematics		School:	Science & Tec	chnology		
Last Revision date: 20	011			First Year	Offered (New	·):	2013	
Replace this Module existi	ng module(s)?	ΈS		If YES, giv	e the module	codes:	MATH730	
Module Code:	MMTD081							
Module Name:	Measure Theory and							
Module Content:	Outer and inner measu Measure, Measurables Lebesque integrable fu Countable additive set	Algebra of sets and limits; set functions. Outer and inner measure; extension of measure; σ - finite measures, Lebesque measure, Riemann-Stieltjies Measure, Measurables functions, Measure space, convergence in measure. Lebesque integrable functions, convergence in mean, properties in integrals. Countable additive set functions, Hahn and Jordan decomposition, Radon-Nikodyn theorem. Differentiation: Functions of bounded vation, Vitali's theorem.						
Learning Outcomes:	known mathemat module content. Students should be validity or invalidit Students should be structure and its selection.	 Students should be able to critique given mathematical proofs on measure theory and affirm their validity or invalidity. Students should be able to investigate if a given set function is a measure, an outer-measure on a give structure and its substructures or superstructure and their interrelations. Students should be able to prove the relation between types of convergence. Students should be able to calculate Lebeque integrals and see it as a generalization of the Rieman 						
				Level Code	CF	SM Code (3	rd Order)	
Module Information:	16			6		150199		
Periods per Week:	Classes	Practicals	Tut	orial	Seminars		Independent Learning	
	2 x 1 hrs	0		1		0	10 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	Continuous summati assessment will be d Quizzes, Tutorials, A module.	one at the end	d of the mod	dule. Continu	ous summativ	e assessme	ent based on	
Assessment Methods:		A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary assessment.						
	Min Summative Asse	essment mark	for exam ac	admission (%)			40	
Assessment Weighting:	Final mark =				Assessment Ma		60	
Assessment Weighting.	i ilidi ilidik		% 5	% Summative Assessment Mark			40	
	Min Final Assessme		. ,				50	
		Paper 1	Par	per 2	Paper 3		Paper 4	
Summative Assessment	Theory / Practical	Theory						
ln	ln (*							
Paper:	Duration	3 hrs						

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:	MATH740			

Module Code:	MMTD082							
Module Name:	Functional Analysis							
Module Content:	Topology and completion of metric spaces. Normed spaces and Banach spaces: linear operators and functionals, dual spaces, adjoint operators, Hahn-Banach theorem, Open Mapping Theorem, Closed Graph Theorem, Banach Fixed Point Theorem, Spectral theory of linear compact operators. Hilbert spaces: Orthogonal complement and direct sums, Riesz representative theorem, Hilbert Adjoint, self-adjoint, unitary and normal operators, spectral theory of bounded self-adjoint operators.							
Learning Outcomes:	 students to advar To develop probletideas. 	 To have a good understanding of introductory topics in analysis which will form a sound basis for students to advance in this field. To develop problem solving skills in the area of analysis and communicate clearly their knowledge and 						
	SAQA Credits		ITS Cou	rse Level Code		CESM Code	(3 rd Order)	
Module Information:	16			6	+		150103	
						•		
Periods per Week:	Classes	Practicals		Tutorial Semin		ars	Independent Learning	
γοι του	2 x 1 hrs	0		1		0	10 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	Continuous summatinassessment will be d				als, Assi	gnments, and	Tests. Summative	
Assessment Methods:		A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary						
	Min Summative Assessment mark for exam admission (%) 40							
A a a a a a a a a a a t	Final mark =	_		% Summative As	nt Mark	60		
Assessment Weighting:	Filiai iliaik -	•		% Summative Assessment Mark			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 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:	MATH750				

Module Code:	MMTE082							
Module Name:	Category Theory							
Module Content:	Abstract and Concrete categories, The duality principle. Properties of morphisms: Sectiosns, retractions, monomorphisms, epimorphisms, bimorphisms and isomorphisms. Properties of special objects: initial and terminal objects, zero objects and quotients. Properties of functors. Universal construction: Equalizers, regular and extremal monomorphisms and epimorphisms, (Co)products, mono-sources and epic-links, (Co)limits and pullbacks' pullouts.							
Learning Outcomes:	 To develop problem knowledge and i 							
Module Information:	SAQA Credits	SAQA Credits		ourse Level Co	de	CESM Code (3rd Order)		
	16			6		150101		
Periods per Week:	Classes	Practicals		Tutorial	Semi	nars	Independent Learning	
•	2 x 1 hrs	0		1		0	10 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	MMTA071 and MMT	TB071						
Assessment Criteria:	Continuous summat assessment will be o				utorials, As	signments	, and Tests. Summativ	
Assessment Methods:	A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary assessment.							
	Min Summative Assessment mark for exam admission (%) 40							
Nacasamant Waightings	Final mark =	<u>.</u>		% Summative Assessment Mark 60				
Assessment Weighting:	i iliai iliaik -			% Summative Assessment Mark 40				
	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: 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:	MATH750				

Module Code:	MMTF082							
Module Name:	Combinatorics	Combinatorics						
Module Content:	Permutations and Co Exclusion, Recurren						nciple of Inclusion – Discrete probability.	
Learning Outcomes:	Be able to able aApply combinator					blems.		
Madula Information.	SAQA Credits		ITS Cour	se Level Cod	е	CESM Co	de (3 rd Order)	
Module Information:	16			6			150101	
Periods per Week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning	
	3 x 1 hrs	0		1		0	10 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	MMTA071 and MMT	A072						
Assessment Criteria:	Continuous summati assessment will be o				torials, Ass	signments, a	and Tests. Summative	
Assessment Methods:		A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary						
	Min Summative Assessment mark for exam admission (%)						40	
A	Final manus		%	Summative n		60		
Assessment Weighting:	Finai mark =	Final mark =		Summative A	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	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:	MATH760				

Module Code:	MMTG082						
Module Name:	Number Theory						
Module Content:			Function, Sequences with, Riemann Zeta Function		ssion, Sums &		
Learning Outcomes:	Understand theUnderstand the	 Understand the Prime number theorem and its applications Understand the Riemann Zeta Function and its relationship to other areas of mathematics Understand the complexity of the Riemann's Hypothesis Understand the properties of primes 					
	SAQA Credits		ITS Course Level Code	CESM C	ode (3 rd Order)		
Module Information:	16		6	1	150101		
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning		
•	2 x 1 hrs	0	1	0	10 hrs		
Pre-requisite module/s:	None						
Co-requisite module/s:	MMTC072 and MM	TB071					
Assessment Criteria:		Continuous summative assessment based on Quizzes, Tutorials, Assignments, and Tests. Summative assessment will be done at the end of the module.					
Assessment Methods:			rom continuous assessme tively, to get the final mar				
	Min Summative Assessment mark for exam admission (%) 40						
			% Summative As	ssessment Mark	60		
Assessment Weighting:	Final mark	Final mark =		ssessment Mark	40		
	Min Final Assessme	ent mark to pas	s (%)		50		
		Paper 1	Paper 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory					
	D	2 1					
Paper:	Duration	3 hrs					

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:	MATH780			

Module Code:	MMTH082						
Module Name:	Ring Theory	Ring Theory					
Module Content:	Ideals & Quotient Ri	Ideals & Quotient Rings, Modules, Properties of Rings, Unique Factorisation Theorem					
Learning Outcomes:		 Understand the algebraic structure of rings and their applications in related algebraic areas Understand the Unique Factorisation Theorem. 					
Module Information:	SAQA Credi	SAQA Credits ITS Course Level Code CESM Code (3rd Ord				le (3 rd Order)	
Module information:	16		6				150101
	Classes	Practicals		Tutorial	Ser	ninars	Independent Learning

Periods per Week:	2 x 1 hrs	0	1	0	10 hrs				
Pre-requisite module/s:	None	None							
Co-requisite module/s:	MMTC072 and MMT	MMTC072 and MMTB071							
Assessment Criteria:		Continuous summative assessment based on Quizzes, Tutorials, Assignments, 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 1:1 respectively, to get the final mark. There will be no supplementary assessment.							
	Min Summative Asse		40						
A	Final manus		% Summative As	60					
Assessment Weighting:	Finai mark =	Final mark =		% Summative Assessment Mark					
	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:				

Module Code:	MMTC082						
Module Name:	Approximation Theo	ry					
Module Content:	Best Approximations Approximations, Mu		Approximations, Possib	pility of Approximation	n, Uniqueness of		
Learning Outcomes:	 Understand the r mathematical an 		ation theory techniques	theorems and their a	pplications in general		
Module Information:	SAQA Credits		ITS Course Level Cod	le CESM C	ode (3 rd Order)		
	16		6	1:	50101		
Periods per Week:	Classes	Practicals	Tutorial	Seminars	Independent Learning		
	2 x 1 hrs	0	1	0	10 hrs		
Pre-requisite module/s:	None						
Co-requisite module/s:	MMTC072 and MMT	ΓB071					
Assessment Criteria:	Continuous summat assessment will be o		nt based on Quizzes, Tu d of the module.	itorials, Assignments,	, and Tests. Summativ		
Assessment Methods:			rom continuous assessr tively, to get the final ma				
	Min Summative Assessment mark for exam admission (%)						
	Final ments		% Summative As	ssessment Mark	60		
Assessment Weighting:	Final mark =	i 	% Summative As	ssessment Mark	k 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					

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)? No	If YES, give the module codes:					

Module Code:	MMTA082	MMTA082						
Module Name:	Graph Theory	Graph Theory						
Module Content:	Graphs, Planar grap	hs, Platonic g	raphs, Co	olouring, Genus	of a graph	, Euler Wa	alks & Hamilton Walks	
Learning Outcomes:	 Understand the 	 Be able to identify the various types of graphs Understand the relationship between Graph Theory & Combinatorics Be able to draw the different types of graphs 						
Mark to be for a section	SAQA Credits		ITS Cou	ırse Level Cod	е	CESM C	ode (3 rd Order)	
Module Information:	16			6		1:	50101	
Periods per Week:	Classes	Practicals		Tutorial	Semir	nars	Independent Learning	
•	2 x 1 hrs	0		1		0	10 hrs	
Pre-requisite module/s:	None							
Co-requisite module/s:	MMTC072 and MM	TB071						
Assessment Criteria:	Continuous summat assessment will be				torials, Ass	ignments,	and Tests. Summative	
Assessment Methods:		A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary						
	Min Summative Assessment mark for exam admission (%)					40		
	F'			% Summative A	t Mark	60		
Assessment Weighting:	Final mark	=		% Summative A	t Mark	40		
	Min Final Assessme	ent mark to pas	ss (%)				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)? No	If YES, give the module codes:			

