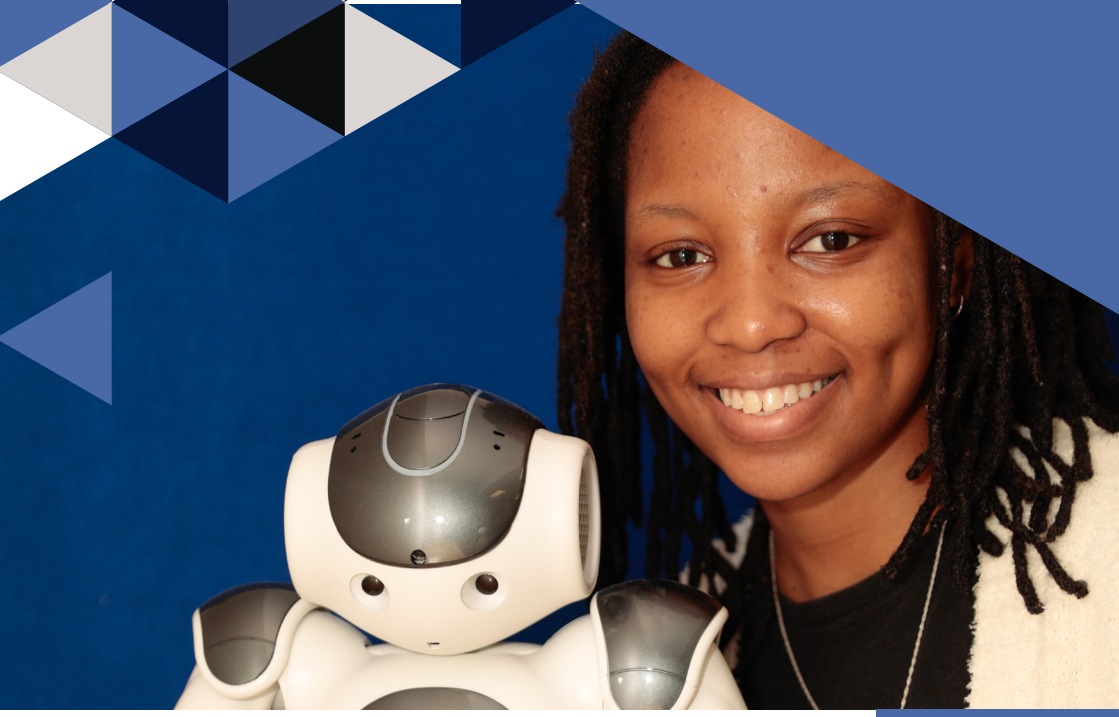
INFORMATION & TECHNOLOGY



2022 HANDBOOK

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

FACULTY OF ACCOUNTING & INFORMATICS

HANDBOOK FOR 2022

FACULTY of Accounting and Informatics

DEPARTMENT of INFORMATION TECHNOLOGY

Faculty of Accounting & Informatics

Vision A globally recognized faculty for academic excellence.

Mission

"Developing Leaders for the Information Society" through

- Excellence in teaching and learning
- Relevant research and creative innovation
- Social entrepreneurship

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

Vision Leading ICT Scholarship and Innovation

Mission

"Advancing ICT" through

- A Quality Teaching and Learning Experience
- Relevant and Problem-Driven Research
- Engagement with Society
- Entrepreneurship

Values

- **Innovation:** Thinking out of the box. Striving for better. Cutting-edge curriculum, research and process. Creativity. Exciting. Embrace collaboration.
- **Compassion:** To care and have empathy – to consider from another's perspective. Understand our students. Ethics – do no harm. Committed. Ubuntu: "I am because we are".
- **Transformation:** Embrace the digital revolution. The architects of change. Be adaptive. Economic and societal progress. A mix of human and technological values.

Goals

The goals of the Department are:

- To continuously produce a critical mass of quality IT graduates from sound teaching, learning, and assessment practices
- To produce and publish high quality applied research in IT
- To significantly contribute to the empowerment of communities, society, and humanity, using IT as an enabler

What is a University of Technology?

A university of technology is characterized by being research informed rather than research driven where the focus is on strategic and applied research that can be translated into professional practice. Furthermore, research output is commercialized thus providing a source of income for the institution. Learning programmes, in which the emphasis on technological capability is as important as cognitive skills, are developed around graduate profiles as defined by industry and the professions.

Teaching and learning profile for Information Technology

The pervasion of 5IR and advent of a hyper connected society place new demands on the computing graduate. These digital natives are entrusted to provide technologically enriched innovations towards solutions for persistent societal and industrial challenges.

In response to this global demand, our Department maintains a carefully architected pyramid of programs. These range from low down Higher Certificate aimed at enhancing the digital literacy of the student which better equips them for the demands of their chosen higher education pathways, to a high powered Honours Degree aimed at developing skills in key areas of computing like, AI,

Robotics, Computer Vision and IoT. The apex consists of Masters and PhD and our team of established mentors usher postgraduate students towards leveraging their newly instilled knowledge in applied research for solving real-world problems.

Undergraduate and graduate programs' curriculum derive from the international computing curriculum for which ACM/IEEE are custodians. This allows for a world class computing curriculum which permutated throughout our programs which endows our graduates with cutting edge knowledge in emerging ICT and a practical ability of their application.

Computing staff are a dedicated and experienced team of academics from diverse ethnic and cultural backgrounds. There are varying years of experience ranging from new appointments to career academics and those with many years of industry experience. Our staff are continuously developing new skills in stewardship, teaching and learning pedagogy, research and engagement and evolving teaching and learning practices to keep pace with socio-technological developments and to cope with digital divide.

Learning technologies have always featured in our practices and we are not newcomers to the recent boom in embracing technologically enhanced learning platforms. As early as the 2000s online learning platforms have featured in our instruction. High tech computer laboratories boast the latest equipment and software to enhance the learning experience. A recent grant led to the purchase of multi-million Rand high powered computers to support advanced research in areas like data analytics and AI. We have the only Luban workshop in South Africa fitted with state-of-the-art equipment for Robotics, 3D printing and IoT. In addition we have partnerships with leaders in IT industry including, Microsoft, AWS, IBM, SAP, Huawei, Cisco and others.

We pride ourselves with research accomplishments. Collaborations with researchers from other regions such as, Korea, China have resulted in incredible innovations in smart energy, AI and big data analytics. Post graduate students are often the recipient of research awards, grants and accolades. This contributes in part towards DUT achieving world ranking status for high quality research output.

