INFORMATION TECHNOLOGY

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

FACULTY OF ACCOUNTING & INFORMATICS

20 HAND 24 BOOK

HANDBOOK FOR 2024

FACULTY of ACCOUNTING AND INFORMATICS

FACULTY VISION
Globally recognized for excellence.

FACULTY MISSION
"Developing Adaptive and Transformative Leaders for a Smart Society" through:

- Excellence in Learning, Teaching and Assessment
- Relevant Research and Creative Innovation
- Entrepreneurship and Collaboration

FACULTY VALUES
Fairness
We treat people equitably with respect. Our decisions are impartial. We embrace diversity and inclusion.

Accountability
We accept responsibility for activities, decisions, actions and disclose outcomes in a transparent way.

Integrity
We enhance our reputation with consistent trustworthy conduct.

DEPARTMENT OF
INFORMATION TECHNOLOGY

PROGRAMMES

Diploma in Information and Communication Technology in Applications Development
Diploma in Information and Communication Technology in Applications Development
(4-year Extended Curriculum Program)
Bachelor of Information and Communications Technology
Advanced Diploma in Information and Communications Technology
Bachelor of Information and Communications Technology Honours
Master of Information and Communications Technology
Doctor of Philosophy in Information Technology

DEPARTMENTAL VISION

A dynamic word class Information and Communications Technology scholarship of learning & research through creativity and innovation

DEPARTMENTAL MISSION

"Advancing ICT" through

- Innovative curriculum and cutting-edge technology
- Quality research for real world societal and industry problems
- Engagement that empowers society for improvement
- Fostering a spirit of entrepreneurship

DEPARTMENTAL VALUES

Integrity
Adaptive curriculum, Ground breaking research.

Transparency
To care and have empathy. Ubuntu: "I am because we are".

Accountability
To accept responsibilities for our actions.

Transformation
The architects of change. Economic and societal progress.

What is a University of Technology?
A University of Technology is characterized by being research informed than research driven where the focus is on strategic and applied research that can be translated into professional practice. Furthermore, emphasis on research output is directed towards commercialization to provide an alternative source of income for the University. Learning programmes, in which the emphasis on technological capability is as important as cognitive skills, are developed around graduate profiles as supported by industry and the professions.

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IMPORTANT NOTICE

The departmental rules in this handbook must be read in conjunction with the University's General Rules included in the Student Handbook.

The University reserves the right to change the contents without prior notice.

NOTE TO ALL REGISTERED STUDENTS

Your registration is in accordance with all current rules of the University. If, for whatever reason, you do not register consecutively for every year of your programme, your existing registration contract with the University will cease. Your re-registration anytime thereafter will be at the discretion of the University and, if permitted, will be in accordance with the rules applicable at that time.

1. CONTACT DETAILS

All Departmental queries to:

Secretary:	Ms. Thabile Ntuli
Tel No:	0313735594
Email:	thabilen1@dut.ac.za
Location of Department:	B-Block 2nd floor east wing, Ritson Campus

All Faculty queries to:

Faculty Assistant:	Mr Khulekani Christain Mjwara
Tel No:	031 3735544
Email:	KhulekaniM4@dut.ac.za
Faculty Officer:	Mrs N Singh-Sakichand
Tel:	031 373 5149
Email:	nitashas@dut.ac.za
Location of Faculty office:	East Wing, Hotel School Building, Ritson Campus
Executive Dean:	Professor O Olugbara
Tel No:	031 373 5597
Executive Dean's Secretary	Ms L Phasha
Email:	MatladiP@dut.ac.za
Location of Executive Dean's office:	North Wing, Hotel School Building, Ritson Campus

2. STAFFING

Position	Name	Qualification
Head of Department	Dr TM Masenya	PhD Information Science (UNISA), Masters in Information Technology (UP), BA Information Science (Hons) (UP), BA Information Science (UP)
Associate Professors	Prof R C Millham Prof B van Niekerk	PhD Computer Science (DMU), CEng (UK Engineering Society) PhD IS (UKZN), MSc Eng. (UKZN)
Associate Directors	Mrs K Singh Mrs F T Khan	MICT (DUT), BSc (Hons) Comp Sc, BEd (Hons), UHDE (UDW) MSc IT (USYD)
Senior Lecturers	Mr E Asmal Mr A Hansrajh Dr J Pancham	MICT (DUT), NHD CDP (MLST) MICT (DUT), BSc (Hons) (UNISA) JSED PhD IT (DUT) MICT (Cum laude) (DUT)
Lecturers	Dr AT Akinola Dr C Boamah-Abu Mrs J Dwarika Mrs S Hoosen Dr S Joseph Mrs P Jackson Mr T H Speckman Mr S G Moodley Mr B Ngxata Mr R Soobramoney Mrs S Soobramoney Mrs R C Thompson Ms L S Manqele	PhD Comp Sc (UNIZULU), MSc Comp Sc (UNIZULU) PhD IS (UCT) MCom IS (UCT) BSc (Hons) Comp Sc (RU) MSc IS (Cum laude) (UNISA) BSc (Hons) IS (UNISA), BTech IT (DIT) MICT (DUT), BSc (Hons) (UDW) PhD IT (DUT) MTech IT(Cum laude) (DUT) MICT (DUT) MICT (NMU) MICT (DUT), BTech IT (DUT) MCom IS&T (UKZN) MICT (DUT), BSc (Hons) Comp Sc (UND) MICT (DUT) MICT (DUT) MSc Eng (UCT)
nGAP lecturer	Mr F M Khubisa	MICT (cum laude) (DUT)
Administrative Staff	Ms T Ntuli	BCom (Hons) (RBS)
Technical staff	Mr. A Ramdass Mr. M Womack Mrs. G Pursan Mr. BNM Mbuthuma Mr. R Govender	BSc Maths and Comp Sc (UDW) BCom (UKZN) BTech IT (DUT) Postgrad BA (DUT) BSc IT (PCT)

3. PROGRAMMES OFFERED BY THE DEPARTMENT

Programmes offered in this Department, which upon successful completion lead to the award of the following qualifications:

Qualification Name	Qualification Code	SAQA NLRD No.	NQF Level	Current Status of Programme offerings	SAQA CREDITS
Diploma in Information and Communication Technology in Application Development	DIIAD1	94697	6	First Intake 2016	360
Diploma in Information and Communication Technology in Application Development (4-year Extended Curriculum Programme)	DIIAF1	94697	6	First Intake 2016	360
Bachelor of Information and Communications Technology	BINCT1	104534	7	First Intake 2019	376
Advanced Diploma in Information and Communications Technology	ADICT1	109939	7	First Intake 2020	120
Bachelor of Information and Communications Technology Honours	BICTH1	118412	8	First Intake 2021	128
Master of Information and Communications Technology	MICMT1	96833	9	First Intake 2016	180
Doctor of Philosophy in Information Technology	DPINF1	102023	10	First Intake 2016	360
PHASED-OUT PROGRAMMES					
Qualification Name	**Qualification Code**	**SAQA NLRD No.**	**NQF Level**	**Last New Intake**	**SAQA CREDITS**
Higher Certificate in Information Technology	HCINF1	98911	5	Last intake January 2022	120

4. PROGRAMME INFORMATION AND RULES FOR ENTRANCE REQUIREMENTS

4.1. NAME OF QUALIFICATION: DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY IN APPLICATIONS DEVELOPMENT QUALIFICATION CODE: DIIAD1

The minimum duration for the above programme is three years of full-time study

MINIMUM ENTRANCE REQUIREMENTS

In addition to the requirements of the General Rules G7 and G21B, the minimum admission requirement is a National Senior Certificate (NSC) or Senior Certificate (SC) or a National Certificate Vocational (NCV) that is valid for entry into a Diploma and must meet the following minimum requirements:

NATIONAL SENIOR CERTIFICATE (NSC) (01 January 2009)		**SENIOR CERTIFICATE (SC)(PRE 2009)**			**NATIONAL CERTIFICATE VOCATIONAL (NCV)**	
NSC DIPLOMA ENTRY		**SENIOR CERTIFICATE (SC)**			**(NCV) LEVEL 4**	
Compulsory Subjects	**NSC Rating Code**	**Compulsory Subjects**	**HG**	**SG**	**Compulsory Subjects**	**Mark**
English (Home Language) OR English (1st Additional language)	3 4	English	E n/a	C n/a	At least 50% in **THREE** Fundamental subjects including English	50%
Mathematics **OR** Mathematics Literacy	3 6		E n/a	C n/a		
Two 20 credit subjects (Life Orientation or more than one additional language is excluded)	3		n/a	n/a	a) At least 50% in one fundamental subject, in addition to English & Mathematics. (b) At least 60% in three compulsory vocational subjects	60%

4.2. NAME OF QUALIFICATION: DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY IN APPLICATIONS DEVELOPMENT (4 YEAR EXTENDED CURRICULUM PROGRAMME) QUALIFICATION CODE: DIIAF1

The minimum duration for the above programme is four years of full-time study

MINIMUM ENTRANCE REQUIREMENTS

In addition to the requirements of the General Rules G7 and G21B, the minimum admission requirement is a National Senior Certificate (NSC) or Senior Certificate (SC) or a National Certificate Vocational (NCV) that is valid for entry into a Diploma and must meet the following minimum requirements:

NATIONAL SENIOR CERTIFICATE (NSC) (01 January 2009)		**SENIOR CERTIFICATE (SC)(PRE 2009)**			**NATIONAL CERTIFICATE VOCATIONAL (NCV)**	
NSC DIPLOMA ENTRY		**SENIOR CERTIFICATE (SC)**			**(NCV) LEVEL 4**	
Compulsory Subjects	**NSC Rating Code**	**Compulsory Subjects**	**HG**	**SG**	**Compulsory Subjects**	**Mark**
English(Home Language) OR English (First Additional Language)	3 3	English	E	D	At least 50% in **THREE** Fundamental subjects including English,	50%
Mathematics **OR** Mathematics Literacy	3 5	Mathematics	E n/a	C n/a		
Two 20 credit subjects (excluding Life Orientation or more than one additional language)	3		n/a	n/a	At least 60% in three compulsory vocational subjects	60%

In addition, a combination of alternative access and placement tests may be administered to gauge the level of preparedness for the academic demand of the programme.