Module Code:	MMTB082						
Module Name:	Potential Theory						
Module Content:	Harmonic Functions, Subharmonic Functions, Potentials, Polar Sets, Equilibrium Measures, The Generalized Laplacian, The Dirichlet Problem, Capacity, Applications of Potential Theory						
Learning Outcomes:		 Understand potential theory in the complex plane. Apply potential theoretic techniques in solving analytic problems 					
M - dodo lođe om -4: - o	SAQA Credits		ITS Co	urse Level Code		CESM Co	de (3 rd Order)
Module Information:	16			6		150	0101
Periods per Week:	Classes	Practicals		Tutorial	Sem	inars	Independent Learning
	2 x 1 hrs	0		1		0	10 hrs
Pre-requisite module/s:	None						
Co-requisite module/s:	MMTC072 and MM	TB071					
Assessment Criteria:	Continuous assessi assessment will be				nments, a	ind Tests. S	Summative
Assessment Methods:		A module mark will be calculated from continuous assessment and be combined with summative assessment in the ratio 1:1 respectively, to get the final mark. There will be no supplementary					
	Min continuous assessment mark for exam admission (%) 40						40
	Final made	_		% Summative As	60		
Assessment Weighting:	Final mark	=		% Summative Assessment Mark			40
	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%					

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: PHYS700				

Module Code	MPHS080							
Module Name:	Research Project							
Module Content:	Students will be introduced to many of the skills required to carry out independent research. The exact skills taught will depend on the type of research project to be undertaken. However, the skills will include laboratory techniques, word processing, literature searching, and oral presentation.							
Learning Outcomes:	Acquired laborateDeveloped furtheDeveloped comp	By the end of this module students will have : Acquired laboratory skills necessary for independent research Developed further skills in operating different types of instrumentation. Developed computational and data-processing skills related to chemical information and data. Be aware of the techniques required for successful information retrieval from primary and secondary sources.						
Module Information:	SAQA Credits		ITS Co	ırse Level	Code	CESN	I Code (3 rd O	rder)
Module information.	40			06			140701	
Periods per Week:	Classes	Practicals		Tutorial	Semi	nars		dependent ∟earning
		14 hrs				3/module		2 hrs
Pre-requisite module/s:	MPHA031,MPHB03	1,MPHA032 ar	nd MPHI	3032				
Co-requisite module/s:	None							
Assessment Criteria:	Demonstrate proficie data, analysing data					eview, r	eferencing, co	ollecting
Assessment Methods:	A combination of ser project presentation.	•	itions, m	ini disserta	tion and summ	ative as	ssessment in t	the form of a
	Min Summative Asse	essment mark	for exar	n admissior	า (%)		n/a	
A 4 \ \ \ \ \ \ \ \ \	Final mark =	% Summative	Assess	Mark	40 (10% semi	nars:30	% project pre	sentation)
Assessment Weighting:	Filiai iliaik –	% Summative	Assess	Mark	60 (Evaluation	of proj	ect write-up)	
	Min Final Assessme	nt mark to pas	s (%)					
		Paper 1		Paper 2	Pape	r 3	Р	aper 4
Summative Assessment	Theory / Practical	Res Project						
Paper:	Duration							
	Sub minimum	40%						

CURRICULUM INFORMATION						
Department: Physics School: Science & Technology						
Last Revision date: 2011 First Yea	r Offered (New): 2013					
Replace this Module existing module(s)? Yes If YES, gi codes:	ive the module PHYS711					

Module Code:	MPHA081							
Module Name:	Quantum Mechanics	S						
Module Content:	equation. Rectangul Occupation of energ Plane wave solution fields. The Zeeman	Quantum and wave Mechanics: Introductory mechanics. Axiomatic statement of the Schrodinger equation. Rectangular potential well of finite and infinite depth. The hydrogen atom. Identical particles. Occupation of energy states by electrons. Heisenberg's interpretation. Dirac's quantum mechanics. Plane wave solution of the Dirac equation. Spin of a particle. A charged particle in electromagnetic fields. The Zeeman effect in a strong external magnetic field. Time dependant perturbation. Semi-classical theory of radiation. Spectral analysis. Many body problems.						
Learning Outcomes:	 Describe the forr Describe genera properties Use perturbation 	 Students should be able to: Describe the formal principles of quantum mechanics and apply these to some atomic systems Describe general methods for solving atomic systems with emphasis on the significant quantum properties Use perturbation methods to analyze more complex situation Solve mathematical problems 						
Module Information:	SAQA Credits		ITS Cou	rse Level Code	CESM Code (3rd)	Order)		
Module information:	20		06	6	140701			
Periods per Week:	Classes	Practicals		Tutorial	Seminars	Independent Learning		
•	4 x 45 min			1 x 45 min	1 x semester	12.9 hrs		
Pre-requisite module/s:	MPHA031,MPHB03	1,MPHA032 ar	nd MPHB	032				
Co-requisite module/s:	None							
Assessment Criteria:	statement of the Sch hydrogen atom. Iden interpretation. Dirac particle. A charged	nrodinger equa ntical particles. 's quantum me particle in elec nt perturbation	ition. Reconction. Occupate chanics.	tangular potential ion of energy state Plane wave solution etic fields. The Zen	well of finite and infires by electrons. Heison of the Dirac equat	enberg's ion. Spin of a ng external magnetic		
Assessment Methods:	Summative Tests; T	utorials; Assigi	nments. S	Summative written	examination.			
	Min Summative Ass	essment mark	for exam	admission (%)		40		
A a a a a a una unt Mai unhtim un	Final mark =	_	9	% Summative Asse	60			
Assessment Weighting:	Fillal Illark -	-	o,	% Summative Asse	40			
	Min Final Assessme	ent 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: 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:	PHYS721			

Module Code:	MPHB081						
Module Name:	Statistical Mechanics	5					
Module Content:	Boltzman's velocity distribution law. The Gamma space. The micro canonic ensemble. The canonic ensemble. Quantum Statistics. Bose-Einstein and Fermi-Dirac Statistics. Gas degeration with examples of strongly and weakly degenerate Fermi-Dirac and Bose Einstein gases. Einstein and Debye expressions for heat capacity. Plank's radiation formula. Applications.						
Learning Outcomes:	 Sescribe the role Deduce the Boltz Apply statistical the temperature; Deduce the Einsteach the theory with acceptable. Deduce the equality Deduce the Fermerature. Describe superfluence 	 After completing this module, the student should be able to: Sescribe the role of statistical concepts in understanding macroscopic systems; Deduce the Boltzmann distribution for the probability of finding a system in a particular quantum state. Apply statistical theory to determine the magnetisation of a paramagnetic solid as a function of temperature; Deduce the Einstein and Debye expressions for the heat capacity of an insulating solid and compath the theory with accepted experimental results; Deduce the equation of state and entropy for an ideal gas; Deduce the Fermi-Dirac and Bose-Einstein distributions; Describe superfluidity in liquid helium and Bose-Einstein condensation Deduce the heat capacity of an electron gas. 					s a function of
Module Information:	SAQA Credits		ITS Cou	urse Level Code		CESM Code (3 rd Order)	
	20	4		06		14	40701
Periods per Week:	Classes	Practicals		Tutorial	Semina		Independent Learning
	4 x 45 min			1 x 45 min			12.9 hrs
Pre-requisite module/s:	MPHA031,MPHB031	I, MPHA032 a	nd MPH	B032			
Co-requisite module/s:	None						
Assessment Criteria:	Describe, explain and apply in a logical manner the principles, concepts and facts related to Boltzman's velocity distribution law. The Gamma space. The micro canonic ensemble. The canonic ensemble. Quantum Statistics. Bose-Einstein and Fermi-Dirac Statistics. Gas degeration with examples of strongly and weakly degenerate Fermi-Dirac and Bose Einstein gases. Einstein and Debye expressions for heat capacity. Plank's radiation formula. Applications.					onic ensemble.	
Assessment Methods:	Summative Tests; Tu	utorials; Assig	nments.	Summative writter	ı examin	ation.	
	Min Summative Asse	essment mark		` '			40
Assessment Weighting:	Final mark =			% Summative Assessment Mark 60			60
Assessment Weighting.	- marmark			% Summative Assessment Mark			40
	Min Final Assessmer	nt mark to pas	s (%)				50
		Paper 1		Paper 2	Paper :	3	Paper 4
Summative Assessment	Theory / Practical	Theory					
Paper:	Duration	3 hrs					
		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:	PHYS732		