Along the way, headliner grabbing students have left their mark. A group of postgraduate students have formed a club that delivers ICT solutions for many needy and opportune ambits in the University. Undergraduate students are local, regional and sometimes continental representatives for heavyweights in IT like, Microsoft, AWS and IBM.

Research Profile

DUT is ranked within the top 5 Universities in South Africa and in the top 300 Universities World Ranking. This accolade is mainly a result of high-quality research and demonstrates our ability as a serious heavy-weight contender. Each year, computing research makes significant contributions to achieving such accolades.

Masters and PhD students (PG students) speak highly of their learning experience and of their time spent at DUT. These students hail from many local and international regions, forming a rich tapestry of culture and ethnicity which enriches the overall learning experience via interactions. Our students mingle with different cultures, languages and socio-economic standing which is vital in an industry that has long ago diminished regional boundaries and promoted global collaborating teams.

Our research is often fascinating and captivating. PG students ply their skills to perform exciting research in areas of big data, data analytics, data streaming, machine learning, deep learning, natural language processing, IoT, edge computing, cyber security, cloud computing, user experience, software engineering, image processing and computer vision. Research is underpinned by a simple philosophy of innovative and clever computing solutions that improve the lives and livelihood of society. Research is applied in nature and design-research by methodology.

Some of our recent PG student research topics are: Using ICT for disease intervention in resource constrained environments: case study Narok county, Kenya; A Context-Aware word embedding model for morphologically rich languages using Sesotho saLeboa as a Case Study; Detecting identity theft in real time using big data; Predicting depression on social media using machine learning; Integrating design thinking and DevOps for improved requirements engineering in agile software projects and Design model of IoT ready network architecture for Botswana Healthcare System; and practical course delivery as a service for higher and tertiary education in Zimbabwe: A robotic and artificially intelligent approach.

We boast state of the art computing resources and a wide range of support units dedicated to enhance the research experience and enable the PG student to quickly satisfy their research goals. There are dedicated PG student computer laboratories with high-tech computers and equipment for AI, Big Data, Robotics, IoT and 3D printing. There are comfortable spaces for research outside the computer laboratories and lecture halls should the PG student need to work on their thesis. The Library provides access to top ranked computing journals and other publications accessible from anywhere in the world. In addition, the Writing Centre provides one-on-one peer assistance to improve quality of the thesis or publication.

PG students complete their studies well within their planned timeframes and embark on successful careers in academia or in IT industry, both locally or abroad. They achieve publications and other research outputs along their journey which enhances their profiles. Our PG Degrees are recognized world-wide and some of our mentors have achieved international acclaim and regional awards and ratings for their advanced standing in a certain field of computing. This profile is increasing with each passing year.

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

CONTENTS

1 DEPARTMENT AND FACULTY CONTACT DETAILS

All Departmental queries to:

Secretary:	Ms.Thabile Ntuli
Tel No:	031 373 5594
e-Mail:	itdept@dut.ac.za, thabilen1@dut.ac.za
Location:	2nd Floor, Block B, West Wing, Ritson Campus

Administrative Assistant:	Ms. Jabulisile Dlamini
Tel No:	031 373 5596
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All Faculty queries to:

Faculty assistant	Ms. D Small
Tel No:	031373 5418
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Location:	East Wing, Hotel School Building, Ritson Campus

Executive Dean:	Prof O Olugbara
Secretary:	Ms. Matladi L Phasha
Tel No:	031 373 5597
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Location:	North Wing, Hotel School Building, Ritson Campus

2 STAFFING

	Name and Qualification	
Head of Department	Dr Wing J W	PhD IT (DUT)
Associate Professors	Prof Millham RC	PhD Computer Science (De Montfort University), CEng (UK Engineering Society)
Associate Directors	Khan F T	MSc IT (University of Sydney)
	Singh K	MICT (DUT), BSc (Hons) Computer BEd (Hons) UHDE (UDW)
Senior Lecturers	Asmal E	MICT (DUT), NHD CDP (MLST), ND
	Hansrajh A	MICT (DUT), BSc (Hons) (UNISA) JSED
	Pancham J	MICT (DUT) ND Telecom (Telkom), BSc (Hons) (UDW)
	Dr Singh A	DTech IT (DUT)
	Dr van Niekerk B	PhD IS (UKZN), MSc Eng. (UKZN)
Lecturers	Dr Adeliyi T	PhD IT [DUT]
	Boamah-Abu C	MCom IS (UCT), BSc (Hons) Comp Sc (Rhodes)
	Dwarika, J	MSc IS (UNISA), BSc (Hons) (UNISA), BTech IT (DIT)
	Hoosen S	MICT (DUT), BSc (Hons) (UDW)
	Jackson P	MICT (DUT)
	Joseph S	MTech IT (DUT)
	Speckman T	MICT (NMU)
	Moodley S G	MICT (DUT), BTech IT (DUT)
	Ngxata B	MCom IS&T (UKZN), BTech IT (MLST), Dip IT (WSU)
	Dr Makamba M	PhD Comp Sc [UNISA]
	Soobramoney R	MICT (DUT), BSc (Hons) (UND)
	Soobramoney S	MICT (DUT)
	Thompson R C	MICT (DUT)
	Adebanjo H	PhD Comp Sc (UKZN)
nGap Lecturer	Khubisa, F	MICT (cum laude) [DUT]

Administrative Staff:	Secretary:	Ms. T Ntuli
	Admin. Assistant	Ms. J Dlamini
	Senior Technician Networks:	Mr. A Ramdass
	Technicians:	Mr. M Womack
		Mrs. G Pursan
		Mr. BNM Mbuthuma
		Mr. R Govender

3 PROGRAMMES OFFERED BY THE DEPARTMENT

The table below provides details of the programme offerings

IT = Information Technology
ICT = Information and Communications Technology
ECP = Extended Curriculum Programme

Programme Name	Subject Code	SAQA NLRD	NQF level	NQF Credits
Higher Certificate in IT	HCINF1	98911	5	120
Diploma in ICT in Applications Development	DIIAD1	94697	6	360
Diploma in ICT in Applications Development (4 year ECP)	DIIAF1	94697	6	360
Advanced Diploma in ICT	ADICT1	109939	7	120
Bachelor of ICT	BINCT1	104534	7	376
Bachelor of ICT (Hons)	BINCT1	118412	8	128
Master of ICT	MICMT1	96833	9	180
PhD in IT	DPINF1	96804	10	360

4 PROGRAMME INFORMATION

4.1. UNDER-GRADUATE PROGRAMMES

4.1.1. Higher Certificate in IT (HCINF1)

This programme is a one-year exit level qualification at NQF level 5. The graduate will be equipped with foundational technical skills in IT with a focus on web development, e-commerce, computer networks and IT solutions development. Higher certificates are terminal qualifications and do not automatically lead to enrolment into diploma and degree programmes. Minimum requirements that all other students registered for diplomas and degrees must be met before any student with a certificate enrols for a higher qualification.