Note: These requirements represent the minimum and students will be ranked according to a points system based on the rating code

4.3. NAME OF QUALIFICATION: BACHELOR OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
QUALIFICATION CODE: BINCT1

The minimum duration for the above programme is three years of full-time study

MINIMUM ENTRANCE REQUIREMENTS						
In addition to the requirements of the General Rules G7 and G21B, the minimum admission requirement is a National Senior Certificate (NSC) or Senior Certificate (SC) or a National Certificate Vocational (NCV) that is valid for entry into a Diploma and must meet the following minimum requirements:						
NATIONAL SENIOR CERTIFICATE (NSC) (01 January 2009)		**SENIOR CERTIFICATE (SC) (PRE 2009)**			**NATIONAL CERTIFICATE VOCATIONAL (NCV)**	
NSC DIPLOMA ENTRY		**SENIOR CERTIFICATE (SC)**			**(NCV) LEVEL 4**	
Compulsory Subjects	**NSC Rating Code**	**Compulsory Subjects**	**HG**	**SG**	**Compulsory Subjects**	**Mark**
English (Home Language) OR English (1st additional)	4 4	English	D D		At least 60% in **THREE** Fundamental subjects including English,	60%
Mathematics	4		D			
At least one of the designated 20-credit subjects	4	At least one of the designated 20-credit subjects	D	n/a	At least 70% in four vocational subjects relevant to the field of Information Technology.	70%

4.4. NAME OF QUALIFICATION: ADVANCED DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY QUALIFICATION CODE: ADICT1

The minimum duration for the above programme is one year of full-time study

MINIMUM ENTRANCE REQUIREMENTS
In addition to General Rules G7 and G21C, admission requires a Diploma in Information and Communication Technology at NQF level 6, 360 credits or equivalent
Note: In addition to the above, the Department of IT can apply selection and ranking criteria based on academic merits and/or work experience before granting admission.

4.5. NAME OF QUALIFICATION: BACHELOR OF INFORMATION AND COMMUNICATIONS TECHNOLOGY HONOURS QUALIFICATION CODE: BICTH1

The minimum duration for the above programme is one year of full-time study

MINIMUM ENTRANCE REQUIREMENTS
In addition to General Rule G23 (1) the minimum admission requirements are Advanced Diploma Information and Communications Technology or Bachelor of Information and Communications Technology or A Cognate Qualification at NQF 7

4.6. NAME OF QUALIFICATION: MASTER OF INFORMATION AND COMMUNICATIONS TECHNOLOGY QUALIFICATION CODE: MICMT1

The minimum duration for Master's Degree shall be one academic year of registered study.

MINIMUM ENTRANCE REQUIREMENTS
In addition to the General Rule G24(1), the minimum admission requirement is Honours Degree in ICT OR Post Graduate Diploma in ICT OR equivalent.
Note: In addition to the above, admission requires approval of draft research proposal and availability of a willing and able supervisor from the Department of IT.

4.7. NAME OF QUALIFICATION: DOCTOR OF PHILOSOPHY IN INFORMATION TECHNOLOGY
QUALIFICATION CODE: DPINF1

The minimum duration for a Doctoral Degree shall be two consecutive academic years of registered study.

MINIMUM ENTRANCE REQUIREMENTS
In addition to the General Rule G25(1), the minimum admission requirement is a Master of Information and Communications Technology Degree OR equivalent.
Note: In addition to the above, admission requires approval of draft research proposal and availability of a willing and able supervisor from the Department of IT.

SELECTION PROCEDURE FOR ALL PROGRAMS

Meeting the minimum entry requirements does not automatically guarantee acceptance. It depends on the number of applicants and number of places allowed by DUT. A points system is used for admission to the Department of Information Technology.

Please Note:

(1) In addition to the above, the Department of IT can apply selection and ranking criteria based on academic merits and/or work experience before granting admission.

(2) In addition to the above, the Department of IT can apply selection and ranking criteria based on academic merits and/or work experience before granting admission.

OR

Admission Requirement based upon Work Experience, Age and Maturity For admission to entry level DIPLOMA and certificate studies:

A person may, subject to such requirements as the Senate may determine, be admitted to the Institution even if such a person is not in a possession of a National Senior Certificate, Senior Certificate, or an equivalent certificate, provided that:

(a) The person shall have reached the age of 23 in the first year of registration and shall have at least:

- three years' appropriate work experience; and/or
- capacity for the proposed instructional programme, which shall be assessed at the discretion of the respective Head of Department by a Senate approved admission assessment comprising of a DUT Standardised Assessment Test for Access and Placement (SATAP), Academic Literacies (AI) & English for Academic Purposes (EAP) and/or an appropriate subject or programme specific written assessment designed and marked by the relevant Department; and

(b) The relevant Faculty Board shall be satisfied that the person's standard of communication skills, ability to study successfully and/or work experience are such that the person, in the opinion of the relevant Faculty Board, should be able to complete the proposed instructional programme successfully. If required, the communication skills and study skills should be tested; and

The person's application for admission in terms of work experience, age and maturity is approved prior to registration. Applicants intending to gain admission through work experience, age and maturity must submit their applications at least four months before commencement of the academic year inclusive of the date of scheduling writing a requisite eligibility assessment.

5. PROGRAMME STRUCTURE

NB: The Department reserves the right not to offer an Elective Module in a semester. Students must select from electives on offer.

5.1. NAME OF QUALIFICATION: DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY IN APPLICATION DEVELOPMENT

QUALIFICATION CODE: DIIAD1

YEAR ONE – STUDY PERIOD ONE						
Core (C); Fundamental(F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[GE] Inst.	Information & Communications Technology Literacy & Skills	ICTL101	5	8		CA
[GE] Fac.	Business Fundamentals I	BFND101	5	12		CA
[F]	Fundamentals of Computer Security	FCSC101	5	8		CA
[C]	Applications Development IA*	APDA101	5	12		CA
[F]	Operating Systems	OSYS101	5	12		CA
[C]	Information Systems 1*	INSS101	5	8		CA
SEMESTER 2						
[GE] Inst.	Me, My World, My Universe	MWMU101	5	8		CA
[GE] Inst.	Cornerstone 101	CSTN101	5	12		CA
[GE] Program	Applications Development Project I*	APDP101	5	12	Applications Development IA [E]; Applications Development 1A[C] Applications Development IB [C]	CA
[C]	Applications Development IB*	APDB101	5	12	Applications Development IA [E]	CA
[F]	Communications Networks 1	CNTW101	5	16		CA

YEAR TWO – STUDY PERIOD TWO						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[GE] Fac.	Business Fundamentals II	BFND201	6	12	Business Fundamentals I [P]	CA
[C]	Mobile Computing IIA	MCPA201	6	8		Exam
[C]	Information Systems IIA*	ISYA201	6	8	Information Systems I [P]	Exam
[C]	Applications Development IIA*	APDA201	6	12	Applications Development IA [P]; Applications Development IB [P]	Exam
[C]	IT Project Management	ITPM101	6	12		Exam
[C]	Information Management 11A	INMA201	6	8		Exam
SEMESTER 2						
[GE] Inst.	Community Engagement Project	CMEP101	6	8		CA
[C]	Mobile Computing IIB	MCPB201	6	12	Mobile Computing IIA [E]	Exam
[C]	Information Systems IIB*	ISYB201	6	8	Information Systems IIA [E]	Exam
[C]	Applications Development IIB*	APDB201	6	12	Applications Development IIA [E]	Exam
[C]	Information Management IIB	INMB201	6	8	Information Management IIA [E]	Exam
[GE] Program	Applications Development Project II*	APDP201	6	12	Applications Development Project I [P]; Applications Development IIA [E]; Applications Development IIB [C]; Information Systems IIA [E]	CA