Module Code:	MPHA082	MPHA082						
Module Name:	Electrodynamics							
Module Content:	an electromagnetic f conducting media. E Radiation from a poi Coherence of radiati	Maxwell's equations. The wave equation. Plane wave solutions of Maxwell's equations. Energy density in an electromagnetic field. Behavior of field vectors at interfaces. Electromagnetic waves in non-conducting media. Electromagnetic waves in conductors. Guided waves. Retarded potentials. Radiation from a point charge and from an oscillating dipole. Bremstrahlung. Scattered radiation. Coherence of radiation. Scatter in X-rays. Developments of opto-electronic properties of matter.						
Learning Outcomes:	 Apply Maxwell's of Describe electror Demonstrate und Solve problems a approaches one Demonstrate und Relate electrodyr Solve the time-invalue problems Solve the time-deplane electromag 	At the end of the course the student will be able to: Apply Maxwell's equation to variety of physical systems Describe electromagnetic phenomena with the aid of potentials Demonstrate understanding how electric potential and fields transform Solve problems applying potential formalism and understand that the results are independent of the approaches one used Demonstrate understanding of the process of electromagnetic radiation Relate electrodynamics with relativity Solve the time-independent Maxwell equations using standard mathematical techniques for boundary value problems Solve the time-dependent Maxwell equations for elementary problems including the propagation of plane electromagnetic waves Understand guided waves						
Madala lafamatian	SAQA Credits		ITS C	ourse Level Cod	le	CESM Code	(3 rd Order)	
Module Information:	20			06		14070	01	
Periods per Week:	Classes	Practicals		Tutorial	Semir	nars	Independent Learning	
_	4 x 45 min			1 x 45 min			12.9 hrs	
Dra raquiaita madula/a:	MPHA031,MPHB03 ²	1 MPHA032 ar	A MD	PHB032				
rie-requisite module/s:	,	i,ivii i iAUJZ ai	iu ivir	HBU3Z				
	None	1,1VII 11A002 di	IU IVIP	HB032				
Co-requisite module/s:	None Describe, explain an equations. The wav electromagnetic field	d apply in a loe e equation. Place Behavior of etic waves in conscillating of	ogical lane v field v onduc lipole.	manner the princ wave solutions o ectors at interfac tors. Guided wave Bremstrahlung.	f Maxwell's es. Electror es. Retarde Scattered	equations. Emagnetic waved potentials. Fradiation. Col	related to Maxwell's Energy density in an es in non-conducting Radiation from a point herence of	
Co-requisite module/s: Assessment Criteria:	None Describe, explain an equations. The wav electromagnetic field media. Electromagnetic charge and from a	d apply in a love equation. Pl. Behavior of etic waves in conscillating of X-rays. Develo	ogical lane v field v onduc lipole. pmen	manner the princ vave solutions o ectors at interfac tors. Guided wave Bremstrahlung. ts of opto-electror	f Maxwell's es. Electror es. Retarde Scattered nic propertie	equations. Emagnetic waved potentials. Fradiation. Col	Energy density in an es in non-conducting Radiation from a point	
Co-requisite module/s: Assessment Criteria:	None Describe, explain an equations. The wav electromagnetic field media. Electromagne charge and from a radiation. Scatter in 2	d apply in a lo e equation. P I. Behavior of etic waves in c n oscillating o X-rays. Develo or Assignment	ogical lane v field v onduc lipole. pmen	manner the princ wave solutions o ectors at interfac tors. Guided wav Bremstrahlung. is of opto-electror nmative examina	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. Emagnetic waved potentials. Fradiation. Col	Energy density in an es in non-conducting Radiation from a point	
Co-requisite module/s: Assessment Criteria: Assessment Methods:	None Describe, explain an equations. The wav electromagnetic field media. Electromagnetharge and from a radiation. Scatter in Tests, Tutorials and/	d apply in a lo e equation. P I. Behavior of etic waves in c n oscillating o X-rays. Develo or Assignment	ogical lane v field v onduc lipole. pmen	manner the princ wave solutions o ectors at interfac tors. Guided wav Bremstrahlung. is of opto-electror nmative examina	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. E magnetic wave d potentials. F radiation. Col ss of matter.	Energy density in an es in non-conducting Radiation from a point herence of	
Co-requisite module/s: Assessment Criteria: Assessment Methods:	None Describe, explain an equations. The wav electromagnetic field media. Electromagnetic charge and from a radiation. Scatter in Tests, Tutorials and/	d apply in a lo e equation. P I. Behavior of etic waves in c n oscillating o X-rays. Develo or Assignment	ogical lane v field v onduc lipole. pmen	manner the princ vave solutions o ectors at interfac tors. Guided wave Bremstrahlung. ts of opto-electror nmative examina am admission (%	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. E magnetic wave d potentials. F radiation. Col es of matter.	Energy density in an es in non-conducting Radiation from a point herence of	
Co-requisite module/s: Assessment Criteria: Assessment Methods:	None Describe, explain an equations. The wav electromagnetic field media. Electromagnetharge and from a radiation. Scatter in Tests, Tutorials and/	ed apply in a love equation. Pl. Behavior of etic waves in conoscillating of X-rays. Develoor Assignment essment mark	ogical lane v field v onduc lipole. pmen s. Sur for exa	manner the princ vave solutions o ectors at interfactors. Guided wave Bremstrahlung. is of opto-electrornmative examina am admission (% Summative As	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. E magnetic wave d potentials. F radiation. Col es of matter.	Energy density in an es in non-conducting Radiation from a point herence of 40	
Co-requisite module/s: Assessment Criteria: Assessment Methods:	None Describe, explain an equations. The wav electromagnetic field media. Electromagneth charge and from a radiation. Scatter in Tests, Tutorials and/Min Summative Asse	ed apply in a love equation. Pl. Behavior of etic waves in conoscillating of X-rays. Develoor Assignment essment mark	ogical lane v field v onduc lipole. pmen s. Sur for exa	manner the princ vave solutions o ectors at interfactors. Guided wave Bremstrahlung. is of opto-electrornmative examina am admission (% Summative As	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. E magnetic wave d potentials. F radiation. Col es of matter.	Energy density in an es in non-conducting Radiation from a point herence of 40 60 40	
Pre-requisite module/s: Co-requisite module/s: Assessment Criteria: Assessment Methods: Assessment Weighting: Summative Assessment	None Describe, explain an equations. The wav electromagnetic field media. Electromagneth charge and from a radiation. Scatter in Tests, Tutorials and/Min Summative Asse	d apply in a love equation. Pl. Behavior of etic waves in conscillating of X-rays. Develoor Assignment essment mark	ogical lane v field v onduc lipole. pmen s. Sur for exa	manner the princ vave solutions o ectors at interfac tors. Guided wave Bremstrahlung. ts of opto-electror nmative examina am admission (% % Summative As	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. E magnetic wave d potentials. F radiation. Col es of matter.	Energy density in an es in non-conducting Radiation from a point herence of 40 60 40 50	
Co-requisite module/s: Assessment Criteria: Assessment Methods: Assessment Weighting:	None Describe, explain an equations. The wav electromagnetic field media. Electromagnet charge and from a radiation. Scatter in Tests, Tutorials and/ Min Summative Assertinal mark = Min Final Massessme	d apply in a love equation. Pl. Behavior of etic waves in conoscillating of X-rays. Develoor Assignment essment mark	ogical lane v field v onduc lipole. pmen s. Sur for exa	manner the princ vave solutions o ectors at interfac tors. Guided wave Bremstrahlung. ts of opto-electror nmative examina am admission (% % Summative As	f Maxwell's es. Electror es. Retarde Scattered nic propertie tion.	equations. E magnetic wave d potentials. F radiation. Col es of matter.	Energy density in an es in non-conducting Radiation from a point herence of 40 60 40 50	

CURRICULUM INFORMATION						
Department: Physics School: Science & Technology						
Last Revision date: 2011	First Year Offered (New):	2013				
Replace this Module existing module(s)? Yes	eplace this Module existing module(s)? Yes If YES, give the module codes: PHYS742					

Module Code:	MPHB082							
Module Name:	Solid State Physics							
Module Content:	Burger's vectors and Miscellaneous Topi Electron Microscop electron diffraction posemiconductor Physical Physical Electron Conductor Physical Electron Electron Conductor Physical Electron Elec	Core Topics Defect Solid State: classifications of imperfections, point defects and ordering, dislocations, elasticity, Burger's vectors and energy of alloys. Miscellaneous Topics: Electron Microscopy: Interactions of electrons with matter, kinematical theory of electron diffraction, electron diffraction patterns and indexing. Semiconductor Physics: Semiconductor theory; p-n junction devices; BJTs; FETs. Silicon Processing and IC fabrication; Lasers.						
Learning Outcomes:	Describe variousDescribe forces aExplain the variouUnderstand elect	After completion of this course students are expected to: Describe various one, two, and three dimensional defect types Describe forces and energies involved in dislocation interactions Explain the various crystal structures from the given diffraction patterns Understand electron microscopy Understand what semiconductor physics is all about						
Module Information:	SAQA Credits IT		ITS Course I	Level Code	CESM Code (3 rd Order)			
wodule illioilliation.	20		06	06 1407				
Periods per Week:	Classes	Practicals	Tuto	rial	Seminars	Independent Learning		
,	4 x 45 min		1 x 45	min		12.9 hrs		
Pre-requisite module/s:	MPHA031,MPHB031	1,MPHA032 an	d MPHB032					
Co-requisites module/s:	None							
Assessment Criteria:	Describe, explain an classifications of imp and energy of alloys.	erfections, poi						
Assessment Methods:	Summative (60%): T examination.	ests, Tutorials	and/or Assignm	ents. Summat	tive (40%): 1 × 3	h written		
	Min Summative Asse	essment mark	for exam admiss	sion (%)		40		
Assessment Weighting:	Final mark =			native Assessi	60			
assessinent weighting.				native Assessi	40			
	Min Final Assessme	nt mark to pass	s (%)	 	50			
		Paper 1	Pap	er 2	Paper 3	Paper 4		
Summative Assessment	Theory / Practical	Theory						
Paper:	Duration	3 hrs						
rapei.	Sub minimum	40 %						

DEPARTMENT: STATISTICAL SCIENCES

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:							

Module Code:	MSTA081									
Module Name:	Probability Theory	Probability Theory								
Content:	Variables and D moments, Gene	 Definition of Probability Measure, Conditional Probability, Dependence and Independence, Random Variables and Distribution Functions, Joint Marginal and Conditional Distribution, Expectations and moments, Generating Functions, Distributions of Random Functions, Convergence, Law of Large Numbers, Central Limit Theorem. 								
Learning Outcomes:	 Describe mather Demonstrate known Model life randor Compute the reli 	After learning this course the students will be able to Describe mathematical models and stochastic processes Demonstrate knowledge of advanced probability methods Model life random processes using appropriate statistical distributions. Compute the reliability of different stochastic systems Apply the knowledge of random processes in signal processing operations research.								
Module Information:	SAQA Credits		ITS Course Level	CESM C	Gode (3 rd Order)					
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning					
r orrodo por mooki	4	2	2	2	4					
Pre-requisite module/s:	All four Statistics III	modules								
Co-requisite module/s :	None									
Assessment criteria:	work and tests. A summative ass A student is adm	sessment will c	onsist of one three-hour mal assessment based o	 A module mark will be obtained from continuous assessment based on quizzes, assignments, practic work and tests. A summative assessment will consist of one three-hour paper. A student is admitted to the formal assessment based on a module mark of 50% The final mark is the average of the summative and summative assessment marks. 						
Assessment methods:	 Assignments Practical's Case Studies Tests examinations presentations all of the above constant 	sistent with cor	ntinuous assessment (su	mmative and summ						
Assessment methods:	 Practical's Case Studies Tests examinations presentations all of the above constitutions 		ntinuous assessment (su for exam admission (%)	mmative and summ						
Assessment methods: Mark Structure:	 Practical's Case Studies Tests examinations presentations all of the above constitutions 	essment Mark	for exam admission (%) % Summative A	mmative and summ ssessment Mark ssessment Mark	ative)					
	 Practical's Case Studies Tests examinations presentations all of the above cons Minimum Form Asse	essment Mark t	for exam admission (%) % Summative A	ssessment Mark	ative) 40 60					
	 Practical's Case Studies Tests examinations presentations all of the above cons Minimum Form Asserting Final mark =	essment Mark t	for exam admission (%) % Summative A	ssessment Mark	ative) 40 60 40					
	 Practical's Case Studies Tests examinations presentations all of the above cons Minimum Form Asserting Final mark =	essment Mark to pass (%)	for exam admission (%) % Summative A % Summative A	ssessment Mark ssessment Mark	ative) 40 60 40 50					
Mark Structure:	 Practical's Case Studies Tests examinations presentations all of the above cons Minimum Form Asse Final mark = Minimum final mark	essment Mark t = to pass (%) Paper 1	for exam admission (%) % Summative A % Summative A	ssessment Mark ssessment Mark	ative) 40 60 40 50					

CURRICULUM INFORMATION							
Department: Statistical Sciences		School:	Science & Technology				
Last Revision date: 2011		First Year (Offered (New):	2013			
Replace this Module existing module(s)?							