Duration
Min: 1 year; Max: 2 years

4.1.2. Diploma in ICT in Applications Development (DIIAD1)

One of two streams in the Diploma in ICT, this qualification will develop knowledge and practiced skill required for the development of IT solutions that are reliable, efficient and useful.

Duration
Min: 3 years; Max: 5 years

4.1.3. Diploma in ICT in Applications Development (4 year ECP) (DIIAF1)

Graduates will be able to develop knowledge and practiced skill required for the development of IT solutions that are reliable, efficient and useful.

Duration
Min: 4 years; Max: 5 years

4.1.4. Advanced Diploma in ICT (ADICT1)

This programme is designed to prepare graduates for the IT industry or for postgraduate study through the deepening of their knowledge and understanding of theories, methodologies and practices within the field of IT and research.

Duration
Min: 1 years; Max: 2 years

4.1.5. Bachelor of ICT (BINCT1)

This Bachelor Degree has a theoretical and practical focus aimed at developing knowledge and skills that are in high demand throughout the IT industry. Graduates will be capable of improving organizational processes through the implementation of current IT developments.

Duration
Min: 3 years; Max: 5 years

4.1.6. Bachelor of ICT Hons (BICTH1)

This honours degree is an optional continuation of the Bachelor of Information and Communication Technology allowing students to pursue advanced studies in a particular area of interest in ICT. The degree exposes students to research and advanced topics in ICT beyond what is offered in the three-year undergraduate degree. It provides high achieving students with an opportunity to cultivate research and development skills appropriate to the ICT discipline and to understand the fundamentals of ICT-related research.

Duration
Min: 1Year; Max 3 Years (See rules G23(C2 and G23 (C3)

4.2. POST-GRADUATE PROGRAMMES

4.2.1. Master of ICT (MICMT1)

A full research programme, the Master of ICT is designed to equip its graduates with knowledge for conducting IT based research. Upon completion, graduates will be poised to undertake either independently or collaboratively complex IT research such as that required in a PhD. Graduates will have the ability to disseminate findings of their research through publications.

Duration
Min: 1 year; Max: 3 years

4.2.2. PhD in IT (DPINF1)

PhD will equip its graduates with knowledge for conducting high quality research and contributing new knowledge to an area of IT. Graduates will be able to conduct independent research that results in innovations and produces new knowledge in an area of IT. Graduates will have developed the ability to disseminate findings of their research and in doing so make a contribution towards IT.

Duration
Min: 2 years; Max: 4 years

5 MINIMUM ADMISSION REQUIREMENTS

5.1. Higher Certificate in IT (HCINF1)

In addition to General Rules G7 and G20B, the minimum admission requirement is a National Senior Certificate (NSC) or Senior Certificate (SC) or a National Certificate Vocational (NCV) level 4 pass and must meet the following requirements:

Compulsory Subjects	NSC Rating	SC		NCV
		HG	SG	
English (Home Language)	3	E	C	50%

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.

5.2. Diploma in ICT in Applications Development (DIIAD1)

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:

Compulsory Subjects	NSC Rating	SC		NCV
		HG	SG	
English (Home Language)	3	E	C	50%
OR				
English (1st Additional Language)	4	n/a	n/a	n/a
Mathematics	3	E	C	50%
OR				
Mathematical Literacy	6	n/a	n/a	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

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.

5.3. Diploma in ICT in Applications Development (4 year ECP) (DIIAF1)

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 requirements:

Compulsory Subjects	NSC Rating	SC		NCV
		HG	SG	
English (Home Language) OR English (1st Additional Language)	3 3	E n/a	C n/a	50% n/a
Mathematics OR **Mathematical Literacy**	3 5	E n/a	C n/a	50% 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

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.

5.4. Advanced Diploma in ICT (ADICT1)

In addition to General Rules G7 and G21C, admission requires a Diploma in Information and Communications 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.

5.5. Bachelor of ICT (BINCT1)

In addition to the requirements of the General Rules G7 and G23B, the minimum admission requirement is a National Senior Certificate (NSC) awarded with Bachelors Pass or Senior Certificate (SC) awarded with Exemption or a National Certificate Vocational (NCV) that is valid for entry into a Degree and must meet the following requirements:

Compulsory Subjects	NSC Rating	Compulsory Subjects	SC (HG)	NCV
English (Home Language) OR **English** (1st Additional Language)	4	**English**	D	
Mathematics	4	**Mathematics**	D	

And at least one of any credit bearing subject	4	And at least one of any credit bearing subject	D	(a) At least 60% in one fundamental subject, in addition to English & Mathematics. (b) At least 70% in three compulsory vocational subjects

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.

5.6. **Bachelor of Information and Communication Technology Honours, (BICTH1)**

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

5.7. **Masters in ICT (MICMT1)**

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.

5.8. **PhD in IT (DPINF1)**

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.

6 PROGRAMME RULES

6.1. UNSATISFACTORY ACADEMIC PROGRESS

General Rules G17 and G19 to G25 apply. In addition, the Department reserves the right to recommend that a student withdraw from a programme due to poor performance.

6.2. PROGRESSION RULES

6.2.1. Diploma in ICT 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. See section 7 of this handbook for majors.

6.2.2. Diploma in ICT in Applications Development (4 year ECP) (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. See section 7 of this handbook for majors.

6.2.3. Bachelor of ICT (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

6.3. INTERRUPTION OF STUDIES

Should a student interrupt their studies by more than three years the student will be required to provide evidence of appropriate knowledge which will be evaluated by the Department prior to being given permission to re-register. Furthermore, please refer to rule G6B in the DUT General Handbook.

6.4. FINAL MARK WEIGHTING

The final mark for a module with an examination is calculated as 40% course mark and 60% examination mark. The calculation of the course mark for each module will be indicated within the student guide of each module.

6.5. GENERAL EDUCATION MODULE RULES

The General Education modules are compulsory and covers 30% of the total credits of an undergraduate Diploma and Degree Programme.

6.6. PHASE-OUT MODULE RULES

Phase out modules may not be offered as both full-time and part-time.

6.7. PART-TIME MODULE RULES

Part time students may have to write tests and/or examinations during full-time hours that is, during normal daytime working hours.