YEAR THREE – STUDY PERIOD THREE						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[C]	Applications Development IIIA*	APDA301	6	12	Applications Development IIA [P]; Applications Development IIB [P]	Exam
[C]	Information Systems IIIA*	ISYA301	6	12	Information Systems IIA [P]; Information Systems IIB [P]; Applications Development Project II [E]	Exam
[GE] Program	Applications Development Project IIIA*	ADPA301	6	12	Applications Development Projects II [P]; Applications Development IIA [P]; Applications Development IIB [P]	CA
[C]	Human Computer Interaction	HCIN101	6	12		Exam
[GE] Program	Theory of ICT Professional Practice III	TIPP301	6	12		Exam
SEMESTER 2						
[GE] Fac.	Entrepreneurial Spirit	ENSP101	6	12	Business Fundamentals II [P]	CA
[C]	Applications Development IIIB*	APDB301	6	12	Applications Development IIIA [E]	Exam
[C]	Information Systems IIIB*	ISYB301	6	12	Information Systems IIIA [E]	Exam
[GE] Program	Applications Development Project IIIB*	ADPB301	6	24	Applications Development IIA [P]; Applications Development IIB [P]; Applications Development Project IIIA [E]	CA

5.2. NAME OF QUALIFICATION: DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY IN APPLICATION DEVELOPMENT (4 YEAR EXTENDED CURRICULUM PROGRAMME)
QUALIFICATION CODE: (D11AF1)

YEAR ONE – STUDY PERIOD ONE						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[F]	Fundamentals of Computer Security	FCSC101	5	3		CA
[F]	Operating Systems	OSYS101	5	3		CA
[GE] Inst.	Information & Communications Technology Literacy & Skills	ICTL101	5	3		CA
[F]	IT Logic & Technology IA	ILGA101	5	8		CA
[F]	Skills Development IA	SKDA101	5	8		CA
SEMESTER 2						
[F]	IT Logic & Technology IB	ILGB101	5	8	IT Logic & Technology IA [E]	CA
[C]	Information Systems I*	INSS101	5	3		CA
[GE] Inst.	Cornerstone 101	CSTN101	5	4		CA
[F]	Skills Development IB	SKDB101	5	8		CA

YEAR TWO – STUDY PERIOD TWO						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[C]	Applications Development IA*	APDA101	5	6		CA
[GE] Fac.	Business Fundamentals I	BFND101	5	6		CA
[F]	Communications Networks I	CNTW101	5	8		CA
[F]	IT Logic & Technology IIA	ILGA201	5	8	IT Logic & Technology IA [P]; IT Logic & Technology IB [P]	CA
[F]	Skills Development IIA	SKDA201	5	8	Skills Development IA [P]; Skills Development IB [P]	CA
SEMESTER 2						
[C]	Applications Development IB*	APDB101	5	6	Applications Development IA [E]	CA
[GE] Program	Applications Development Project I*	APDP101	5	8	Applications Development IA [E]; Applications Development 1A[C]; Applications Development IB [C]	CA
[F]	IT Logic & Technology IIB	ILGB201	5	8	IT Logic & Technology IIA [E]	CA
[GE] Inst.	Me, My World, My Universe	MWMU101	5	6		CA
[F]	Skills Development IIB	SKDB201	5	8	Skills Development IA [P]; Skills Development IB [P]; Skills Development IIA[E]	CA

YEAR THREE – STUDY PERIOD THREE						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[C]	Applications Development IIA*	APDA201	6	12	Applications Development IA [P]; Applications Development IB [P]	Exam
[GE] Fac.	Business Fundamentals II	BFND201	6	12	Business Fundamentals I [P]	CA
[C]	Information Management IIA	INMA201	6	8		Exam
[C]	Information Systems IIA*	ISYA201	6	8	Information Systems I [P]	Exam
[C]	IT Project Management	ITPM101	6	12		Exam
[C]	Mobile Computing IIA	MCPA201	6	8		Exam
SEMESTER 2						
[GE] Fac.	Applications Development IIB*	APDB201	6	12	Applications Development IIA [E]	Exam
[C]	Applications Development Project II*	APDP201	6	12	Applications Development Project I [P]; Applications Development IIA [E]	CA
[GE] Inst.	Community Engagement Project	CMEP101	6	8		CA
[C]	Information Management IIB	INMB201	6	8	Information Management IIA [E]	Exam
[C]	Information Systems IIB*	ISYB201	6	8	Information Systems IIA [E]	Exam
[C]	Mobile Computing IIB	MCPB201	6	12	Mobile Computing IIA [E]	Exam

YEAR FOUR – STUDY PERIOD FOUR						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name** *denotes major	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[C]	Applications Development IIIA*	APDA301	6	12	Applications Development IIA [P]; Applications Development IIB [P]	Exam
[C]	Information Systems IIIA*	ISYA301	6	12	Information Systems IIA [P]; Information Systems IIB [P]; Applications Development Project II [E]	Exam
[GE] Program	Applications Development Project IIIA*	ADPA301	6	12	Applications Development Project II [P]; Applications Development IIA [P]; Applications Development IIB [P]	CA
[C]	Human Computer Interaction	HCIN101	6	12		Exam
[GE] Program	Theory of ICT Professional Practice III	TIPP301	6	12		Exam
- SEMESTER 2						
[GE] Fac.	Entrepreneurial Spirit	ENSP101	6	12	Business Fundamentals II [P]	Exam
[C]	Applications Development IIIB*	APDB301	6	12	Applications Development IIIA [E]	CA
[C]	Information Systems IIIB*	ISYB301	6	12	Information Systems IIIA [E]	CA
[GE] Program	Applications Development Project IIIB*	ADPB301	6	24	Applications Development IIA [P]; Applications Development IIB [P]; Applications Development Project IIIA [E]	Exam

5.3. NAME OF QUALIFICATION: BACHELOR OF INFORMATION AND COMMUNICATIONS TECHNOLOGY QUALIFICATION CODE: (BINCT1)

YEAR ONE – STUDY PERIOD ONE						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name**	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
		SEMESTER 1				
[GE] Fac.	Business Fundamentals I	BFND101	6	12		CA
[C]	Introduction to Computing	INCP101	5	12		Exam
[F]	Discrete Structures	DSTR101	6	16		Exam
[GE] Inst.	Interpersonal Communication & Self	ICMS101	5	8		CA
[F]	Mathematics for Computing IA	MCMA101	6	12		CA
		SEMESTER 2				
[C]	Cornerstone 101	CSTN101	5	12		CA
[GE] Program	Business Fundamentals II	BFND201	6	12	Business Fundamentals I [P]	CA
[F]	Software Development Fundamentals	SWDF101	5	12		Exam
[GE] Inst.	Mathematics for Computing IB	MCMB101	6	12		Exam
[F]	Systems Fundamentals	SYSF101	5	12		Exam

YEAR TWO – STUDY PERIOD TWO						
Core (C); Fundamental (F) Gen Edu. (GE)	**Module Name**	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[C]	Systems Analysis and Design II	SADS201	6	12		Exam
[GE] Inst.	Law for Life	LWLF101	5	8		CA
[F]	Organizational Behavior II	OGBH201	5	12		Exam
[C]	Networks and Operating Systems II	NOPS201	6	16	Systems Fundamentals [C]	Exam
[F]	Programming Languages II	PRLN201	6	12		Exam
SEMESTER 2						
[C]	Algorithms and Data Structures II	ALDS201	6	12	Discrete Structures [C]	Exam
[C]	Information Management II	INFM201	6	12		Exam
[C]	Information Assurance and Security II	INAS201	6	16		Exam
[C]	Computer Organization and Architecture II	COAR201	6	16	Systems Fundamentals [C]	Exam
[GE] Fac.	Entrepreneurial Spirit	ENSP101	6	12	Business Fundamentals I [P], Business Fundamentals II [P]	CA

YEAR THREE – STUDY PERIOD THREE

Core (C); Fundamental (F) Gen Edu. (GE), Elective (E)	Module Name	Module Code	NQF level	Module credits	Pre-requisite (P) Co-requisite (C) Exposure (E)	Exam\ CA
		SEMESTER 1				
[GE]	Industry Exposure	IEXP101	5	8		CA
[C]	Platform Based Development III	PBDV301	7	16	Programming Languages II [C]	CA
[C]	Integrative Programming & Technology III	IPRT301	7	16		Exam
[C]	Social and Professional Issues III	SPRI301	7	16		Exam
[C]	Research Skills	RESK301	7	12		CA
		SEMESTER 2 **Note**: Choose **TWO** of the elective modules** offered in semester 2				
[C]	Project III	PRJT302	7	12	Programming Languages II [C]	CA
[E]	Strategy Acquisition & Management III**	SAQM301	7	16		Exam
[C]	Software Engineering III	SFEN301	7	16		Exam
[E]	Project Management III**	PJMN301	7	16		Exam
[E]	Business Intelligence III**	BSIT301	7	16	Information Management II [C]	Exam
[E]	Parallel and Distributed Computing III**	PDCP301	7	16	Programming Languages II [C]	Exam
[E]	Machine Intelligence III**	MCHI301	7	16		Exam
[E]	Graphics III**	GRPH301	7	16		Exam
[E]	Human Computer Interaction III**	HCPI301	7	16		Exam
[E]	Web Systems and Technology III**	WSYT301	7	16		Exam

5.4. NAME OF QUALIFICATION: ADVANCED DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY
QUALIFICATION CODE: (ADICT1)