MSTA082							
Statistical Inference							
 Confidence inter- 	 Methods of finding estimators, Criteria for evaluating estimators, Sufficiency and completeness. Confidence intervals: pivotal quantity method and general method. Theory of hypothesis testing, Tests for Normal populations, UMP test, Generalized likelihood ratio test. 						
skills to: Explain in detail is models. Explain in detail is estimation proce Demonstrate the area of hypothesi Explain in detail is and analysis tech underlying param Demonstrate cor	 Upon successful completion of the requirements of this course, students should have the knowledge an skills to: Explain in detail the notion of a parametric model and point estimation of the parameters of those models. Explain in detail and demonstrate approaches to include a measure of accuracy for estimation procedures and our confidence in them by examining the area of interval estimation. Demonstrate the plausibility of pre-specified ideas about the parameters of the model by examining the area of hypothesis testing. Explain in detail and demonstrate the use of non-parametric statistical methods, wherein estimation and analysis techniques are developed that are not heavily dependent on the specifications of an underlying parametric model. Demonstrate computational skills to implement various statistical inferential approaches 						
		113 00	1136 FEACI		CLSW CC	ode (5 · Order)	
Classes	Practicals	<u> </u>	Tutorial	Semir	nars	Independent Learning	
4	2		2		2	4	
All four Statistics III i	modules						
None							
work and tests.A summative assA student is adm	sessment will c	consist o	f one three-hour essment based o	paper. n a modul	·		
 Assignments Practical's Case Studies Tests Examinations Presentations all of the above cons 	sistent with cor	ntinuous	assessment (su	mmative a	ınd summa	tive)	
	soment Mark	for evan	admission (%)			40	
Minimum Form Asse	essment wark	ioi cxaii	1 801111331011 (70)			40	
			% Summative A			60	
Final mark =	•		` '			60 40	
	to pass (%)		% Summative A % Summative A	ssessmen	t Mark	60 40 50	
Final mark =	to pass (%)		% Summative A		t Mark	60 40	
Final mark =	to pass (%)		% Summative A % Summative A	ssessmen	t Mark	60 40 50	
	Statistical Inference Methods of findir Confidence interfor Normal popu Upon successful corskills to: Explain in detail models. Explain in detail estimation proce Demonstrate the area of hypothes Explain in detail and analysis tech underlying param Demonstrate corsequence SAQA Credits 12 Classes 4 All four Statistics III in None A module mark work and tests. A summative ass A student is admaverage of the sum average of th	Statistical Inference Methods of finding estimators, Confidence intervals: pivotal questimators, to Normal populations, UMP to Upon successful completion of the skills to: Explain in detail the notion of a models. Explain in detail and demonstrate estimation procedures and our Demonstrate the plausibility of area of hypothesis testing. Explain in detail and demonstrate and analysis techniques are deformed underlying parametric model. Demonstrate computational skith samples are deformed to the samples	 Statistical Inference Methods of finding estimators, Criteria f Confidence intervals: pivotal quantity m for Normal populations, UMP test, Gender Williams Upon successful completion of the requirer skills to: Explain in detail the notion of a paramet models. Explain in detail and demonstrate approximation procedures and our confider Demonstrate the plausibility of pre-spectarea of hypothesis testing. Explain in detail and demonstrate the usund analysis techniques are developed underlying parametric model. Demonstrate computational skills to impose the practicals A Practicals A Module mark will be obtained from conwork and tests. A summative assessment will consist on A student is admitted to the formal assess average of the summative and summation. Assignments Practical's Case Studies Tests Examinations Presentations all of the above consistent with continuous 	Statistical Inference Methods of finding estimators, Criteria for evaluating es Confidence intervals: pivotal quantity method and gener for Normal populations, UMP test, Generalized likelihod. Upon successful completion of the requirements of this couskills to: Explain in detail the notion of a parametric model and procedures. Explain in detail and demonstrate approaches to include estimation procedures and our confidence in them by e Demonstrate the plausibility of pre-specified ideas about area of hypothesis testing. Explain in detail and demonstrate the use of non-param and analysis techniques are developed that are not hear underlying parametric model. Demonstrate computational skills to implement various SAQA Credits ITS Course Level 12 Classes Practicals Tutorial 4 2 2 All four Statistics III modules None A module mark will be obtained from continuous assess work and tests. A summative assessment will consist of one three-hour A student is admitted to the formal assessment based of average of the summative and summative assessment of average of the sum and average of the sum and average of the sum and average of th	Statistical Inference Methods of finding estimators, Criteria for evaluating estimators, S. Confidence intervals: pivotal quantity method and general method for Normal populations, UMP test, Generalized likelihood ratio test. Upon successful completion of the requirements of this course, stude skills to: Explain in detail the notion of a parametric model and point estima models. Explain in detail and demonstrate approaches to include a measu estimation procedures and our confidence in them by examining to Demonstrate the plausibility of pre-specified ideas about the paran area of hypothesis testing. Explain in detail and demonstrate the use of non-parametric statis and analysis techniques are developed that are not heavily dependentlying parametric model. Demonstrate computational skills to implement various statistical in the statistical in the statistics of the statistics o	Statistical Inference Methods of finding estimators, Criteria for evaluating estimators, Sufficiency Confidence intervals: pivotal quantity method and general method. Theory of for Normal populations, UMP test, Generalized likelihood ratio test. Upon successful completion of the requirements of this course, students should skills to: Explain in detail the notion of a parametric model and point estimation of the models. Explain in detail and demonstrate approaches to include a measure of accur estimation procedures and our confidence in them by examining the area of Demonstrate the plausibility of pre-specified ideas about the parameters of th area of hypothesis testing. Explain in detail and demonstrate the use of non-parametric statistical metho and analysis techniques are developed that are not heavily dependent on the underlying parametric model. Demonstrate computational skills to implement various statistical inferential a SAQA Credits ITS Course Level CESM Co 12 Classes Practicals Tutorial Seminars 4 2 2 2 2 All four Statistics III modules None A module mark will be obtained from continuous assessment based on quizze work and tests. A summative assessment will consist of one three-hour paper. A student is admitted to the formal assessment based on a module mark of s average of the summative and summative assessment marks. Assignments Practical's Case Studies Tests Examinations Presentations all of the above consistent with continuous assessment (summative and summa	

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

Module Code:	MSTB081							
Module Name:	Sampling Theory							
Content:		 Review of Simple and Stratified Random Sampling, Sampling with Probability Proportional to size, Systematic Sampling, Multistage Sampling, Sources of Errors. 						
Learning Outcomes:	 Demonstrate adv Gain more advan Demonstrate und with unequal prol 	In the course the students will be able to a Demonstrate advanced knowledge in Gain more advanced insight into stratified random sampling; systematic and cluster sampling. Demonstrate understanding of estimation of the sample size; ratio and regression estimation; sa with unequal probabilities; complex surveys. Explain and offset cases of non-response in surveys.						
Module Information:	SAQA Credits		ITS Course	Level		CESM Code	(3 rd Order)	
Module Information:	12							
Periods per week:	Classes	Practicals	Tu	ıtorial	Semin	ars	Independent Learning	
	4	2		2		2	4	
Pre-requisite module/s:	All four Statistics III r	nodules						
Co-requisite module/s:	None							
Assessment criteria: Assessment methods:	work and tests. A summative ass A student is admi The final mark is Assignments Practical's Case Studies Tests Examinations	 A summative assessment will consist of one three-hour paper. A student is admitted to the formal assessment based on a module mark of 50% The final mark is the average of the summative and summative assessment marks. Assignments Practical's Case Studies Tests 						
	Presentations all of the above consistent with continuous assessment (summative and summative)							
	all of the above cons			`	mmative a	nd summative	'	
			or exam adm	ission (%)			40	
Mark Structure:	all of the above cons	essment Mark f	or exam adm	ission (%) mmative A	ssessment	Mark	40 60	
Mark Structure:	all of the above cons Minimum Form Asse Final mark =	essment Mark f	or exam adm	ission (%)	ssessment	Mark	40	
Mark Structure:	all of the above cons Minimum Form Asse Final mark = Minimum final mark to	essment Mark f	or exam adm % Su % Su	ission (%) mmative A mmative A	ssessment	Mark Mark	40 60 40	
Mark Structure: Summative Assessment	all of the above cons Minimum Form Asse Final mark = Minimum final mark to	essment Mark f	or exam adm % Su % Su	ission (%) mmative A	ssessment ssessment	Mark Mark	40 60 40 50	
	all of the above cons Minimum Form Asse Final mark = Minimum final mark to	essment Mark f to pass (%)	or exam adm % Su % Su	ission (%) mmative A mmative A	ssessment ssessment	Mark Mark	40 60 40 50	

CURRICULUM INFORMATION						
Department: Statistical Sciences	School:	Science & Technology				
Last Revision date: 2011	First Year	Offered (New):	2013			
Replace this Module existing module(s)?						