7 PROGRAMME STRUCTURE

7.1. Higher Certificate in IT (HCINF1)

Year 1 (Study Period – 1)

Module Code	Module Name
CSTN101	Cornerstone 101
DBAD102	Database Administration
ECMR102	E-Commerce
HDWS102	Hardware Support
NWRK102	Networking
SWSP102	Software Support
SLDV102	Solutions Development
WEBP102	Web Project
WBTC102	Web Technology

7.2. Diploma in ICT in Applications Development (DIIAD1) Note: * denotes Major module

Year 1 (Study Period – 1)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
CSTN101	Cornerstone 101	[GE] Inst.	21	5	12	CA	
ICTL101	Information & Communications Technology Literacy & Skills	[GE] Inst.	21	5	8	CA	
BFND101	Business Fundamentals 1	[GE] Fac.	21	5	12	CA	
APDA101	Applications Development IA*	[C]	21	5	12	CA	
FCSC101	Fundamentals of Computer Security	[F]	21	5	8	CA	
INSS101	Information Systems 1*	[C]	21	5	8	CA	
MWMU101	Me, My World, My Universe	[GE] Inst.	22	5	8	CA	
OSYS101	Operating Systems	[F]	22	5	12	CA	
APDP101	Applications Development Project I*	[GE] Program	22	5	12	CA	Applications Development IA [E]; Applications Development 1A[C] Applications Development IB [C]
APDB101	Applications Development IB*	[C]	22	5	12	CA	Applications Development IA [E]
CNTW101	Communications Networks 1	[F]	22	5	16	CA	

Year 2 (Study Period – 2)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
BFND201	Business Fundamentals II	[GE] Fac.	21	6	12	CA	Business Fundamentals I [P]
MCPA201	Mobile Computing IIA	[C]	21	6	8	Exam	
ISYA201	Information Systems IIA*	[C]	21	6	8	Exam	Information Systems I [P]
APDA201	Applications Development IIA*	[C]	21	6	12	Exam	Applications Development IA [P]; Applications Development IB [P]
ITPM101	IT Project Management	[C]	21	6	12	Exam	
INMA201	Information Management IIA	[C]	21	6	8	Exam	
CMEP101	Community Engagement Project	[GE] Inst.	22	6	8	CA	
MCPB201	Mobile Computing IIB	[C]	22	6	12	Exam	Mobile Computing IIA [E]
ISYB201	Information Systems IIB*	[C]	22	6	8	Exam	Information Systems IIA [E]
APDB201	Applications Development IIB*	[C]	22	6	12	Exam	Applications Development IIA [E]
INMB201	Information Management IIB	[C]	22	6	8	Exam	Information Management IIA [E]
APDP201	Applications Development Project II*	[GE] Program	22	6	12	CA	Applications Development Project I [P]; Applications Development IIA [E]; Information Systems IIA [E].

Year 3 (Study Period – 3)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
APDA301	Applications Development IIIA*	[C]	21	6	12	Exam	Applications Development IIA [P]; Applications Development IIB [P]
ISYA301	Information Systems IIIA*	[C]	21	6	12	Exam	Information Systems IIA [P]; Information Systems IIB [P]; Applications Development Project II [E]
ADPA301	Applications Development Project IIIA*	[GE] Program	21	6	12	CA	Applications Development Projects II [P]; Applications Development IIA [P]; Applications Development IIB [P]
HCIN101	Human Computer Interaction	[C]	21	6	12	Exam	

TIPP301	Theory of ICT Professional Practice III	[GE] Program	21	6	12	Exam	
ENSP101	Entrepreneurial Spirit	[GE] Fac.	22	6	12	CA	Business Fundamentals I [P], Business Fundamentals II [P]
APDB301	Applications Development IIIB*	[C]	22	6	12	Exam	Applications Development IIIA [E]
ISYB301	Information Systems IIIB*	[C]	22	6	12	Exam	Information Systems IIIA [E]
ADPB301	Applications Development Project IIIB*	[GE] Program	22	6	24	CA	Applications Development Project IIIA [E]; Applications Development IIIA [E]

7.3. Diploma in ICT in Applications Development (4-year ECP) (DIIAF1)

Note: * denotes Major module

Year 1 (Study Period – 1)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
CSTN101	Cornerstone 101	[GE] Inst.	21	5	4	CA	
FCSC101	Fundamentals of Computer Security	[F]	21	5	3	Exam	
ICTL101	Information & Communications Technology Literacy & Skills	[GE] Inst.	21	5	3	CA	
ILGA101	IT Logic & Technology IA	[F]	21	5	8	CA	
SKDA101	Skills Development IA	[F]	21	5	8	CA	
ILGB101	IT Logic & Technology IB	[F]	22	5	8	CA	IT Logic & Technology IA [E]
INSS101	Information Systems I*	[C]	22	5	3	Exam	
OSYS101	Operating Systems	[F]	22	5	3	Exam	
SKDB101	Skills Development IB	[F]	22	5	8	CA	

Year 2 (Study Period – 2)

Module Code	Module Name	Core; Fundamental General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
APDA101	Applications Development IA*	[C]	21	5	6	Exam	
BFND101	Business Fundamentals I	[GE] Fac.	21	5	6	CA	
CNTW101	Communications Networks I	[F]	21	5	8	Exam	
ILGA201	IT Logic & Technology IIA	[F]	21	5	8	CA	IT Logic & Technology IA [P]; IT Logic & Technology IB [P]
SKDA201	Skills Development IIA	[F]	21	5	8	CA	Skills Development IA [P]; Skills Development IB [P]
APDB101	Applications Development IB*	[C]	22	5	6	Exam	Applications Development IA [E]
APDP101	Applications Development Project I*	[GE] Program	22	5	8	CA	Applications Development IA [E]; Applications Development 1B [C]
ILGB201	IT Logic & Technology IIB	[F]	22	5	8	CA	IT Logic & Technology IIA [E]
MWMU101	Me, My World, My Universe	[GE] Inst.	22	5	6	CA	
SKDB201	Skills Development IIB	[F]	22	5	8	CA	Skills Development IA [P]; Skills Development IB [P]

Year 3 (Study Period – 3)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
APDA201	Applications Development IIA*	[C]	21	6	12	Exam	Applications Development IA [P]; Applications Development IB [P]
BFND201	Business Fundamentals II	[GE] Fac.	21	6	12	CA	Business Fundamentals I [P]
INMA201	Information Management IIA	[C]	21	6	8	Exam	
ISYA201	Information Systems IIA*	[C]	21	6	8	Exam	Information Systems I [P]
ITPM101	IT Project Management	[C]	21	6	12	Exam	
MCPA201	Mobile Computing IIA	[C]	21	6	8	Exam	
APDB201	Applications Development IIB*	[C]	22	6	12	Exam	Applications Development IIA [E]
APDP201	Applications Development Project II*	[GE] Program	22	6	12	CA	Applications Development Project I [P]; Applications Development IIA [E]; Information Systems IIA [E];
CMEP101	Community Engagement Project	[GE] Inst.	22	6	8	CA	