YEAR ONE – STUDY PERIOD ONE						
Core (C); Fundamental (F) Gen Edu. (GE), Elective (E)	**Module Name**	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1						
[C]	Data Structures	DAST401	7	16		Exam
[C]	Platform Based Development	PBDE401	7	16		CA
[C]	Research skills	RESK401	7	12		Exam
[C]	Applied Mathematics for Computing A	APMC401	7	12		Exam
SEMESTER 2 Note: Choose **TWO** of the elective modules** offered in semester 2						
[C]	Software Development and Management	SODM401	7	16		Exam
[C]	Applied Mathematics for Computing B	APMC402	7	16		Exam
[E]	Strategy Acquisition and Management 3**	SAMA301	7	16		Exam
[E]	Business Intelligence 3**	BUIN301	7	16		Exam
[E]	Parallel and Distributed Computing 3**	PDCO301	7	16		Exam
[E]	Machine Intelligence 3**	MAIN301	7	16		Exam
[E]	Graphics 3**	GRAP301	7	16		Exam
[E]	Human Computer Interaction 3**	HCIN301	7	16		Exam

5.5. NAME OF QUALIFICATION: BACHELOR OF INFORMATION AND COMMUNICATIONS TECHNOLOGY HONOURS QUALIFICATION CODE: BICTH1

YEAR ONE- STUDY PERIOD ONE						
Core (C); Fundamental (F) Gen Edu. (GE), Elective [E]	**Module Name**	**Module Code**	**NQF level**	**Module credits**	**Pre-requisite (P) Co-requisite (C) Exposure (E)**	**Exam\ CA**
SEMESTER 1 **Note:** Choose **ONE** of the elective modules** offered in semester 1						
[E]	Advanced Data analytics**	ADDA401	8	16		CA
[C]	Advanced Software Development and Management	ASDM401	8	16		CA
[C]	Cloud Computing	CLCO401	8	16		CA
[E]	Machine Learning**	MALE402	8	16		CA
[C]	Principles of Research	PRIC401	8	16		CA
[E]	Web and Mobile Systems Development**	WMSD401	8	16		CA
[E]	Virtual Systems and Services**	VSSE401	8	16		CA
SEMESTER 2 **Note:** Choose **ONE** of the elective modules** offered in semester 2						
[E]	Advanced Cybersecurity**	ADCY402	8	16		CA
[E]	Advanced Image Processing**	ADIP402	8	16		CA
[E]	Advanced Networking**	ADNT401	8	16		CA
[C]	Applied Research	APRE402	8	32	PRIC401[P]	CA
[E]	Advanced User Experience Design**	AUED402	8	16		CA
[C]	Global Professional Practice	GLPP402	8	16		CA
[E]	Internet of Things**	INTG402	8	16		CA

6. DEPARTMENT SPECIFIC REGISTRATION RULES

6.1. PROGRESSION RULES

- **Diploma in Information and Communication Technology in Applications Development (DIIAD1)**

In addition to General Rules G14, G16, G17 and G21B the student shall pass and accumulate the minimum number of credits at the end of each year as indicated in the table below. This gives the student five years to complete the three-year qualification without intervention. Should a student not achieve the minimum credit indicated in the table below, he/she will not be permitted to register in the subsequent year.

End of Year	Minimum Credits
1	50
2	120
3	200
4	280

A student may not progress to study period 3 (third year) unless they have passed all first-year majors (4), and 2 out of 5 second-year majors.

- **Diploma in Information and Communication Technology in Applications Development (4 Year Extended curriculum Program) (DIIAF1)**

In addition to Rules G14, G16, G17 and G21B the student shall pass and accumulate the minimum number of credits at the end of each year period, as indicated in the table below. This gives the student five years to complete the four-year qualification without intervention. Should a student not achieve the minimum credit indicated in the table below, he/she will not be permitted to register in the subsequent year.

End of Year	Minimum Credits
1	50
2	120
3	200
4	280

A student may not progress to study period 4 (fourth year) unless they have passed all the major modules in first and second year (4) and at least 2 of the 5 major modules in third year.

- **Bachelor of Information and Communications Technology (BINCT1)**

  In addition to Rules G14, G16, G17 and G23B the student shall pass and accumulate the minimum number of credits at the end of each year of registration, as indicated in the table below. This gives the student five years to complete the three-year qualification without intervention. Should a student not achieve the minimum credit indicated in the table below, he/she will not be permitted to register in the subsequent year.

End of year	Minimum Credits
1	60
2	120
3	200
4	260

6.2. CHOICE OF ELECTIVES

Not all electives that appear on a program structure may be offered by the department in a particular academic year. Electives will be offered depending on staff resources and student interest in the module. Registration of module choice will be first-come-first-serve.

7. MODULE CONTENT

Students must read this section in conjunction with the relevant module guides.

7.1. DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY IN APPLICATION DEVELOPMENT(DIIAD1)

MODULE CODE	MODULE NAMES	NQF LEVEL\ CREDITS
ADPA301	**Applications Development Project IIIA** **NQF: 6 HEQSF: 12** Learning outcomes: Critically analyze a current business system to propose improvements; Model business processes; Portfolio of evidence for a solution to a real life business problem; Apply knowledge from other learning areas into the capstone project; Demonstrate written and oral communication skills; Deploy application for the chosen business domain Module Content: Business process modelling; Application development and deployment; Implement latest technologies using industry standards; Apply project management techniques	
ADPB301	**Applications Development Project IIIB** **NQF: 6 HEQSF: 24** Learning Outcomes: Use software development methodology to develop the application; Use software development tools to develop the application; Demonstrate independence, originality and evidence of professional practice; Portfolio of evidence for a solution to a real-life business problem; Demonstrate written and oral communication skills. Module Content: Application of Software Development Methodology; Project Integration Management; Version control: managing, sharing and tracking source code; Integration with databases; Implementation of Web services; Cloud based storage; Implement client and server-side technologies	
APDA101	**Applications Development 1A** **NQF: 5 HEQSF: 12** Introduction .Net Platform; Introducing the C# Programming Language; Getting start with .Net developing using C#; Language Essentials; Expressions and Operators; Primer on Types and Objects; Simple Flow Control; Basics of Exception and Resource Management; Introduction Types; Methods; Introduction to Unit Testing.	
APDA201	**Applications Development IIA** **NQF: 6 HEQSF: 12** Introduction to (a) development framework(s), Client-side; languages for Web Development, Server-side languages; for Web Development, Frontend Frameworks for Web; Development, Backend Frameworks for Web; Development, Web Development Tools.	

APDA301	**Applications Development IIIA** **NQF: 6 HEQSF: 12** Informed understanding of Cloud Computing Concepts Design and build applications that are cloud computing ready; Create, deploy, configure and monitor applications that run in the chosen cloud platform; Ability host Windows Communication Foundation (WCF); services using the chosen cloud platform Solid knowledge of virtualization and storage A sound understanding of Blobs; Include web forms security in cloud-based applications Ability to upload and test cloud applications.
APDB101	**Applications Development IB** **NQF: 5 HEQSF: 12** Fields, Properties; Constructors; Operators, Overloading and Conversions; Object Oriented Programming; Methods; Events; Exceptions; Working with IO; Arrays; Text Files.
APDB201	**Applications Development IIB** **NQF: 6 HEQSF: 12** Creating and managing Filters, controller Extensibility; creating and managing Views, Designing Model Templates; Model Binding, Model Validation, Creating Asynchronous; Java Script Functions, Working with Java Script; Frameworks, Security Vulnerability when developing; applications, Authentication and Authorizing access to; applications, Deployment.
APDB301	**Applications Development IIIB** **NQF: 6 HEQSF: 12** Build service oriented cloud applications; Manage service oriented cloud applications; Analyse the programming of cloud computing services to fully reveal and understand the framework behind the various services; Sound knowledge of creating and deploying cloud services Employ worker roles and queues for asynchronous processing; Create and access SQL databases for cloud-based storage Control access to cloud applications.; Build cloud applications taking into consideration security,; confidentiality and audits.
APDP101	**Applications Development Project 1** **NQF: 5 HEQSF: 12** Demonstrate through a real-life project, the application of fundamental knowledge of how to design, develop and implement a windows application. The application must incorporate limited processing capabilities, documentation in the form of a report that demonstrates the ability to perform systems analysis and design, apply logic and problem-solving skills and implement OOP design principles to deliver and present the full application.
APDP201	**Applications Development Project II** **DIIAD1; DIIAF1** **NQF: 6 HEQSF: 12** Planning and Analysis: Documents and Presentation, design documents and Presentation, implementation and; Testing. Applications must include the use of either a; relational model database server or an object-relational; database. Examples of these database servers are Oracle; MS SQL, MY SQL, DB4objects, and DB2. All applications; must be developed as either web / mobile based and; designed to incorporate the relevant development; libraries.
BFND101	**Business Fundamentals I** **NQF: 6 HEQSF: 12** Efficiently manage key aspects of academic life Basic business communication, written and verbal Information Literacy; Basic Business Finance; customer benefits.; Market Analysis: You need to know your market, customer needs, where they are, how to reach them, etc. Strategy and Implementation: Be specific. Include management responsibilities with dates and budget. Management Team: Include backgrounds of key members of the team, personnel strategy, and details.; Financial Plan: Include profit and loss, cash flow, balance; sheet, break-even analysis, assumptions, business ratios, etc.; Basic Research Methodology Project Presentation.