Module Code:	MSTC081							
Module Name:	Biostatistics	Biostatistics						
Content:	way analyses of	 Design of biomedical studies: Bias elimination, control, randomization, precision, replication, one-two way analyses of variance; factorial, crossed, nested, repeated measures designs. Multiple comparisons. Multiple regression, Analysis of covariance. 						
Learning Outcomes:	After learning this co	After learning this course the students will be able to Apply parametric and nonparametric statistical methods to numerical data from the life sciences. Understand different aspects of survival analysis as data analysis methodology. Analyse a wide spectrum of problems on time to event data. Demonstrate understanding of Survival Analysis and its multitude of applications in the fields of healt engineering, economics, biology and the physical sciences. Describe the distribution of failure times (time to event), analysis times and Hazard models (Parametr & Semi-parametric), Censoring, truncation and the recording of survival data. Demonstrate knowledge of nonparametric analysis of survival data, the Cox proportional hazards model, building a Cox proportional hazards model, diagnostics to check model for misspecification, outliers, and influential points.						
Module Information:	SAQA Credits		ITS Co	urse Level		CESM Cod	e (3 rd Order)	
Periods per week:	Classes	Practicals		Tutorial	Seminars		Independent Learning	
. onodo por mooni	4	2		2		2	4	
Pre-requisite module/s:	All four Statistics III r	nodules						
Co-requisite module/s :	None							
Assessment criteria:	 A module mark w work and tests. A summative ass A student is adm The final mark is 	essment will c	onsist o	f one three-hour pessment based or	paper. n a module	e mark of 50		
Assessment methods:	 Assignments Practical's Case Studies Tests Examinations Presentations all of the above considerations 	istent with cor	ntinuous	assessment (sur	mmative aı	nd summativ	re)	
	Minimum Form Asse	ssment Mark	for exan	admission (%)			40	
Mark Structure:	Final mark =	:		% Summative As % Summative As			60 40	
	Minimum final 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: 2011	First Year Offered (New): 2013					
Replace this Module existing module(s)? No	If YES, give the module codes:					

Module Code:	MSTB082						
Module Name:	Non-Parametric Stat	istics					
Content:	Nonparametric infe Nonparametric tests Measures of associa	Single sample	e tests, I				of goodness of fit. samples tests.
Learning Outcomes:	 Demonstrate knot non-linear relation Understand the obstween model of Explain nonparar as well as model Demonstrate und 	 After learning this course the students will be able to Demonstrate knowledge of different aspects of nonparametric regression as an explorative tool and non-linear relationships in a wide variety of applications. Understand the differences between parametric and nonparametric regression and the difference between model driven and data driven approaches. Explain nonparametric density estimation in practice and theory for univariate and multivariate analyses as well as models for nonparametric regression and the smoothing parameters. Demonstrate understanding of advanced tools such as semi-parametric regression, additive models and in particular generalised additive models are also included. 					
Module Information:	SAQA Credits		ITS Co	urse Level		CESM Cod	de (3 rd Order)
Module illioillation.	12						
Periods per week:	Classes	Practicals		Tutorial	Semin	ars	Independent Learning
	4	2		2		2	4
Pre-requisite module/s:	All four Statistics III r	modules					
Co-requisite module/s :	None						
Assessment criteria:	 A module mark w work and tests. A summative ass A student is adm The final mark is 	sessment will c	consist o	f one three-hour essment based o	paper. n a module	e mark of 50	
Assessment methods:	 Assignments Practical's Case Studies Tests Examinations Presentations all of the above considerations 	sistent with cor	ntinuous	assessment (sur	mmative ar	nd summati	ve)
	Minimum Form Asse	essment Mark	for exan	n admission (%)			40
Mark Structure:	Final mark =			% Summative As	ssessment	Mark	60
Mark Structure:	Final mark -	•		% Summative As	ssessment	Mark	40
	Minimum final 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 & Technolo	gy			
Last Revision date: 2011		First Year Offered (New):	2013			
Replace this Module existing module(s)?						

Module Code:	MSTD081						
Module Name:	Multivariable Analys	is					
Content:	multivariate norn	Review of matric algebra. Multivariate distributions; Multivariate normal distribution. Sampling from multivariate normal population; Inference about multivariate means, multivariate analysis of variance, multivariate regression. Inference about covariance structure including principal components.					
Learning Outcomes:	F distributions. Demonstrate und moments, condii Demonstrate und and elliptical disi Demonstrate knot bescribe mather	ation and theorowledge of multiple derstanding of tional distributions derstanding of tributions.	y extens tivariate concept ons, and multivar	ively. distributions in th s of jointly distribu independence as	uted random s well as cha oution and its	variables, n aracteristic fo s properties,	as well as spherical
Module Information:	SAQA Credits		ITS Co	urse Level	С	ESM Code	(3 rd Order)
Periods per week:	Classes	Practicals		Tutorial	Seminai	rs	Independent Learning
	4	2		2		2	4
Pre-requisite module/s:	All four Statistics III	modules					
Co-requisite module/s :	None						
Assessment criteria:	work and tests.A summative assA student is adm	sessment will c	onsist o	ntinuous assessm f one three-hour p essment based on nmative and sumi	oaper. n a module r	mark of 50%	ssignments, practica
Assessment methods:	 Practical's Case Studies Tests Examinations Presentations all of the above constitutions 	sistent with cor	tinuous	assessment (sum	nmative and	summative)	
	Minimum Form Asse	essment Mark t	or exam	admission (%)			40
Mark Structure:	Final mark =	=		% Summative As			60
main Stiuctuie.				% Summative As	sessment M	lark	40
	Minimum final mark	. ,					50
	T. (5 " :	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: 2011	First Year Offered (New): 2013				
Replace this Module existing module(s)?	If YES, give the module codes:				

Module Code:	MSTC082						
Module Name:	Stochastic Processes						
Content:	 Basic concept of stochastic processes. The Poisson process and generalizations. Renewal processes. Discrete and continuous time Markov chains and applications. Random walk and Brownian motion. 						
Learning Outcomes:	After learning this course the students will be able to Understand the mathematical bases of probability; conditional probability and conditional expectation Demonstrate understanding of Markov chains. Exponential distribution and the Poisson Process. Continuous time Markov chains.						
Module Information:	SAQA Credits		ITS Course	Level		CESM Co	de (3 rd Order)
Module information.	12						
Periods per week:	Classes	7	Γutorial	Semir	ars	Independent Learning	
·	4	2		2		2	4
Pre-requisite module/s:	All four Statistics III	modules					
Co-requisite module/s :	None						
Assessment criteria: Assessment methods:	work and tests. • A summative ass • A student is adm	 A summative assessment will consist of one three-hour paper. A student is admitted to the formal assessment based on a module mark of 50% The final mark is the average of the summative and summative assessment marks. Assignments Practical's Case Studies Tests 					
	all of the above cons	sistent with con	ntinuous ass	essment (su	ımmative a	nd summati	ive)
	Minimum Form Asse	essment Mark t					40
Mark Structure:	Final mark =	=		% Summative Assessment Mark			60
			% S	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			40
	Minimum final mark	T	<u> </u>				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: 2011	First Year Offered (New): 2013				
Replace this Module existing module(s)? No	If YES, give the module codes:				

Module Code:	MSTE081							
Module Name:	Categorical Data An	Categorical Data Analysis						
Content:	 Distribution and inference for Categorical Data, Two-Dimensional Tables: Test of Independence, Test of Homogeneity, Relative Risk and the Odds Ration, Independence and the Odds Ratio, Long Linear Models for Three-Dimensional Tables, Model Selection Criteria; Logistics Regression and Logistic Models: Multiple Logistics Regression, Logistic Regression Diagnostic, Model Selection Methods, Logit Models for Multinomial Responses 							
Learning Outcomes:	Analyse categoriAnalyse two-wayDemonstrate theApply deviance to	 Upon successful completion of this module, the students should have knowledge and skills Analyse categorical (or count) responses and categorical or continuous predictor variables Analyse two-way and multi-way tables Demonstrate theoretical and applied knowledge of logistic regression Apply deviance tables to real problems Apply CDA to bio-data and business environments 						
Module Information:	SAQA Credits		ITS Course Level	CESM C	ode (3 rd Order)			
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning			
r criodo per week.	4	2	2	2	4			
Pre-requisite module/s:	All four Statistics III i	modules	•		•			
Co-requisite module/s :	None							
Assessment criteria:	 A module mark will be obtained from continuous assessment based on quizzes, assignments, practical work and tests. A summative assessment will consist of one three-hour paper. A student is admitted to the formal assessment based on a module mark of 50% The final mark is the average of the summative and summative assessment marks. Assignments Practical's Case Studies 							
Assessment methods:	 Practical's 		and dummative and dum	nmative assessment				
Assessment methods:	Practical'sCase StudiesTestsExaminationsPresentations	sistent with con	tinuous assessment (su		marks.			
Assessment methods:	 Practical's Case Studies Tests Examinations Presentations all of the above cons 				marks.			
	 Practical's Case Studies Tests Examinations Presentations all of the above cons Minimum Form Asse	essment Mark fo	tinuous assessment (su or exam admission (%) % Summative A	mmative and summa	marks. ative) 40 60			
Assessment methods: Mark Structure:	 Practical's Case Studies Tests Examinations Presentations all of the above cons Minimum Form Asse Final mark =	essment Mark fo	tinuous assessment (su or exam admission (%) % Summative A	mmative and summa	marks. ative) 40 60 40			
	 Practical's Case Studies Tests Examinations Presentations all of the above cons Minimum Form Asse	essment Mark for to pass (%)	tinuous assessment (su or exam admission (%) % Summative A % Summative A	mmative and summa ssessment Mark ssessment Mark	marks. ative) 40 60 40 50			
Mark Structure:	 Practical's Case Studies Tests Examinations Presentations all of the above cons Minimum Form Asse Final mark = Minimum final mark	essment Mark for to pass (%)	tinuous assessment (su or exam admission (%) % Summative A	mmative and summa	marks. ative) 40 60 40			
	 Practical's Case Studies Tests Examinations Presentations all of the above cons Minimum Form Asse Final mark =	essment Mark for to pass (%)	tinuous assessment (su or exam admission (%) % Summative A % Summative A	mmative and summa ssessment Mark ssessment Mark	marks. ative) 40 60 40 50			

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:				