INMB201	Information Management IIB	[C]	22	6	8	Exam	Information Management IIA [E]
ISYB201	Information Systems IIB *	[C]	22	6	8	Exam	Information Systems IIA [E]
MCPB201	Mobile Computing IIB	[C]	22	6	12	Exam	Mobile Computing IIA [E]

Year 4 (Study Period – 4)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
APDA301	Applications Development IIIA*	[C]	21	6	12	Exam	Applications Development IIA [P]; Applications Development IIB [P]
ISYA301	Information Systems IIIA*	[C]	21	6	12	Exam	Information Systems IIA [P]; Information Systems IIB [P]; Applications Development Project II [E]
ADPA301	Applications Development Project IIIA*	[GE] Program	21	6	12	CA	Applications Development Projects II [P]; Applications Development IIA [P]; Applications Development IIB [P]
HCIN101	Human Computer Interaction	[C]	21	6	12	Exam	
TIPP301	Theory of ICT Professional Practice III	[GE] Program	21	6	12	Exam	
ENSP101	Entrepreneurial Spirit	[GE] Fac.	22	6	12	CA	Business Fundamentals I [P], Business Fundamentals II [P]
APDB301	Applications Development IIIB*	[C]	22	6	12	Exam	Applications Development IIIA [E]
ISYB301	Information Systems IIIB*	[C]	22	6	12	Exam	Information Systems IIIA [E]
ADPB301	Applications Development Project IIIB*	[GE] Program	22	6	24	CA	Applications Development Project IIIA [E]; Applications Development IIIA [E]

7.4. Advanced Diploma in ICT (ADICT1)

Note: ** indicates an **Elective** – Two modules must be selected from the Electives. The Department reserves the right not to offer an Elective Module.

Year 1 (Study Period – 1)

Module Code	Module Name	Compulsory/ Elective	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
DAST401	Data Structures	C	21	7	16	Exam	
PBDE401	Platform Based Development	C	21	7	16	CA	
RESK401	Research skills	C	21	7	12	Exam	
APMC401	Applied Mathematics for Computing A (Probability & Statistics)	C	21	7	12	Exam	
SODM401	Software Development and Management	C	22	7	16	Exam	
APMC402	Applied Mathematics for Computing B (Discrete Structures & Linear Algebra)	C	22	7	16	Exam	
SAMA301	Strategy Acquisition and Management III**	E	22	7	16	Exam	
BUIN301	Business Intelligence III**	E	22	7	16	Exam	
PDCO301	Parallel and Distributed Computing III**	E	22	7	16	Exam	
MAIN301	Machine Intelligence III**	E	22	7	16	Exam	
GRAP301	Graphics III**	E	22	7	16	Exam	
HCIN301	Human Computer Interaction III**	E	22	7	16	Exam	

7.5 Bachelor of ICT (BINCT1)

Year 1 (Study Period – 1)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
BFND101	Business Fundamentals I	[GE] Fac.	21	6	12	CA	
INCP101	Introduction to Computing	[C]	21	5	12	Exam	
DSTR101	Discrete Structures	[F]	21	6	16	Exam	
ICMS101	Interpersonal Communication & Self	[GE] Inst.	21	5	8	CA	

MCMA101	Mathematics for Computing IA	[F]	21	6	12	CA	
CSTN101	Cornerstone 101	[GE] Inst.	22	5	12	CA	
BFND201	Business Fundamentals II	[GE] Fac.	22	6	12	CA	Business Fundamentals I [P]
SWDF101	Software Development Fundamentals	[C]	22	5	12	Exam	
MCMB101	Mathematics for Computing IB	[C]	22	6	12	CA	
SYSF101	Systems Fundamentals	[F]	22	5	12	Exam	

Year 2 (Study Period – 2)

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
SADS201	Systems Analysis and Design II	[C]	21	6	12	Exam	
LWLF101	Law for Life	[GE] Inst.	21	5	8	CA	
OGBH201	Organizational Behavior II	[F]	21	5	12	Exam	
NOPS201	Networks and Operating Systems II	[C]	21	6	16	Exam	Systems Fundamentals [C]
PRLN201	Programming Languages II	[F]	21	6	12	Exam	
ALDS201	Algorithms and Data Structures II	[C]	22	6	12	Exam	Discrete Structures [C]
INFM201	Information Management II	[C]	22	6	12	Exam	
INAS201	Information Assurance and Security II	[C]	22	6	16	Exam	
COAR201	Computer Organization and Architecture II	[C]	22	6	16	Exam	Systems Fundamentals [C]
ENSP101	Entrepreneurial Spirit	[GE] Fac.	22	6	12	CA	Business Fundamentals I [P], Business Fundamentals II [P]

Year 3 (Study Period – 3)

Note: ** indicates an **Elective** – Two modules must be selected from the Electives.
The Department reserves the right not to offer an Elective Module.

Module Code	Module Name	Core; Fundamental; General Education	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
IEXP101	Industry Exposure	C	21	7	12	CA	
PBDV301	Platform Based Development III	C	21	7	16	Exam	Programming Languages II [C]
IPRT301	Integrative Programming & Technology III	C	21	7	16	Exam	
SPRI301	Social and Professional Issues III	C	21	7	16	Exam	
PRJA301	Project IIIA	C	21	7	8	CA	Programming Languages II [C]
PRJB301	Project IIIB	C	22	7	12	CA	Programming Languages II [C]
SAQM301	Strategy Acquisition & Management III**	E	22	7	16	Exam	
SFEN301	Software Engineering III	C	22	7	16	Exam	
PJMN301	Project Management III**	E	22	7	16	Exam	
BSIT301	Business Intelligence III**	E	22	7	16	Exam	Information Management II [C]
PDCP301	Parallel and Distributed Computing III**	E	22	7	16	Exam	Programming Languages II [C]
MCHI301	Machine Intelligence III**	E	22	7	16	Exam	
GRPH301	Graphics III**	E	22	7	16	Exam	
HCPI301	Human Computer Interaction III**	E	22	7	16	Exam	
WSYT301	Web Systems and Technology III**	E	22	7	16	Exam	