BFND201	**Business Fundamentals II** **NQF: 6 HEQSF: 12** Introduction to research methodology (research terms and concepts e.g. qualitative; quantitative; research ethics; types of research); Environmental Considerations; Business Communication; Technology and Society.
CMEP101	**Community Engagement Project** **NQF: 6 HEQSF: 8** The principles of community engagement.; Working in groups (being an effective team player). Guidelines for undertaking a community engagement project.; The community as a main factor in community engagement.; Skills for community engagement. Ethical issues in community engagement.; Planning, Implementing and Evaluating a community engagement project.
CNTW101	**Communications Networks 1** **NQF: 5 HEQSF: 16** Introduction to Networks. Networks in our Daily Lives. Communicating on a Local Network. Network Addressing; Providing Network Services; Building A Home Network. Network Security. Configuring Devices; Testing and Troubleshooting.
CSTN101	**Cornerstone 101** **NQF: 5 HEQSF: 12** The module content will be developed around the concept of journeys, across time, across space, and across human relationships. Each section will draw in issues of ethics, diversity and critical citizenry. The design team may later take a different metaphor or theme, but; with the same outcomes and attributes. The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning.
ENSP101	**Entrepreneurial Spirit** **NQF: 6 HEQSF: 12** Spirit of Entrepreneurship - Product visioning; Operations - Project Management; Team Management; Business and Finance - Investigating the Business Environment/Architecture; Financing; Marketing; Risk Management; Entrepreneurial Case study Analysis; ICT Enablers; Intellectual property protection; Completion of business plan.
FCSC101	**Fundamentals of Computer Security** **DIIAD1; DIIAF1** **NQF: 5 HEQSF: 8** Basic Security Principles & Terms; System Security; Human & Physical Security User Security; Malware; Policies/Procedures & Documentation; Basic Cryptography.

VSSE401	**Virtual Systems and Services** **NQF: 8 HEQSF: 16** Implement virtualization via a defined process. Implement a virtualized user platform (desktop). Implement virtualization for a server. Apply an appropriate management strategy for a virtual network. Implement a virtual storage system. Implement software system component emulation (service virtualization).
WMSD401	**Web and Mobile Systems Development** **NQF: 8 HEQSF: 16** Utilise industry standardized technologies to support the development of web and mobile systems. Develop web and mobile apps that are usable, efficient and secure on more than one platform. Apply sound architecture and design principles in developing web and mobile systems. Apply security measures in the development of secure web and mobile systems. Concisely document the details of a proposed web or mobile system.
HCIN101	**Human Computer Interaction** **NQF: 6 HEQSF: 12** Informed understanding of the human cognitive and physical capabilities to process information; Sound understanding of incorporating HCI into design of technology; Informed understanding of availability and functionality of technology; Fundamental knowledge of principles and paradigms; embodying usability of interactive systems Fundamental knowledge of methods for evaluating Designs; Ability to analyse user's behaviour; Understand the principles and paradigms embodying; Usability.
ICTL101	**Information and Communications Technology Literacy & Skills** **NQF: 5 HEQSF: 8** Basics of ICTs Hardware, Software, and Users Internet Search; Word Processing; Spreadsheets; Presentations; Referencing; Security, Legal, Ethical, and Societal Issues Economics of ICTs.
INMA201	**Information Management IIA** **DIIAD1; DIIAF1** **NQF: 6 HEQSF: 8** Database systems; The Database Approach Database Development Process Database Alternatives; Database Models; Relational Models Characteristics Database Design; Data Modelling with Entity Relationship Diagrams; Data Modelling Advanced Concepts Normalizing Database Designs; Introduction to Structured Query Language.
INMB201	**Information Management IIB** **NQF: 6 HEQSF: 8** Advanced Structured Query Language; Implementation Alternatives; Database Management.
INSS101	**Information Systems 1** **NQF: 5 HEQSF: 8** An Overview of systems analysis and design; The role of the systems analyst Investigating systems requirements; Use Cases Domain Modelling; Extending the Requirements models.

ISYA201	**Information Systems IIA** **NQF: 6 HEQSF: 8** Essentials of Design and the Design Activities Designing the User and Systems Interfaces Object oriented design principles; Object oriented design: Use Case realization Database, Controls, and Security Making the system Operational.
ISYA301	**Information Systems IIIA** **NQF: 6 HEQSF: 12** The Scope of Software Engineering; The Software Process and its Attendant Problems Software Life-Cycle Models; Software Quality Assurance; Current Trends in Systems Development
ISYB201	**Information Systems IIB** **NQF: 6 HEQSF: 8** The Software life cycle models; Software Security Software Maintenance; Agile development using SCRUM as a tool History of agile methods; Philosophy of agile methods.
ISYB301	**Information Systems IIIB** **NQF: 6 HEQSF: 12** Fundamentals of Software Testing; Ensuring Testing throughout the Software Life Cycle; Recognizing key concepts in maintenance testing Comparing the four test types; Coping with the psychology of testing; Implementing Static Analysis Techniques Leveraging Test-Design Techniques Differentiating various "specifications" Applying specification-based techniques Utilizing structure-based techniques Deploying experience-based knowledge Test Management, Structuring a test plan Interpreting a test summary report; Managing incidents, Addressing project and product risks Implementing Configuration Management (CM); Defining the functions of CM; Evaluating objectives of CM Adopting Test Support Tools.
ITPM101	**IT Project Management** **NQF: 6 HEQSF: 12** Backdrop: The Science of Scrum; New Management Responsibilities; The Scrum Master; Bringing Order from Chaos The Product Owner Planning a Scrum Project; Project Reporting- Keeping Everything Visible The Team; Scaling Projects Using Scrum Rules.
MCPA201	**Mobile Computing IIA** **NQF: 6 HEQSF: 8** Overview of Mobile technologies and platforms Basic User Interface design; Advanced User interface Design; Working with Files and Directories Understanding Protocol Independent Multicast Technology; Mobile Internationalization Generic connection framework Text and multimedia messaging; Sending and receiving messages (binary and multipart).

MCPB201	**Mobile Computing IIB** **NQF: 6 HEQSF: 12** Wireless Devices and Services XML and Web Services Session Initiation Protocol Responses; Multimedia; Advanced Multimedia; Security and transactions; Testing SATSA Applications with the Emulator Basic Smartcard Communication; Smart Card Communication with Java Card RMI Generating Signatures; Managing Certificates; Cryptography.
MWMU101	**Me, My World, My Universe** **NQF: 5 HEQSF: 8** The module will start with a "refresher" on the appropriate mathematical computations and solving of simple, single context applications in the following areas of mathematics; Numbers and Operations, Functional Relationships. Space, Shape, Measurement and Data Handling Broader issues involving the quantitative literacies/reasoning will be addressed by examining; relevant/current case studies within the themes indicated above.
OSYS101	**Operating Systems** **NQF: 5 HEQSF: 12** Introduction to Operating Systems; Memory Management: Simple and Virtual Systems Processor Management; Process Management; Concurrent Processes Device Management File Management.
TIPP301	**Theory of ICT Professional Practice III** **NQF: 6 HEQSF: 12** Organizational structure Communication Skills; Skills of ethical analysis; Professional Ethics and Social Responsibility Elements of social analysis; Intellectual Property; Information Privacy; Responsibility of a computer professional.

7.2. DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY IN APPLICATION DEVELOPMENT- 4 YEAR EXTENDED CURRICULUM PROGRAMME (DIIAF1)

MODULE CODE	MODULE NAMES	NQF LEVEL\ CREDITS
ADPA301	**Applications Development Project IIIA** **NQF: 6 HEQSF: 12** Learning outcomes: Critically analyze a current business system to propose improvements; Model business processes; Portfolio of evidence for a solution to a real-life business problem; Apply knowledge from other learning areas into the capstone project; Demonstrate written and oral communication skills; Deploy application for the chosen business domain Module Content: Business process modelling; Application development and deployment; Implement latest technologies using industry standards; Apply project management techniques	
ADPB301	**Applications Development Project IIIB** **NQF: 6 HEQSF: 24** Learning Outcomes: Use software development methodology to develop the application; Use software development tools to develop the application; Demonstrate independence, originality and evidence of professional practice; Portfolio of evidence for a solution to a real-life business problem; Demonstrate written and oral communication skills. Module Content: Application of Software Development Methodology; Project Integration Management; Version control: managing, sharing and tracking source code; Integration with databases; Implementation of Web services; Cloud based storage; Implement client and server-side technologies	
APDA101	**Applications Development 1A** **NQF: 5 HEQSF: 6** Introduction .Net Platform; Introducing the C# Programming Language; Getting start with .Net developing using C#; Language Essentials; Expressions and Operators; Primer on Types and Objects; Simple Flow Control; Basics of Exception and Resource Management; Introduction Types; Methods; Introduction to Unit Testing.	
APDA201	**Applications Development IIA** **NQF: 6 HEQSF: 12** Introduction to (a) development framework(s), Client-side; languages for Web Development, Server-side languages; for Web Development, Frontend Frameworks for Web; Development, Backend Frameworks for Web; Development, Web Development Tools.	
APDA301	**Applications Development IIIA** **NQF: 6 HEQSF: 12** Informed understanding of Cloud Computing Concepts Design and build applications that are cloud computing ready; Create, deploy, configure and monitor applications that run in the chosen cloud platform; Ability host Windows Communication Foundation (WCF); services using the chosen cloud platform Solid knowledge of virtualization and storage A sound understanding of Blobs; Include web forms security in cloud-based applications Ability to upload and test cloud applications.	
APDB101	**Applications Development IB** **NQF: 5 HEQSF: 6** Fields, Properties; Constructors; Operators, Overloading and Conversions; Object Oriented Programming; Methods; Events; Exceptions; Working with IO; Arrays; Text Files.	