Module Code:	MSTS080						
Module Name:	Research Project (Statistics)						
Content:	The student, in consultation with supervisor, selects a research topic in Statistics, does independent research and writes a report.						
Learning Outcomes:	Plan and conductionPresent the findingAdopt a critical at	 Students completing this module successfully will be able to Plan and conduct statistical research under supervision. Present the findings of the research in an appropriately structured written research report. Adopt a critical and ethical approach to conducting statistical analysis and research. Report on research conducted, both in their own work and in that of others. 					
Module Information:	SAQA Credits		ITS Course Level	CESM	l Code (3 rd Order)		
wodule illiorillation.	12						
Periods per week:	Classes	Practicals	Tutorial	Seminars	Independent Learning		
р.	4	2	2	2	4		
Pre-requisite module/s:	All four Statistics III	modules					
Co-requisite module/s :	None						
	 A module mark v 	vill be obtained	from continuous asses	sment hased on di	izzes assignments practic		
	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies	sessment will on	from continuous assess consist of one three-hou mal assessment based of the summative and su	ır paper. on a module mark			
	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations	sessment will on the for sthe average of the averag	consist of one three-hou mal assessment based	ir paper. on a module mark immative assessm	of 50% ent marks.		
	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations all of the above con-	sessment will on the form the average of the average of the sistent with consistent with consi	consist of one three-houmal assessment based if the summative and summative and summative and summative assessment (sometinuous assessment (sometinuous admission (%)	on a module mark Immative assessm ummative and sum	of 50% ent marks. nmative)		
Assessment criteria: Assessment methods: Mark Structure:	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations all of the above con-	sessment will on itted to the for the average of the average of the sistent with coressment Mark	consist of one three-houmal assessment based of the summative and suntinuous assessment (sometinuous assessment (sometinuous admission (%) Summative	or paper. on a module mark mmative assessm	of 50% ent marks. nmative)		
Assessment methods:	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations all of the above con	sessment will on itted to the for the average of the average of the sistent with contessment Mark	consist of one three-houmal assessment based of the summative and suntinuous assessment (sometinuous assessment (sometinuous admission (%) Summative	or paper. on a module mark immative assessm ummative and sum Assessment Mark	of 50% ent marks. nmative) 40 60		
Assessment methods:	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations all of the above con- Minimum Form Assi	sessment will on itted to the for the average of the average of the sistent with contessment Mark	consist of one three-houmal assessment based of the summative and suntinuous assessment (sometinuous assessment (sometinuous admission (%) Summative	or paper. on a module mark immative assessm ummative and sum Assessment Mark	of 50% ent marks. nmative) 40 60 40		
Assessment methods:	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations all of the above con- Minimum Form Assi	sessment will on itted to the for the average of th	consist of one three-houmal assessment based if the summative and suntinuous assessment (sometinuous assessment (sometinuous admission (%) Summative % Summative	ummative and sum Assessment Mark	of 50% ent marks.		
Assessment methods: Mark Structure:	work and tests. A summative as: A student is adm The final mark is Assignments Practical's Case Studies Tests Examinations Presentations all of the above con- Minimum Form Assignments Minimum final mark	sessment will on itted to the for the average of th	consist of one three-houmal assessment based if the summative and suntinuous assessment (sometinuous assessment (sometinuous admission (%) Summative % Summative	ummative and sum Assessment Mark	of 50% ent marks. nmative) 40 60 40 50		

Master of Science Degree

Rules for Master of Science Degree

The General Rules for master's degree apply.

SSTM 1 Requirements for Awarding a Master's Degree

In complement to the General Rules, the following requirements must be met for the Master of Science Degree by Research:

- · Completed dissertation to be submitted, and
- At least one manuscript based on the candidate's research and of which the candidate is the first author

Programmes Offered

The School offers the following *Master's Programmes*

MAMA090	Master of Science in Applied Mathematics
MBIA090	Master of Science in Biochemistry
MBOA090	Master of Science in Botany
MCHA090	Master of Science in Chemistry
MMAA090	Master of Science in Mathematics
MPHA090	Master of Science in Physics
MSTA090	Master of Science in Statistics

DEPARTMENT: MATHEMATICS & APPLIED MATHEMATICS

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: AMAT800				

Module Code:	MAMA090	MAMA090							
Module Name:	Master of Scie	Master of Science in Applied Mathematics							
Module Content:	results of an a	The Master of Science in Applied Mathematics comprises a dissertation based on the research results of an approved supervised research project in the field of Applied Mathematics, presented in a form suitable for publication.							
Learning Outcomes:	methods in an To plan an proposal a To access, To critically The graduate associated wit The graduate	 At this level the learner will acquire graduate level knowledge of research philosophy and research methods in an approved specialized field of Applied Mathematics. The learner will have the ability: To plan and conduct a research project, including written and verbal presentations of the research proposal and research report To access, extract and synthesize scientific information from multimedia sources To critically interpret and evaluate published scientific information. The graduate will further have an appreciation for the environmental and social responsibilities associated with planning, conducting and communicating scientific research results. The graduate will also have developed a scientifically ethical approach to the collection, analysis, presentation and publication of research results. 							
Module Information:	SAQA Credits	5	ITS Course Level	Code	CESM C	ode (3 rd Order)			
module information.	180		8		15	50201			
Periods per Week:	Classes	Practicals	Tutorial	Semi	nars	Independent Learning			
, p	N/A	Res Project	N/A	2 per	year	Res Project			
Pre-requisite module/s:	None								
Co-requisite module/s:	None								
Assessment Criteria:	comprehensiv	Candidates will be required to demonstrate an ability and proficiency by means of a comprehensive dissertation, which may be supplemented by an oral presentation of their research findings. The dissertation is assessed by a panel of both internal and an external							
Assessment Methods:	Dissertation e	valuated or assesse	d by internal and ex	ternal assess	sors.				
Assessment Weighting:	Min Final Asse	essment mark to pas	ss (%)			50			

DEPARTMENT: BIOCHEMISTRY & BIOTECHNOLOGY

CURRICULUM INFORMATION						
Department: Biochemis	try & Biotechnology	School: Science & Technology				
Last Revision date:	2011		First Year Offered (New):	2013		
Replace this Module existing	g module(s)?	Yes	If YES, give the module codes:	BIOC800		

Module Code:	MBIA090	MBIA090						
Module Name:	Master of Science in I	Master of Science in Biochemistry						
Module Content:		The Master of Science in Biochemistry comprises a dissertation based on the research results of an approved supervised research project in the field of Biochemistry, presented in a form suitable for publication.						
Learning Outcomes:	proposal and rese To access, extract To critically interpr The graduate will associated with pl	red specialized onents and samp uct a research pearch report tand synthesize ret and evaluate further have an lanning, conductalso have devel	field of Biochemist ling programmes roject, including we scientific informate published scientific appreciation for the ting and communicated a scientifical	ry. The learne ritten and verl tion from mult ic information e environmen cating scientif	er will have coal present imedia sou tal and sort ic research	the ability: tations of the research urces cial responsibilities		
Module Information:	SAQA Credits		TS Course Level	Code	CESM Co	de (3 rd Order)		
module illiorillation.	180		8		13	0201		
Periods per Week:	Classes	Practical	s Tutorial	Semin	ars	Independent Learning		
	N/A							
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Methods:	Internal and external	evaluation						
Assessment Weighting:	Min Final Assessmen		Internal and external evaluation					

DEPARTMENT: BIOLOGY & ENVIRONMENTAL SCIENCES

CURRICULUM INFORMATION						
Department: Biology & Environmental Sciences School: Science & Technology						
Last Revision date: 2011		First Year (New):	Offered 2013			
Replace this Module existing module(s)?	Yes	If YES, give	e the module BLGY808			

Module Code:	MZOA090	MZOA090					
Module Name:	Master of Science in	Master of Science in Zoology					
Module Content:	The Master of Science	The Master of Science in Zoology comprises a dissertation based on the research results of an					
Module Content:	Approved supervised publication.	Approved supervised research project in the field of Zoology, presented in a form suitable for publication.					
Learning Outcomes:	methods in an approv To design experin To plan and conding presentations of t To access, extract sources To critically interp The graduate will social responsibilicommunicating so The graduate will	 At this level the learner will acquire graduate level knowledge of research philosophy and research methods in an approved specialized field of Zoology. The learner will have the ability: To design experiments and sampling programmes To plan and conduct a research project, including written and verbal presentations of the research proposal and research report To access, extract and synthesize scientific information from multimedia sources To critically interpret and evaluate published scientific information. The graduate will further have an appreciation for the environmental and social responsibilities associated with planning, conducting and communicating scientific research results. The graduate will also have developed a scientifically ethical approach to the collection, analysis, presentation and publication of research results. 					
Module Information:	SAQA Credits	SAQA Credits		S Course Level Code		CESM Code (3rd Order)	
	180	180		8		130601	
Periods per Week:	Classes	Practicals	Tutorial	Semi	nars	Independent Learning	
	N/A	Research project	N/A		2	Research project	
Pre-requisite module/s:	None						
Co-requisite module/s:	None	None					
Assessment Methods:	Internal and external	Internal and external evaluation					
Assessment Weighting:	Min Final Assessmen	Min Final Assessment mark to pass (%)					

DEPARTMENT: CHEMISTRY & CHEMICAL TECHNOLOGY

CURRICULUM INFORMATION						
Department: Chemistry & Chemical Technology School: Science & Technology						
Last Revision date: 2011	First Year Offered (New): 2013	3				
Replace this Module existing module(s)? Yes	Replace this Module existing module(s)? Yes If YES, give the module codes: CHMY800					

Module Code:	MCHA090							
Module Name:	Master of Science in	Master of Science in Chemistry						
Module Content:		The Master of Science (Chemistry) comprises a dissertation based on the research results of an approved supervised research project in the field of Chemistry, presented in a form suitable for publication.						
Learning Outcomes:	methods in an approv To design experir To plan and cond proposal and resu To access, extrace To critically interp	ved specialized fie nents and samplin uct a research pro	d of Chemisti g programme ject, including cientific inforr ublished scier	ry. The learner wil s written and verba	al presentations of the research			
	 The graduate will associated with p The graduate will 	 To operate different types of instrumentation. The graduate will further have an appreciation for the environmental and social responsibilities associated with planning, conducting and communicating scientific research results. The graduate will also have developed a scientifically ethical approach to the collection, analysis, presentation and publication of research results. 						
Madula lufamatian	SAQA Credits		ITS Co	urse Level Code	CESM Code (3rd Order)			
Module Information:	180			8	140401			
Davia da man Waals	Classes	Practicals	Tutorial	Seminars	Independent Learning			
Periods per Week:	N/A	Research project	N/A	1	Research Project			
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	dissertation, which m	Candidates will be required to demonstrate their ability and proficiency by means of a comprehensive dissertation, which may be supplemented by an oral presentation, of their research findings. The dissertation is assessed by an assessment panel of both internal and an external assessors.						
		dissertation is assessed by an assessment panel of both internal and an external assessors. Dissertation evaluated / assessed by internal and external assessors.						
Assessment Methods:	Dissertation evaluate	d / assessed by in	ternal and ext	ternal assessors.				