7.6 **Bachelor of ICT (Hons) (BICTH1)**

Note: ** indicates an **Elective** –Choose one elective subject in semester 1(21) and One Elective subject in semester 2 (22)

Module Code	Module Name	Compulsory/ Elective	Block Code	NQF Level	HEQSF Credits	Exam/ CA	Prerequisites [P], Co-Requisites [C], Exposure [E]
ADDA401	Advanced Data analytics	E	21	8	16	CA	
ADNT401	Advanced Networking	E	21	8	16	CA	
ASDM401	Advanced Software Development and Management	C	21	8	16	EXAM	
CLCO401	Cloud Computing	C	21	8	16	CA	
PRESE4R	Principal of Research	C	21	8	16	CA	
WMSD401	Web and Mobile Systems Development	E	21	8	16	CA	
VSSE401	Virtual System and Services	E	21	8	16	CA	
ADCY402	Advanced Cybersecurity	E	22	8	16	CA	
ADIP402	Advanced Image Processing	E	22	8	16	CA	
APRE402	Applied Research	C	22	8	32	CA	PRESE4R[P]
AUED402	Advanced User Experience Design	E	22	8	16	CA	
GLPP402	Global Professional Practice	C	22	8	16	EXAM	
INTG402	Internet of Things	E	22	8	16	CA	
MALE402	Machine Learning	E	22	8	16	CA	