APDB201	**Applications Development IIB** **NQF: 6 HEQSF: 12** Creating and managing Filters, controller Extensibility, creating and managing Views, Designing Model Templates; Model Binding, Model Validation, Creating Asynchronous; Java Script Functions, Working with Java Script; Frameworks, Security Vulnerability when developing; applications, Authentication and Authorizing access to; applications, Deployment.
APDB301	**Applications Development IIIB** **NQF: 6 HEQSF: 12** Build service oriented cloud applications; Manage service oriented cloud applications; Analyze the programming of cloud computing services to fully reveal and understand the framework behind the various services; Sound knowledge of creating and deploying cloud services Employ worker roles and queues for asynchronous processing; Create and access SQL databases for cloud-based storage Control access to cloud applications.; Build cloud applications taking into consideration security,; confidentiality and audits.
APDP101	**Applications Development Project 1** **NQF: 5 HEQSF: 8** Demonstrate through a real-life project, the application of fundamental knowledge of how to design, develop and implement a windows application. The application must incorporate limited processing capabilities, documentation in the form of a report that demonstrates the ability to perform systems analysis and design, apply logic and problem-solving skills and implement OOP design principles to deliver and present the full application.
APDP201	**Applications Development Project II** **NQF: 6 HEQSF: 12** Planning and Analysis: Documents and Presentation, design documents and Presentation, implementation and; Testing. Applications must include the use of either a; relational model database server or an object-relational; database. Examples of these database servers are Oracle; MS SQL, MY SQL, DB4objects, and DB2. All applications; must be developed as either web / mobile based and; designed to incorporate the relevant development; libraries.
BFND101	**Business Fundamentals I** **NQF: 6 HEQSF: 6** Efficiently manage key aspects of academic life Basic business communication, written and verbal Information Literacy; Basic Business Finance; customer benefits.; Market Analysis: You need to know your market, customer needs, where they are, how to reach them, etc. Strategy and Implementation: Be specific. Include management responsibilities with dates and budget. Management Team: Include backgrounds of key members of the team, personnel strategy, and details.; Financial Plan: Include profit and loss, cash flow, balance; sheet, break-even analysis, assumptions, business ratios, etc.; Basic Research Methodology Project Presentation.
BFND201	**Business Fundamentals II** **NQF: 6 HEQSF: 12** Introduction to research methodology (research terms and concepts e.g. qualitative; quantitative; research ethics; types of research); Environmental Considerations; Business Communication; Technology and Society.
CMEP101	**Community Engagement Project** **NQF: 6 HEQSF: 8** The principles of community engagement.; Working in groups (being an effective team player). Guidelines for undertaking a community engagement project.; The community as a main factor in community engagement.; Skills for community engagement. Ethical issues in community engagement.; Planning, Implementing and Evaluating a community engagement project.

CNTW101	**Communications Networks 1** **NQF: 5 HEQSF: 8** Introduction to Networks. Networks in our Daily Lives. Communicating on a Local Network. Network Addressing; Providing Network Services; Building A Home Network. Network Security. Configuring Devices; Testing and Troubleshooting.
CSTN101	**Cornerstone 101** **NQF: 5 HEQSF: 4** The module content will be developed around the concept of journeys, across time, across space, and across human relationships. Each section will draw in issues of ethics, diversity and critical citizenry. The design team may later take a different metaphor or theme, but; with the same outcomes and attributes. The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning.
ENSP101	**Entrepreneurial Spirit** **NQF: 6 HEQSF: 12** Spirit of Entrepreneurship - Product visioning; Operations - Project Management; Team Management; Business and Finance - Investigating the Business Environment/Architecture; Financing; Marketing; Risk Management; Entrepreneurial Case study Analysis; ICT Enablers; Intellectual property protection; Completion of business plan.
FCSC101	**Fundamentals of Computer Security** **NQF: 5 HEQSF: 4** Basic Security Principles & Terms; System Security; Human & Physical Security User Security; Malware; Policies/Procedures & Documentation; Basic Cryptography.
HCIN101	**Human Computer Interaction** **NQF: 6 HEQSF: 12** Informed understanding of the human cognitive and physical capabilities to process information; Sound understanding of incorporating HCI into design of technology; Informed understanding of availability and functionality of technology; Fundamental knowledge of principles and paradigms; embodying usability of interactive systems Fundamental knowledge of methods for evaluating Designs; Ability to analyse user's behaviour; Understand the principles and paradigms embodying; Usability.
ICTL101	**Information and Communications Technology Literacy & Skills** **NQF: 5 HEQSF: 3** Basics of ICTs Hardware, Software, and Users Internet Search; Word Processing; Spreadsheets; Presentations; Referencing; Security, Legal, Ethical, and Societal Issues Economics of ICTs.
ILGA101	**Information Technology Logic & Technology IA** **NQF: 5 HEQSF: 8** Computer Technology Concepts; Logic skills & Problem-solving techniques Pseudocode with variables and constructs Problem solving with puzzles; Critical Reasoning – logic Deductive and Inductive reasoning Problem solving using pseudocode, trace tables; Input, Process, Output Simple Algorithms Flowchart.
ILGA201	**Information Technology Logic & Technology IIA** **NQF: 5 HEQSF: 8** Introduction to Programming; Levels / generations of Language Explore different Software Packages Introduce Programming Tool Syntax – Variable; Decision constructs; Repetition constructs.
ILGB101	**Information Technology Logic & Technology IB** **NQF: 5 HEQSF:8** Structured algorithms; Flowcharts Trace tables; Introduction to Compiler, programming language Loops; Arrays.

ILGB20	**Information Technology Logic & Technology IIB** **NQF: 5 HEQSF: 8** Methods; 1D arrays; Objects and classes; GUI interface; Problem Solving using a programming tool.
INMA201	**Information Management IIA** **NQF: 6 HEQSF: 8** Database systems; The Database Approach Database Development Process Database Alternatives; Database Models; Relational Models Characteristics Database Design; Data Modelling with Entity Relationship Diagrams; Data Modelling Advanced Concepts Normalizing Database Designs; Introduction to Structured Query Language.
INMB201	**Information Management IIB** **NQF: 6 HEQSF: 8** Advanced Structured Query Language; Implementation Alternatives; Database Management.
INSS101	**Information Systems 1** **NQF: 5 HEQSF: 8** An Overview of systems analysis and design the role of the systems analyst Investigating systems requirements; Use Cases Domain Modelling; Extending the Requirements models.
ISYA201	**Information Systems IIA** **NQF: 6 HEQSF: 8** Essentials of Design and the Design Activities Designing the User and Systems Interfaces Object oriented design principles; Object oriented design: Use Case realization Database, Controls, and Security Making the system Operational.
ISYA301	**Information Systems IIIA** **NQF: 6 HEQSF: 12** The Scope of Software Engineering; The Software Process and its Attendant Problems Software Life-Cycle Models; Software Quality Assurance; Current Trends in Systems Development
ISYB201	**Information Systems IIB** **NQF: 6 HEQSF: 8** The Software life cycle models; Software Security Software Maintenance; Agile development using SCRUM as a tool History of agile methods; Philosophy of agile methods.
ISYB301	**Information Systems IIIB** **NQF: 6 HEQSF: 12** Fundamentals of Software Testing; Ensuring Testing throughout the Software Life Cycle; Recognizing key concepts in maintenance testing Comparing the four test types; Coping with the psychology of testing; Implementing Static Analysis Techniques Leveraging Test-Design Techniques Differentiating various "specifications" Applying specification-based techniques Utilizing structure-based techniques Deploying experience-based knowledge Test Management, Structuring a test plan Interpreting a test summary report; Managing incidents, Addressing project and product risks Implementing Configuration Management (CM); Defining the functions of CM; Evaluating objectives of CM Adopting Test Support Tools.
ITPM101	**Information Technology Project Management** **NQF: 6 HEQSF: 12** Backdrop: The Science of Scrum; New Management Responsibilities the Scrum Master; Bringing Order from Chaos the Product Owner Planning a Scrum Project; Project Reporting; Keeping Everything Visible the Team; Scaling Projects Using Scrum Rules.