DEPARTMENT: COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

	MODULE INFORM	MATION		
Department: Computer Science and Information Technology			School:	Science & Technology
Last Revision dat	te:	First Year Offered (New):	2022	
Replace this Mod No	ule existing module(s)?	If YES, give the module codes:		
Module linked to	Qualification/s:	MSC(CSIT)		
Migration Strategy:	No	(If YES, IP05 must also be completed)		

Module Code: (4 alphabetic & 3 numeric)	CSIT800						
Module Name:	Master of Sc	ience in C	omputer	Science and Infor	mation Technolog	ју	
Module Content:	approved su	The Master of Science (CSIT) comprises a dissertation based on the research results of an approved supervised research project in the field of Computer Science and Information technology, presented in a form suitable for journal publication.					
Learning Outcomes:	At this level the learner will acquire graduate level knowledge of research philosophy and research methods in an approved specialized field of Computer Science & Information Technology. The learner will have the ability: > to plan and conduct a research project, including written and verbal presentations of the research proposal and research report > to access, extract and synthesize scientific information from multimedia sources > to critically interpret and evaluate published scientific information. The graduate will further have an appreciation for the environmental and social responsibilities associated with planning, conducting and communicating scientific research results. The graduate will also have developed a scientifically ethical approach to the collection, analysis, presentation and publication of research results.						
Module Information:	SAQA Cr			ITS Course Leve	el Code	CESM Code (3 rd Order)	
	180			8		0601	
Delivery Information:	Camp	us		Full/Part Tin	ne	Period (1st/2ndYr)	
benvery information.	SMI	J	С	ontact, Full Time c	or Part time	1 st & 2 nd Year	
	Classes	Pract	icals	Tutorial	Seminars	Independent Learning	
Periods per Week:	N/A	Rese Proj		N/A	1	Research Project	
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	Candidates will be required to demonstrate an ability and proficiency by means of a comprehensive dissertation, which will be supplemented by an oral presentation of their research proposal and findings. The dissertation will be assessed by an external assessor.						
Assessment Methods:	Dissertation	evaluated	or asses	sed by internal an	d external assess	ors.	
Assessment Weighting:	Min Final As	sessment	mark to p	pass (%)		50	

DEPARTMENT: MATHEMATICS & APPLIED MATHEMATICS

MODULE INFORMATION					
Department: Mathematics & Applied Mathematics School: Science & Technology					
Last Revision date: 2011	First Year Offered (New):	2013			
eplace this Module existing module(s)? Yes If YES, give the module codes: MAH808					

Module Code:	MMAA090							
Module Name:	Master of Scien	Master of Science in Mathematics						
Module Content:		The Master of Science in Mathematics comprises a dissertation based on the research results of an approved supervised research project in the field of Mathematics, presented in a form suitable for publication.						
Learning Outcomes:	methods in an a To plan and proposal an To access, a To critically in the graduate wassociated with	approved speci conduct a rese d research rep extract and syn nterpret and e ill further have planning, cond ill also have de	alized fie earch pro ort thesize s valuate p an appre ducting a eveloped	Id of Mathemat ject, including was scientific informational sublished scient eciation for the end communicat a scientifically of	ics. The ritten and ation from ific information ific information ing scie	learner will hand verbal preson multimedia mation. mental and soontific research	ave thentation source cial resu	ions of the research ces esponsibilities
Module Information:	SAQA Credits		ITS Cou	rse Level Cod	е	CESM Code	(3rd C	Order)
Module illioilliation.	180			8		1501	01	
Daviada nas Waski	Classes	Practical	ls	Tutorial	Ş	Seminars		ndependent _earning
Periods per Week:	N/A	Research Project	1	N/A	2	2 per year	F	Research Project
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	comprehensive	Candidates will be required to demonstrate an ability and proficiency by means of a comprehensive dissertation, which may be supplemented by an oral presentation of their research findings. The dissertation is assessed by a panel of both internal and an external assessors.						
Assessment Methods:	Dissertation eva	luated or asse	ssed by	internal and ext	ernal as	ssessors.		
Assessment Weighting:	Min Final Asses	sment mark to	pass (%)				50

DEPARTMENT: PHYSICS

MODULE 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:	PHYS800		

Module Code:	MPHA090						
Module Name:	Master of Science	Master of Science in Physics					
Module Content:		The Master of Science (Physics) comprises a dissertation based on the research results of an approved supervised research project in the field of Physics, presented in a form suitable for publication.					
Learning Outcomes:	methods in an app To design exp To plan and co proposal and r To access, ext To critically int To operate diff The graduate v associated wit The graduate v	At this level the learner will acquire graduate level knowledge of research philosophy and research methods in an approved specialized field of Physics. The learner will have the ability: To design experiments and sampling programmes					
			Cocaron resalts.				
Module Information:	SAQA Credits		S Course Level Co	de	CESM Code		
Module Information:	SAQA Credits 180			de	CESM Code	01	
			S Course Level Co	de Semir	14070		
Module Information: Periods per Week:	180	IT	S Course Level Co		14070	01 Independent	
	180 Classes	Practicals Research	S Course Level Co 8 Tutorial		14070 nars	01 Independent Learning	
Periods per Week:	180 Classes N/A	Practicals Research	S Course Level Co 8 Tutorial		14070 nars	01 Independent Learning	
Periods per Week: Pre-requisite module/s:	Classes N/A None None Candidates will be dissertation, which	Practicals Research project required to demore the may be supplemented by an asset	TS Course Level Co 8 Tutorial N/A	Semir d proficient esentation	14070 nars 1 cy by means, of their res	Independent Learning Research project of a comprehensive	
Periods per Week: Pre-requisite module/s: Co-requisite module/s:	None Candidates will be dissertation, which dissertation is assexternal assessor.	Practicals Research project required to demore he may be supplemented by an assess.	Tutorial N/A Instrate their ability an ented by an oral price.	Semir d proficien esentation th internal	14070 nars 1 ccy by means , of their res	Independent Learning Research project of a comprehensive	

DEPARTMENT: STATISTICAL SCIENCES

MODULE 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: STAT800					

Module Code:	MSTA090							
Module Name:	Master of Science	Master of Science in Statistics						
Module Content:	The Master of Science in Statistics comprises a dissertation based on the research results of an approved supervised research project in the field of Statistics or Operations Research, presented in a form suitable for publication.							
Learning Outcomes:	At this level the learner will acquire graduate level knowledge of research philosophy and research methods in an approved specialized field of Statistics or Operations Research. The learner will have the ability: To plan and conduct a research project, including written and verbal presentations of the research proposal and research report To access, extract and synthesize scientific information from multimedia sources To critically interpret and evaluate published scientific information. The graduate will further have an appreciation for the environmental and social responsibilities associated with planning, conducting and communicating scientific research results. The graduate will also have developed a scientifically ethical approach to the collection, analysis, presentation and publication of research results.							
Module Information:	SAQA Credits		ITS Course Level Code (+	CESM Code (3rd Order)	
	180			8			150302	
Delivery Information:	Campus SMU Campus			a rt Time et, Full Time or Pa	rt Time	Perio Minimum 2 y	•	
Periods per Week:	Classes	Practicals		Tutorial	Semir	nars	Independent Learning	
ро	N/A	Res Project		N/A	2 per	year	Research Project	
Pre-requisite module/s:	None							
Co-requisites module/s:	None							
Assessment Criteria:	Candidates will be required to demonstrate an ability and proficiency by means of a comprehensive dissertation, which may be supplemented by an oral presentation of their research findings. The dissertation is assessed by a panel of both internal and an external assessors.							
Assessment Methods:	Dissertation evalua	ited / assessed I	y interi	nal and external a	ssessors	S		
Assessment Weighting:	Min Final Assessm	ent mark to pas	s (%)				50	

Doctor of Philosophy

Rules for Doctoral Degree Study

The General Rules for doctoral degrees apply.

SSTD 1 PhD by Publication

If determined by pre-approved research protocol, a collection of published articles could be accepted as a thesis provided the following conditions are satisfied:

- A minimum of three articles is published in peer reviewed accredited journals
- Student is first author in all the publications
- Publications are bound into a monograph incorporating substantial introductory and conclusion chapters

Programmes Offered

The School offers the following *Doctor of Philosophy Programmes*

MAMA100	Doctor of Philosophy in Applied Mathematics
MBIA100	Doctor of Philosophy in Biochemistry
MBOA100	Doctor of Philosophy in Botany
MCHA100	Doctor of Philosophy in Chemistry
MMAA100	Doctor of Philosophy in Mathematics
MPHA100	Doctor of Philosophy in Physics
MSTA100	Doctor of Philosophy in Statistics

CURRICULUM INFORMATION						
School:	Science & Technology		Faculty:			
Qualification Name:	I JOCTOR OF PHILOSOPHY IN THE SPECIFIC LUSCININE		Qualification Co	de: Pl	ID in the s	pecific Discipline
Campus: SMU Campus			Last Revision da	ate:	2011	
Total SAQA C	redits for Qualification:	360	Is this a fixed Cu	ırriculum	:	Yes

DEPARTMENT: MATHEMATICS & APPLIED MATHEMATICS

CURRICULUM	/I 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:	AMAT900

Module Code:	MAMA100					
Module Name:	Doctor of Philos	ophy in Applied Mat	hematics			
Module Content:	results of an ori	hilosophy in Applied ginal, approved and orm suitable for publ	supervised resear			on the research of Applied Mathematics,
Learning Outcomes:	methods in an a To plan and proposal an To access, a To critically in the graduate wassociated with the graduate was a sociated was a soci	approved specialized conduct a research d research report extract and synthesiz interpret and evaluat will further have an planning, conducting	field of Applied M project, including the scientific informate the published scienappreciation for g and communicate apped a scientifical	lathematics. written and value from natific information the enviror ting scientific	The learn verbal presonal timedia amental arc research	nd social responsibilities
Module Information:	SAQA Credits		ITS Course Lo	evel Code		ode (3 rd Order)
	360		10		1	50201
Periods per Week:	Classes	Practicals	Tutorial	Semi	nars	Independent Learning
	N/A	Res Project	N/A	2 per	year	Res Project
Pre-requisite module/s:	None					
Co-requisite module/s:	None					
Assessment Criteria:	comprehensive	be required to demo thesis of their resea and an external asse	rch findings. The t			ency by means of a an assessment panel
Assessment Methods:	Thesis evaluate assessors.	d and assessed by a	an assessment pa	nel, consisti	ng of both	internal and external
Assessment Weighting:	Min Final Asses	sment mark to pass	(%)			50

DEPARTMENT: BIOCHEMISTRY & BIOTECHNOLOGY

MOD	ULE INFOR	MATION	
Department: Biochemistry & Biotechnology		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:	ABIO909