7.7 **ABRIDGED SYLLABI**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
AADM401	**Advanced Software Development and Management**	**BICTH1**	**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.		
ADCY402	**Advanced Cybersecurity**	**BICTH1**	**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**	**BICTH1**	**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**	**BICTH1**	**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.		
ADPA301	**Applications Development Project IIIA**	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
	Identify the expected outcomes of the project.; Provide a well-documented description of the problem to; be addressed and why it is important.; Indicate the expected outcomes of the project, preferably; in measurable terms.; List key personnel who will work on the project and include their CV's; Describe how long (days, months) specific tasks or; components of the project will take.; Show the annual and overall cost of the project. A; detailed budget should be divided into categories such as; salaries, fringe benefits, travel, supplies, equipment, etc.; Construct a plan of action for how the objectives will be achieved. Draw up a checklist that provides the means to determine if the project has accomplished its objectives.		
ADPB301	**Applications Development Project IIIB**	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 24**
	Understanding and application of concepts in application; development Application Development Methodology; Agile/Scrum, Waterfall, RAD, etc. Introduction to Project; Management The project management and Information; Technology Context. The project management process; groups Project Integration Management, Project Scope; Management, Project Time Management, Project Cost; Management, Project Quality Management, Project Human; Resource Management.		
AIP402	**Advanced Image Processing**	**BICTH1**	**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.		
ALDS201	**Algorithms and Data Structures II**	**BINCT1**	**NQF: 6 HEQSF: 12**
	Basic analysis; Algorithmic strategies; Fundamental data structures and algorithms; Basic Automata, Computability and Complexity; Advanced Computational Complexity; Advanced Automata Theory and Computability; Advanced Data Structures Algorithms and Analysis.		
APDA101	**Applications Development 1A**	**DIIAD1;DIIAF1**	**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**	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
	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** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
APDB101	**Applications Development IB** Fields, Properties & Indexers; Constructors and Finalizes; Operators, Overloading and Conversions; Object Oriented Programming; Generic Types and Methods Collection Types; Delegates; Events; Language Integrated Query Essentials; Exceptions; Working with IO.	**DIIAD1;DIIAF1**	**NQF: 5 HEQSF: 12**
APDB201	**Applications Development IIB** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
APDB301	**Applications Development IIIB** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
APDP101	**Applications Development Project I** Fundamental knowledge of how to design, develop and; implement an application, Ability to test the application in; a live environment, Ability to incorporate limited; processing capabilities into the application, Create and; submit documentation for the web application in the form; of a report; Ability to apply logic and problem solving skills, Abilities to; synthesize knowledge from other learning areas into the; capstone project, Demonstrate and present the; application.	**DIIAD1;DIIAF1**	**NQF: 5 HEQSF: 12**
APDP201	**Applications Development Project II** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
APMC401	**Applied Mathematics for Computing A (Probability and Statistics)** Overview; Discrete probability; Continuous probability; Expectation; Stochastic processes; Sampling distributions; Estimation; Hypothesis tests; Correlation and regression.	**ADICT1**	**NQF: 7 HEQSF: 12**
APMC402	**Applied Mathematics for Computing B (Discrete Structures and Linear Algebra)** Sets, Relations, and Functions Propositional logic; Basic Logic used in mathematics and problem solving; Proof Techniques; Basics of Counting; Vector Algebra; Linear Algebra	**ADICT1**	**NQF: 7 HEQSF: 16**
APRE402	**Applied Research** 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.	**NQF: 8 HEQSF: 32**	**BICTH1**
AUED402	**Advanced User Experience Design** 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.	**BICTH1**	**NQF: 8 HEQSF: 16**
BFND101	**Business Fundamentals I** 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.	**BINCT1;DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
	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**	**BINCT1;DIIAD1;DIIAF1**	**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.		
BUIN301	**Business Intelligence III**	**ADICT1**	**NQF: 7 HEQSF: 16**
	Decision Making and Analytics: An Overview; Descriptive Analytics; Predictive Analytics; Prescriptive Analytics; Big Data and Future Directions for Business Analytics.		
BSIT301	**Business Intelligence III**	**BINCT1**	**NQF: 7 HEQSF: 16**
	Decision Making and Analytics: An Overview; Descriptive Analytics; Predictive Analytics; Prescriptive Analytics; Big Data and Future Directions for Business Analytics.		
CLCO401	**Cloud Computing**	**BICTH1**	**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.		
CMEP101	**Community Engagement Project**	**DIIAD1;DIIAF1**	**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 I**	**DIIAD1;DIIAF1**	**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.		
COAR201	**Computer Organisation and Architecture II**	**BINCT1**	**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**	**BINCT1;DIIAD1; HCINF1;DIIAF1**	**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.		
DAST401	**Data Structures**	**ADICT1**	**NQF: 7 HEQSF: 16**
	Abstract data structures; algorithms relevant to the data structures introduced; algorithmic analysis; algorithmic strategies		
DBAD102	**Database Administration**	**HCINF1**	**NQF: 5 HEQSF: 12**
	The nature of data, information and knowledge is explained; The characteristic data types and data flows within a range of organisations; The choice and manipulation of the appropriate data structures to represent information; The relationships between items of data held within records, files, arrays and other appropriate data structures; The related systems of data capture, data quality control and data storage devices; Basic field, record and file formats; The principal methods of Database Organization; The characteristics and uses of applications package database and explain the criteria for the selection of a package; Advantages and disadvantages of a database approach; Physical database designs; Logical data models.		
DSTR101	**Discrete Structures**	**BINCT1**	**NQF: 6 HEQSF: 16**
	Sets, Relations, and Functions Propositional logic; Basic Logic; Proof Techniques; Basics of Counting		
ECMR102	**E-Commerce**	**HCINF1**	**NQF: 5 HEQSF: 12**
	Business processes for e-Commerce; User interface principles for e-commerce websites; Backend processes to capture data; Promotion and Marketing principles and practices; Security of payments; Basic cyber law.		
ENSP101	**Entrepreneurial Spirit**	**BINCT1;DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
	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** Basic Security Principles & Terms; System Security; Human & Physical Security User Security; Malware; Policies/Procedures & Documentation; Basic Cryptography.	**DIIAD1;DIIAF1**	**NQF: 5 HEQSF: 8**
GLPP402	**Global Professional Practice** 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.	**BICTH1**	**NQF: 8 HEQSF: 16**
GRAP301	**Graphics III** 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.	**ADICT1**	**NQF: 7 HEQSF: 16**
GRPH301	**Graphics III** 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.	**BINCT1**	**NQF: 7 HEQSF: 16**
HCIN101	**Human Computer Interaction** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
HCIN301	**Human Computer Interaction III** HCI Concepts ; Human Centred Development ; Graphical User Interface Programming ; Multimedia Systems Development ; Interactive GUI Design ; Graphics and Visualization.	**ADICT1**	**NQF: 7 HEQSF: 16**
HCPI301	**Human Computer Interaction III** HCI Concepts ; Human Centred Development ; Graphical User Interface Programming ; Multimedia Systems Development ; Interactive GUI Design ; Graphics and Visualization.	**BINCT1**	**NQF: 7 HEQSF: 16**
HDWS102	**Hardware Support** Personal Computer Concepts; Operating System Fundamentals; Professional best practices for a PC Technician; Installing and configuring peripheral components; Installing and configuring system components; Maintaining and troubleshooting Peripheral Components; Troubleshooting system components; Installing and configuring Operating Systems; Maintaining and troubleshooting operating systems.	**HCINF1**	**NQF: 5 HEQSF: 12**
ICMS101	**Interpersonal Communication & Self** Fundamentals to Interpersonal Communication ; Interpersonal Communication Skills in Action; Dimensions of Interpersonal Relationships.	**BINCT1**	**NQF: 5 HEQSF: 8**
ICTL101	**Info & Comm. Tech Literacy & Skills** Basics of ICTs Hardware, Software, and Users Internet Search; Word Processing; Spreadsheets; Presentations; Referencing; Security, Legal, Ethical, and Societal Issues Economics of ICTs.	**DIIAD1;DIIAF1**	**NQF: 5 HEQSF: 8**
IEXP101	**Industry Exposure** 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.	**BINCT1**	**NQF: 7 HEQSF: 12**
ILGA101	**IT Logic & Technology IA** 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.	**DIIAF1**	**NQF: 5 HEQSF: 4**
ILGA201	**IT Logic & Technology IIA**	**DIIAF1**	**NQF: 5 HEQSF: 6**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
	Introduction to Programming; Levels / generations of Language Explore different Software Packages Introduce Programming Tool Syntax – Variable; Decision constructs; Repetition constructs.		
ILGB101	**IT Logic & Technology IB** Structured algorithms; Flowcharts Trace tables; Introduction to Compiler, programming language Loops; Arrays.	**DIIAF1**	**NQF: 5 HEQSF: 4**
ILGB20	**IT Logic & Technology IIB** Methods; 1D arrays; Objects and classes; GUI interface; Problem Solving using a programming tool.	**DIIAF1**	**NQF: 5 HEQSF: 6**
INAS201	**Information Assurance and Security II** Foundational Concepts in Security; Principles of Secure Design; Defensive Programming; Threats and Attacks; Network Security; Cryptography; Security Policy and Governance; Digital Forensics.	**BINCT1**	**NQF: 6 HEQSF: 16**
INCP101	**Introduction to Computing** 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.	**BINCT1**	**NQF: 5 HEQSF: 12**
INFM201	**Information Management II** Information Management Concepts and Fundamentals; Database Query Languages; Data Organization Architecture; Data Modelling; Managing the Database Environment; Special Purpose Databases.	**BINCT1**	**NQF: 6 HEQSF: 12**
INMA201	**Information Management IIA** 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.	**DIIAD1; DIIAF1**	**NQF: 6 HEQSF: 8**
INMB201	**Information Management IIB** Advanced Structured Query Language; Implementation Alternatives; Database Management.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 8**
INSS101	**Information Systems I** An Overview of systems analysis and design The role of the systems analyst Investigating systems requirements; Use Cases Domain Modelling; Extending the Requirements models.	**DIIAD1;DIIAF1**	**NQF: 5 HEQSF: 8**
INTG402	**Internet of Things** 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.	**BICTH1**	**NQF: 8 HEQSF: 16**
IPRT301	**Integrative Programming and Technology III** Intersystem Communications; Data Mapping and Exchange; Integrative Coding; Scripting Techniques; Software Security Practices.	**BINCT1**	**NQF: 7 HEQSF: 16**
ISYA201	**Information Systems IIA** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 8**
ISYA301	**Information Systems IIIA** The Scope of Software Engineering; The Software Process and its Attendant Problems Software Life-Cycle Models; Software Quality Assurance; Current Trends in Systems Development	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
ISYB201	**Information Systems IIB** The Software life cycle models; Software Security Software Maintenance; Agile development using SCRUM as a tool History of agile methods; Philosophy of agile methods.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 8**
ISYB301	**Information Systems IIIB** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
ITPM101	**IT Project Management**	**DIIAD1;DIIAF1**	**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.		
LWLF101	**Law for Life**	**BINCT1**	**NQF: 5 HEQSF: 8**
	Introduction; Civil and criminal law; Law of insurance; Road accident fund; Law of contract; Marriage; Succession.		
MAIN301	**Machine Intelligence III**	**ADICT1**	**NQF: 7 HEQSF: 16**
	Introduction to machine intelligence; Search Strategies; Knowledge Representation and Reasoning; Machine Learning; Intelligent Agents; Natural language processing; Computer vision.		
MCHI301	**Machine Intelligence III**	**BINCT1**	**NQF: 7 HEQSF: 16**
	Introduction to machine intelligence; Search Strategies; Knowledge Representation and Reasoning; Machine Learning; Intelligent Agents; Natural language processing; Computer vision.		
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.		
MCMA101	**Mathematics for Computing IA**	**BINCT1**	**NQF: 6 HEQSF: 12**
	Differential Calculus; Integral Calculus; Multivariate Calculus; Vector Algebra; Elementary Linear Algebra.		
MCMB101	**Mathematics for Computing IB**	**BINCT1**	**NQF: 6 HEQSF: 12**
	Overview, Discrete probability; Continuous probability; Expectation; Stochastic processes; Sampling distributions; Estimation; Hypothesis tests; Correlation and regression.		
MCPA201	**Mobile Computing IIA**	**DIIAD1;DIIAF1**	**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**	**DIIAD1;DIIAF1**	**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**	**DIIAF1;DIIAD1**	**NQF: 5 HEQSF: 6**
	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.		
NOPS201	**Networks and Operating Systems II**	**BINCT1**	**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.		
NWRK102	**Networking**	**HCINF1**	**NQF: 5 HEQSF: 12**
	Network Technologies; Installing and Managing Network Connections; Supporting Laptops and mobile Computing Devices; Supporting peripherals; Personal Computer Security Concepts and security.		
OGBH201	**Organisational Behaviour II**	**BINCT1**	**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;		