MCPA201	**Mobile Computing IIA** **NQF: 6 HEQSF: 8** Overview of Mobile technologies and platforms Basic User Interface design; Advanced User interface Design; Working with Files and Directories Understanding Protocol Independent Multicast Technology; Mobile Internationalization Generic connection framework Text and multimedia messaging; Sending and receiving messages (binary and multipart).
MCPB201	**Mobile Computing IIB** **NQF: 6 HEQSF: 12** Wireless Devices and Services XML and Web Services Session Initiation Protocol Responses; Multimedia; Advanced Multimedia; Security and transactions Smartcards? Really? Testing SATSA Applications with the Emulator Basic Smartcard Communication; Smart Card Communication with Java Card RMI Generating Signatures; Managing Certificates; Cryptography.
MWMU101	**Me, My World, My Universe** **NQF: 5 HEQSF: 8** The module will start with a "refresher" on the appropriate mathematical computations and solving of simple, single context applications in the following areas of mathematics; Numbers and Operations, Functional Relationships. Space, Shape, Measurement and Data Handling Broader issues involving the quantitative literacies/reasoning will be addressed by examining; relevant/current case studies within the themes indicated above.
OSYS101	**Operating Systems** **NQF: 5 HEQSF: 3** Introduction to Operating Systems; Memory Management: Simple and Virtual Systems Processor Management; Process Management; Concurrent Processes Device Management File Management.
SKDA101	**Skills Development IA** **NQF: 5 HEQSF: 8** Academic Literacy; Information Literacy Language Skills Numeracy.
SKDA201	**Skills Development IIA** **NQF: 5 HEQSF: 8** Basic Accounting Skills Accounting Concepts Basic Business Skills.
SKDB101	**Skills Development IB** **NQF: 5 HEQSF:8** Business English; Communication; Life Skills.
SKDB201	**Skills Development IIB** **NQF: 5 HEQSF: 8** Business Processes; Enterprise Systems Knowledge for Business Sales processes; Purchasing processes; ERP foundation scenarios using SAP.
TIPP301	**Theory of ICT Professional Practice III** **NQF: 6 HEQSF: 12** Organizational structure Communication Skills; Skills of ethical analysis; Professional Ethics and Social Responsibility Elements of social analysis; Intellectual Property; Information Privacy; Responsibility of a computer professional.

7.3. ADVANCED DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY (ADICT1)

MODULE CODE	MODULE NAMES	NQF LEVEL\ CREDITS
APMC401	**Applied Mathematics for Computing A (Probability and Statistics)** **NQF: 7 HEQSF: 12** Overview; Discrete probability; Continuous probability; Expectation; Stochastic processes; Sampling distributions; Estimation; Hypothesis tests; Correlation and regression.	
APMC402	**Applied Mathematics for Computing B (Discrete Structures and Linear Algebra)** **NQF: 7 HEQSF: 16** Sets, Relations, and Functions Propositional logic; Basic Logic used in mathematics and problem solving; Proof Techniques; Basics of Counting; Vector Algebra; Linear Algebra	
BUIN301	**Business Intelligence 3** **NQF: 7 HEQSF: 16** Decision Making and Analytics: An Overview; Descriptive Analytics; Predictive Analytics; Prescriptive Analytics; Big Data and Future Directions for Business Analytics.	
DAST401	**Data Structures** **NQF: 7 HEQSF: 16** Abstract data structures; algorithms relevant to the data structures introduced; algorithmic analysis; algorithmic strategies	
GRAP301	**Graphics 3** **NQF: 7 HEQSF: 16** Basic Rendering; Geometric Modeling; Computer Animation; OpenGL basics; 2 and 3-D transformations; 3-D Transformations in OpenGL; Projection principles; Objects and simple lighting in OpenGL; Hidden line and surface removal, clipping; Surface Representations: B´ezier and Spline methods; Texture mapping.	
HCIN301	**Human Computer Interaction 3** **NQF: 7 HEQSF: 16** HCI Concepts; Human Centred Development; Graphical User Interface Programming; Multimedia Systems Development; Interactive GUI Design; Graphics and Visualization.	

MAIN301	**Machine Intelligence 3** **NQF: 7 HEQSF: 16** Introduction to machine intelligence; Search Strategies; Knowledge Representation and Reasoning; Machine Learning; Intelligent Agents; Natural language processing; Computer vision.
PBDE401	**Platform Based Development** **NQF: 7 HEQSF: 16** Introduction to Platform-based development; Web Platforms; Mobile Platforms; Game Platforms; Industrial Platforms.
PDCO301	**Parallel and Distributed Computing 3** **NQF: 7 HEQSF: 16** Parallelism fundamentals; Parallel Decomposition; Communication and Coordination; Parallel Algorithms, Analysis, and Programming; Parallel Architecture; Parallel Performance; Distributed Systems.
RESK401	**Research skills** **NQF: 7 HEQSF: 12** Introduction to research; Research ethics; Information sources and retrieval; Literature review; Research process; Quantitative research design; Qualitative research design.
SAMA301	**Strategy Acquisition and Management 3** **NQF: 7 HEQSF: 16** Business IS/IT alignment; Strategic IS planning; Strategic knowledge management; Business exploitation of ICT; Acquiring IT resources and capabilities; IS/IT benefits management and realization; IT risk management; IT governance frameworks.
SODM401	**Software Development and Management** **NQF: 7 HEQSF: 16** Software Processes; Software Project Management; Tools and Environments; Requirements Engineering; Software Design; Software Construction; Software Verification Validation; Software Evolution

7.4. BACHELOR OF INFORMATION AND COMMUNICATIONS TECHNOLOGY DEGREE (BINCT1)

MODULE CODE	MODULE NAMES	NQF LEVEL\ CREDITS
ALDS201	**Algorithms and Data Structures II** **NQF: 6 HEQSF: 12** Abstract data structures; algorithms relevant to the data structures introduced; algorithmic analysis; algorithmic strategies	
BFND101	**Business Fundamentals I** **NQF: 6 HEQSF: 12** Efficiently manage key aspects of academic life Basic business communication, written and verbal Information Literacy; Basic Business Finance; customer benefits.; Market Analysis: You need to know your market, customer needs, where they are, how to reach them, etc. Strategy and Implementation: Be specific. Include management responsibilities with dates and budget. Management Team: Include backgrounds of key members of the team, personnel strategy, and details.; Financial Plan: Include profit and loss, cash flow, balance; sheet, break-even analysis, assumptions, business ratios, etc.; Basic Research Methodology Project Presentation.	
BFND201	**Business Fundamentals II** **NQF: 6 HEQSF: 12** Introduction to research methodology (research terms and concepts e.g. qualitative; quantitative; research ethics; types of research); Environmental Considerations; Business Communication; Technology and Society.	
BSIT301	**Business Intelligence III** **NQF: 7 HEQSF: 16** Decision Making and Analytics: An Overview; Descriptive Analytics; Predictive Analytics; Prescriptive Analytics; Big Data and Future Directions for Business Analytics.	
COAR201	**Computer Organisation and Architecture II** **NQF: 6 HEQSF: 16** Fundamentals of computer architecture; Computer arithmetic; Memory system organization and architecture; Interfacing and communication; Device subsystems; Processor systems design; Organization of the CPU; Performance; Performance enhancements.	
CSTN101	**Cornerstone 101** **NQF: 5 HEQSF: 12** The module content will be developed around the concept of journeys, across time, across space, and across human relationships. Each section will draw in issues of ethics, diversity and critical citizenry. The design team may later take a different metaphor or theme, but; with the same outcomes and attributes. The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning.	
DSTR101	**Discrete Structures** **NQF: 6 HEQSF: 16** Sets, Relations, and Functions Propositional logic; Basic Logic; Proof Techniques; Basics of Counting	

ENSP101	**Entrepreneurial Spirit** **NQF: 6 HEQSF: 12** Spirit of Entrepreneurship - Product visioning; Operations - Project Management; Team Management; Business and Finance - Investigating the Business Environment/Architecture; Financing; Marketing; Risk Management; Entrepreneurial Case study Analysis; ICT Enablers; Intellectual property protection; Completion of business plan.
GRPH301	**Graphics III** **NQF: 7 HEQSF: 16** Basic Rendering; Geometric Modeling; Computer Animation; OpenGL basics; 2 and 3-D transformations; 3-D Transformations in OpenGL; Projection principles; Objects and simple lighting in OpenGL; Hidden line and surface removal, clipping; Surface Representations: B´ezier and Spline methods; Texture mapping.
HCPI301	**Human Computer Interaction III** **NQF: 7 HEQSF: 16** HCI Concepts; Human Centred Development; Graphical User Interface Programming; Multimedia Systems Development; Interactive GUI Design; Graphics and Visualization.
ICMS101	**Interpersonal Communication & Self** **NQF: 5 HEQSF: 8** Fundamentals to Interpersonal Communication; Interpersonal Communication Skills in Action; Dimensions of Interpersonal Relationships.
IEXP101	**Industry Exposure** **NQF: 5 HEQSF: 8** Students will reflect on realistic workplace; expectations to draw links with discipline knowledge; and be able to explain real aspects of the real world; setting. They will be expected to respond and; compare their workplace in ways that inform and; improve future practice. Structured learning; activities and assessments tasks that allow students; the opportunity to illustrate and critically measure; learning and to share experience for a variety of; audiences will be of importance.
INAS201	**Information Assurance and Security II** **NQF: 6 HEQSF: 16** Foundational Concepts in Security; Principles of Secure Design; Defensive Programming; Threats and Attacks; Network Security; Cryptography; Security Policy and Governance; Digital Forensics.
INCP101	**Introduction to Computing** **NQF: 5 HEQSF: 12** Pervasive themes in Computing; History of Computing; Computing Disciplines; Computing Application Domains; Foundations of Computing Systems; The IS function; Impact of IS and computing on organisational; structures and processes.
INFM201	**Information Management II** **NQF: 6 HEQSF: 12** Information Management Concepts and Fundamentals; Database Query Languages; Data Organization Architecture; Data Modelling; Managing the Database Environment; Special Purpose Databases.
IPRT301	**Integrative Programming and Technology III** **NQF: 7 HEQSF: 16** Intersystem Communications; Data Mapping and Exchange; Integrative Coding; Scripting Techniques; Software Security Practices.