Module Code:	MBIA100					
Module Name:	Doctor of Philose	ophy in Biochemi	stry			
Module Content:		ed and supervised	nemistry comprises a t I research project in th			
Learning Outcomes:	methods in an a To design ex To plan and proposal and To access, e To critically in The graduate associated w The graduate	pproved specialize periments and sa conduct a research report atract and synthemater and evalue will further have with planning, cone will also have de	e graduate level know ed field of Biochemisti impling programmes th project, including with size scientific informati uate published scientificant an appreciation for the ducting and communicated eveloped a scientificall of research results.	ry. The learn ritten and ve ion from mutic information environme eating scienti	er will have rbal presen Itimedia son n. ntal and so fic researcl	tations of the research urces cial responsibilities n results.
	SAQA Credits	<u>'</u>	ITS Course Level Co	de	CESM Cod	le (3 rd Order)
Module Information:	360		10		1302	
Periods per Week:	Classes	Practicals	Tutorial	Semin	ars	Independent Learning
•	N/A	Res project	N/A		2	Res project
Pre-requisite module/s:	None					
Co-requisite module/s:	None					
Assessment Methods:	Thesis evaluated	d and assessed b	y both internal and ex	ternal asses	sors.	
Assessment Weighting:	Min Final Asses	sment mark to pa	ss (%)			50%

DEPARTMENT: BIOLOGY & ENVIRONMENAL SCIENCES

CURRICULUM INFORMATION					
Department: Biology & Environmental 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:	BLGY990	

Module Code:	MZOA100					
Module Name:	Doctor of Philosop	hy in Zoology	/			
Module Content:		and supervis	ology comprises a t ed research project			earch results of an presented in a form
Learning Outcomes:	research methods To design exp To plan and coresearch prop To access, ext To critically int The graduate viassociated with	in an approveriments and onduct a resea osal and researact and syntle erpret and evivill further have h planning, cowill also have	sampling programn arch project, includi arch report hesize scientific info aluate published sc	of Zoology. Innes Innes Ing written and Interpretation from Interp	The learner d verbal pr multimedination. mental and cientific res	esentations of the a sources I social responsibilities earch results.
Module Information:	SAQA Credits		ITS Course Level	Code	CESM C	ode (3 rd Order)
	360		10		130	0601
Periods per Week:	Classes	Practic als	Tutorial	Semi	nars	Independent Learning
	N/A	Res project	N/A		2	Res project
Pre-requisite module/s:	None					
Co-requisite module/s:	None					
Assessment Methods:	Thesis evaluated external assessor		l by an assessment	panel, consi	sting of bot	th internal and
Assessment Weighting:	Min Final Assessr	nent mark to	pass (%)			50%

DEPARTMENT: CHEMISTRY & CHEMICAL TECHNOLOGY

IV	ODULE INFOR	RMATION	
Department: Chemistry & Chemical Technology	nology	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:	CHEM900

Module Code:	MCHA100						
Module Name:	Doctor in Philo	sophy in Cher	nistry				
Module Content:	The Doctor of	Philosophy in	Chemist	y comprises a th	esis based	on the resea	rch results of an
Module Content:		ved and super		y comprises a the search project in			rch results of an resented in a form
Learning Outcomes:	methods in an ability:	approved sp	ecialized	field of Chemis	stry. The le		osophy and research ave the
	 To plan an research p To access To critically To operate The graduly associated The graduly 	d conduct a re proposal and re , extract and sy y interpret and e a variety of in ate will further d with planning ate will also ha	search pesearch runthesize evaluate strument have an conductive devel	scientific information published scient ation.	written and ation from natific informations the environraticating sciently ethical a	nultimedia so tion. nental and so ntific researd	ources ocial responsibilities ch results.
Module Information:	SAQA Credits	S	ITS Cou	rse Level Code		CESM Code	e (3 rd Order)
Module information:	360			10		1404	01
Periods per Week:	Classes	Practicals		Tutorial	Semir	nars	Independent Learning
•	N/A	Research p	roject	N/A		1	Research Project
Pre-requisite module/s:	None						
Co-requisite module/s:	None						
Assessment Criteria:	comprehensiv of both interna	e thesis of thei	r researd nal asses	th findings. The the sors.	hesis is ass	essed by an	cy by means of a assessment panel
Assessment Methods:	Thesis evalua external asses		ssed by	an assessment	t panel, co	nsisting of I	ooth internal and
Assessment Weighting:	Min Final Asse	essment mark	to pass (%)		-	50%

DEPARTMENT: MATHEMATICS AND APPLIED MATHEMATICS

CURRICULUM II	NFORMATION	
Mathematics and Applied Department: 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:	MATH900

Module Code:	MMAA100 (T	2, T3 & T4)				
Module Name:	Doctor of Philos	ophy in Mathemati	cs			
Module Content:		ed and supervised				search results of an s, presented in a form
Learning Outcomes:	methods in an a To plan and proposal and To access, e To critically i The graduate w associated with The graduate w	pproved specialize conduct a research research report extract and synthes nterpret and evalual further have an applanning, conducti	id field of Mathemat in project, including value size scientific informate ate published scient appreciation for the eng and communicate uped a scientifically of	ics. The learn written and ve ation from mu fic informatio environmenta ing scientific i	er will have rbal present Itimedia son. I and sociates research r	entations of the research ources al responsibilities
Module Information:	SAQA Credits		ITS Course Level	Code	CESM Co	ode (3 rd Order)
module illioillation.	360		10		15	50101
Periods per Week:	Classes	Practicals	Tutorial	Semi	nars	Independent Learning
'	N/A	Res Project	N/A	2 per	year	Res Project
Pre-requisite module/s:	None					
Co-requisite module/s:	None					
Assessment Criteria:	comprehensive					ncy by means of a n assessment panel of
Assessment Methods:	Thesis evaluate	d and assessed by	both internal and e	xternal asses	sors.	
Assessment Weighting:	Min Final Asses	sment mark to pas	s (%)			50

DEPARTMENT: PHYSICS

CURR	ICULUM INF	ORMATION	
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:	PHYS900

Module Code:	MPHA100					
Module Name:	Doctor of Philoso	phy in Physics				
Module Content:			cs comprises a thesis h project in the field of			n results of an original, a form suitable for
Learning Outcomes:	methods in an ap To design exp To plan and coproposal and To access, ex To critically in To operate a operate access.	proved specialize periments and sa conduct a researce research reporte dract and synthese terpret and evalue variety of instrume will further have	size scientific informat late published scientif lentation. an appreciation for th	ne learner will ritten and ver tion from mul- ric information e environmer	have the bal preser timedia so	ability: ntations of the research purces pocial responsibilities
	 The graduate 	will also have de	ducting and communic veloped a scientificall f research results.			ch results. The collection, analysis,
Module Information:	The graduate presentation a SAQA Credits	will also have de	veloped a scientificall f research results. ITS Course Level Co	ly ethical app	CESM C	ne collection, analysis, ode (3 rd Order)
Module Information:	 The graduate presentation a 	will also have de	veloped a scientificall fresearch results.	ly ethical app	CESM C	ne collection, analysis, ode (3 rd Order) 0701
	The graduate presentation a SAQA Credits	will also have de	veloped a scientificall f research results. ITS Course Level Co	ly ethical app	CESM C	ne collection, analysis, ode (3 rd Order)
Module Information: Periods per Week:	The graduate presentation a SAQA Credits 360	will also have de and publication of	reveloped a scientificall f research results.	ode	CESM C	ode (3 rd Order) 0701 Independent
	The graduate presentation a SAQA Credits 360 Classes	will also have de and publication of Practicals	reveloped a scientifically research results. ITS Course Level Course	ode	CESM C	ode (3 rd Order) 0701 Independent Learning
Periods per Week:	The graduate presentation a SAQA Credits 360 Classes N/A	will also have de and publication of Practicals	reveloped a scientifically research results. ITS Course Level Course	ode	CESM C	ode (3 rd Order) 0701 Independent Learning
Periods per Week: Pre-requisite module/s:	The graduate presentation a SAQA Credits 360 Classes N/A None None Candidates will b	will also have de and publication of Practicals Res project e required to den hesis of their rese	reveloped a scientifically fresearch results. ITS Course Level Course	ode Semir	CESM Co	ode (3 rd Order) 0701 Independent Learning Res Project
Periods per Week: Pre-requisite module/s: Co-requisite module/s:	The graduate presentation at the presentation	Practicals Res project Resis of their resean external asse	reveloped a scientifically fresearch results. ITS Course Level Course	ode Semir ch ability and esis is assess	CESM Control 14 mars 1 proficience sed by an	ode (3 rd Order) 0701 Independent Learning Res Project by by means of a

DEPARTMENT: STATISTICAL SCIENCES

MODULE 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:	STAT900			

Module Code:	MSTA100 (T2, T3 & T4)
Module Name:	Doctor of Philosophy in Statistics
Module Content:	The Doctor of Philosophy in Statistics comprises a thesis based on the research results of an original, approved and supervised research project in the field of Statistics or Operations Research, presented in a form suitable for publication.
Learning Outcomes:	At this level the learner will acquire graduate level knowledge of research philosophy and research methods in an approved specialized field of Statistics or Operations Research. The learner will have the ability: To plan and conduct a research project, including written and verbal presentations of the research proposal and research report To access, extract and synthesize scientific information from multimedia sources To critically interpret and evaluate published scientific information. The graduate will further have an appreciation for the environmental and social responsibilities associated with planning, conducting and communicating scientific research results. The graduate will also have developed a scientifically ethical approach to the collection, analysis, presentation and publication of research results.

MODULE 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:	STAT900				

Module Code:	MSTA100 (T2, T3 & T4)							
Module Name:	Doctor of Philosophy in Statistics							
Module Information:	SAQA Credits		ITS Course Level Code		CESM Code (3rd Order)			
	360		10		150302			
Periods per Week:	Classes	Practicals	Tutorial	Semi	inars	Independent Learning		
	N/A	Res Project	N/A	N/A 2 per year		Res Project		
Pre-requisite module/s:	None							
Co-requisite module/s:	None							
Assessment Criteria:	Candidates will be required to demonstrate their research ability and proficiency by means of a comprehensive thesis of their research findings. The thesis is assessed by an assessment panel of both internal and an external assessors.							
Assessment Methods:	Thesis evaluated and assessed by an assessment panel, consisting of both internal and external assessors.							
Assessment Weighting:	Min Final Assessment mark to pass (%) 50							