LWLF101	**Law for Life** **NQF: 5 HEQSF: 8** Introduction; Civil and criminal law; Law of insurance; Road accident fund; Law of contract; Marriage; Succession.
MCHI301	**Machine Intelligence III** **NQF: 7 HEQSF: 16** Introduction to machine intelligence; Search Strategies; Knowledge Representation and Reasoning; Machine Learning; Intelligent Agents; Natural language processing; Computer vision.
MCMA101	**Mathematics for Computing IA** **NQF: 6 HEQSF: 12** Differential Calculus; Integral Calculus; Multivariate Calculus; Vector Algebra; Elementary Linear Algebra.
MCMB101	**Mathematics for Computing IB** **NQF: 6 HEQSF: 12** Overview, Discrete probability; Continuous probability; Expectation; Stochastic processes; Sampling distributions; Estimation; Hypothesis tests; Correlation and regression.
NOPS201	**Networks and Operating Systems II** **NQF: 6 HEQSF: 16** Overview of Operating Systems; Operating System Principles; Concurrency; Scheduling and Dispatch; Memory Management; Security and Protection; Networked Applications; Reliable Data Delivery; Routing and Forwarding.
OGBH201	**Organisational Behaviour II** **NQF: 5 HEQSF: 12** Introduction to Organizational Behaviour; Managing Demographic and Cultural Diversity; Understanding People at Work: Individual Differences and Perception; Individual Attitudes and Behaviours; Theories of Motivation ; Designing a Motivating Work Environment; Managing Stress and Emotions; Communication ; Managing Groups and Teams; Conflict and Negotiations; Making Decisions; Leading People Within Organizations; Power and Politics; Organizational Structure and Change Organizational Structure; Organizational Culture Building a Customer Service Culture.
PBDV301	**Platform Based Development III** **NQF: 7 HEQSF: 16** Introduction to Platform-based development; Web Platforms; Mobile Platforms; Game Platforms; Industrial Platforms.
PDCP301	**Parallel and Distributed Computing III** **NQF: 7 HEQSF: 16** Parallelism fundamentals; Parallel Decomposition; Communication and Coordination; Parallel Algorithms, Analysis, and Programming; Parallel Architecture; Parallel Performance; Distributed Systems.
PJMN301	**Project Management III** **NQF: 7 HEQSF: 16** Introduction to PM and IT PM; Planning; Schedule/time management; Cost management; Quality management; Human resource management Communications management; Risk management.

PRJT302	**Project III** **NQF: 7 HEQSF: 12** The project must incorporate any relevant area of emphasis either from the Computer Science or Information Technology focus area in the software engineering process of computer systems development.
PRLN201	**Programming Languages II** **NQF: 6 HEQSF: 12** Introduction; Program Representation; Language Translation and Execution; Syntax Analysis; Compiler Semantic Analysis; Code Generation; Runtime Systems; Static Analysis.
RESK301	**Research skills** **NQF: 7 HEQSF: 12** Introduction to research; Research ethics; Information sources and retrieval; Literature review; Research process; Quantitative research design; Qualitative research design.
SADS201	**Systems Analysis and Design II** **NQF: 6 HEQSF: 12** Organizational context; IT-enabled organizational change; Business process management; Analysis of business requirements; IT Project Management in global context; System analysis and design methodology; Analysis and specification of system requirements; Approaches to implementation of Information Systems.
SAQM301	**Strategy Acquisition and Management III** **NQF: 7 HEQSF: 16** Business IS/IT alignment; Strategic IS planning; Strategic knowledge management; Business exploitation of ICT; Acquiring IT resources and capabilities; IS/IT benefits management and realization; IT risk management; IT governance frameworks.

7.5. BACHELOR OF INFORMATION AND COMMUNICATIONS TECHNOLOGY HONOURS (BICTH1)

MODULE CODE	MODULE NAMES	NQF LEVEL\ CREDITS
ADCY402	**Advanced Cybersecurity** **NQF: 8 HEQSF: 16** Evaluate the impact of cybersecurity vulnerabilities. Apply appropriate forensic tools to network traffic, data store meta data and digital data recovery. Develop a framework (policy, technology and control) to protect data, applications and infrastructure for a cloud based system. Develop a set of metrics to detect weaknesses within implemented cybersecurity measures. Implement a malware analysis tool and analyse its output.	

ADDA401	**Advanced Data Analytics** **NQF: 8 HEQSF: 16** Analyse challenges associated with large scale or big data. Implement data analytics software, platforms and applications in order to help organizations make better-informed decisions. Apply data pre-processing techniques and methodologies to prepare data sets for analysis. Apply post-processing techniques in order to integrate results into mainstream organizational processes. Evaluate social, ethical, legal, data governance and policy aspects of data analytics
ADNT401	**Advanced Networking** **NQF: 8 HEQSF: 16** Evaluate planned changes to an organization's network. Analyse an organization's network and accurately communicate inherent problems or shortcomings. Implement and troubleshoot Layer 2 and Layer 3 networking technology. Apply VPN technologies to organizational networks. Analyse and evaluate infrastructure security and services.
ADIP402	**Advanced Image Processing** **NQF: 8 HEQSF: 16** Evaluate the characteristics of images and apply appropriate data structures for image analysis. Apply suitable techniques for image enhancement and restoration. Demonstrate an understanding of Colour representation in digital images and evaluate different Colour models. Evaluate and apply algorithms and techniques for image segmentation and compression and morphological operations. Apply appropriate methods for image feature extraction and object recognition. Utilise library facilities and tools for image acquisition, analysis and manipulation.
APRE402	**Applied Research** **NQF: 8 HEQSF: 32** Analyse contemporary literature and establish a focused topic for investigation. Synthesize and report recent and relevant information in a cogent and coherent manner. Apply quantitative or qualitative research methods. Apply data collection and analysis techniques. Apply research ethics.
ASDM401	**Advanced Software Development and Management** **NQF: 8 HEQSF: 16** Effectively manage the development process of platform-based software projects. Apply software testing to software projects. Develop high quality requirements and design models. Develop plans for the process of software systems maintenance and re-engineering. Plan and implement models, tools and metrics to effectively manage multiple, simultaneous software projects.
AUED402	**Advanced User Experience Design** **NQF: 8 HEQSF: 16** Develop a digital user interface that is well suited to user abilities and characteristics, that promotes effective user interaction and is domain specific. Evaluate users' acceptance of a user interface. Evaluate the usability of a user interface Apply assistive and accessibility technologies to aid users with impairments.
CLCO401	**Cloud Computing** **NQF: 8 HEQSF: 16** Demonstrate an understanding of cloud infrastructure implementation and managing cloud data. Manage the selection and implementation of cloud services and applications. Manage risks arising from contracts for service delivery and security breaches. Apply architecture principles to the implementation of cloud computing services. Design and develop a simple cloud application.

GLPP402	**Global Professional Practice** **NQF: 8 HEQSF: 16** Demonstrate an understanding of core professional practice concepts. Develop appropriate policies and procedures to manage resources in a system. Develop a policy for legal, ethical and privacy concerns for a company's ICT usage.
INTG402	**Internet of Things** **NQF: 8 HEQSF: 16** Architect and design a wireless sensor network or ad-hoc network for a given scenario. Apply programming techniques to acquire data from interfaced IoT components and to analyse data collected from IoT sensors. Analyse applications of IoT automatic control systems. Apply techniques for IoT information management and processing. Build a simple app for a smart device to control different devices. Evaluate security challenges for IoT devices and networks. Evaluate the impact of cybersecurity vulnerabilities.
MALE402	**Machine Learning** **BICTH1** **NQF: 8 HEQSF: 16** Apply an appropriate search technique to solve a formulated problem. Use knowledge representation formalisms and automated reasoning engines to complete a complex task. Design an intelligent agent to make decisions on a course of action from available information. Design an intelligent agent that can learn from and make predictions on data.
PRIC401	**Principles of Research** **NQF: 8 HEQSF: 16** Identify the characteristics and components of academic research. Distinguish between ethical and unethical research activities. Interpret the quality/reliability of different sources. Compare the different research strategies. Evaluate data collection techniques for specific research scenarios. Evaluate data analysis methods for specific research scenarios.
VSSE401	**Virtual Systems and Services** **NQF: 8 HEQSF: 16** Implement virtualization via a defined process. Implement a virtualized user platform (desktop). Implement virtualization for a server. Apply an appropriate management strategy for a virtual network. Implement a virtual storage system. Implement software system component emulation (service virtualization).
WMSD401	**Web and Mobile Systems Development** **NQF: 8 HEQSF: 16** Utilise industry standardized technologies to support the development of web and mobile systems. Develop web and mobile apps that are usable, efficient and secure on more than one platform. Apply sound architecture and design principles in developing web and mobile systems. Apply security measures in the development of secure web and mobile systems. Concisely document the details of a proposed web or mobile system.