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
	Making Decisions; Leading People Within Organizations; Power and Politics; Organizational Structure and Change Organizational Structure; Organizational Culture Building a Customer Service Culture.		
OSYS101	**Operating Systems** Introduction to Operating Systems; Memory Management: Simple and Virtual Systems Processor Management; Process Management; Concurrent Processes Device Management File Management.	**DIIAD1;DIIAF1**	**NQF: 5 HEQSF: 12**
PBDE401	**Platform Based Development/ Platform Based Development III** Introduction to Platform-based development; Web Platforms; Mobile Platforms; Game Platforms; Industrial Platforms.	**ADICT1**	**NQF: 7 HEQSF: 16**
PBDV301	**Platform Based Development/ Platform Based Development III** Introduction to Platform-based development; Web Platforms; Mobile Platforms; Game Platforms; Industrial Platforms.	**BINCT1**	**NQF: 7 HEQSF: 16**
PDCO301	**Parallel and Distributed Computing III** Parallelism fundamentals; Parallel Decomposition; Communication and Coordination; Parallel Algorithms, Analysis, and Programming; Parallel Architecture; Parallel Performance; Distributed Systems.	**ADICT1**	**NQF: 7 HEQSF: 16**
PDCP301	**Parallel and Distributed Computing III** Parallelism fundamentals; Parallel Decomposition; Communication and Coordination; Parallel Algorithms, Analysis, and Programming; Parallel Architecture; Parallel Performance; Distributed Systems.	**BINCT1**	**NQF: 7 HEQSF: 16**
PJMN301	**Project Management III** Introduction to PM and IT PM; Planning; Schedule/time management; Cost management; Quality management; Human resource management Communications management; Risk management.	**BINCT1**	**NQF: 7 HEQSF: 16**
PRESE4R	**Principles of Research** 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.	**BICTH1**	**NQF: 8 HEQSF: 16**
PRJA301	**Project IIIA** 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.	**BINCT1**	**NQF: 7 HEQSF: 8**
PRJB301	**Project IIIB** 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.	**BINCT1**	**NQF: 7 HEQSF: 12**
PRLN201	**Programming Languages II** Introduction; Program Representation; Language Translation and Execution ; Syntax Analysis; Compiler Semantic Analysis; Code Generation; Runtime Systems; Static Analysis.	**BINCT1**	**NQF: 6 HEQSF: 12**
RESK401	**Research skills** Introduction to research; Research ethics; Information sources and retrieval; Literature review; Research process; Quantitative research design; Qualitative research design.	**ADICT1**	**NQF: 7 HEQSF: 12**
SADS201	**Systems Analysis and Design II** 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.	**BINCT1**	**NQF: 6 HEQSF: 12**
SAMA301	**Strategy Acquisition and Management III** 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.	**ADICT1**	**NQF: 7 HEQSF: 16**
SAQM301	**Strategy Acquisition and Management III** 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.	**BINCT1**	**NQF: 7 HEQSF: 16**
SFEN301	**Software Engineering III**	**BINCT1**	**NQF: 7 HEQSF: 16**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
	Software Processes; Software Project Management; Tools and Environments; Requirements Engineering; Software Design; Software Construction; Software Verification Validation; Software Evolution.		
SKDA101	**Skills Development IA** Academic Literacy; Information Literacy Language Skills Numeracy.	**DIIAF1**	**NQF: 5 HEQSF: 3**
SKDA201	**Skills Development IIA** Basic Accounting Skills Accounting concepts Basic Business Skills.	**DIIAF1**	**NQF: 5 HEQSF: 5**
SKDB101	**Skills Development IB** Business English; Communication; Life Skills.	**DIIAF1**	**NQF: 5 HEQSF: 3**
SKDB201	**Skills Development IIB** Business Processes; Enterprise Systems Knowledge for Business Sales processes; Purchasing processes; ERP foundation scenarios using SAP.	**DIIAF1**	**NQF: 5 HEQSF: 5**
SLDV102	**Solutions Development** Structured programming techniques; Objects and Data Types; Operators: Assignment, Logic, Arithmetic, etc; Decision Structures; Selection Statements: If/Nested If/Select Case; Loops; Data validation; Validation/Error/Exception Handling: If statements; Modular programming.	**HCINF1**	**NQF: 5 HEQSF: 12**
SODM401	**Software Development and Management** Software Processes; Software Project Management; Tools and Environments; Requirements Engineering; Software Design; Software Construction; Software Verification Validation; Software Evolution	**ADICT1**	**NQF: 7 HEQSF: 16**
SPRI301	**Social and Professional Issues III** Social context of computing; Analytical Tools; Professional Ethics; Legal protection and personal privacy; Professional Communication; Sustainable computing.	**BINCT1**	**NQF: 7 HEQSF: 16**
SWSP102	**Software Development Fundamentals** Installing and configuring an operating system; Creating and implementing systems policies; Creating and managing partitions, file systems and fault-tolerant volumes; Supporting running applications under a windows operating system; Recognise problems related to boot processes; Viruses and malware; Determine appropriate action for troubleshooting	**HCINF1**	**NQF: 5 HEQSF: 12**
SWSP102	**Software Support** Installing and configuring an operating system; Creating and implementing systems policies; Creating and managing partitions, file systems and fault-tolerant volumes; Supporting running applications under a windows operating system; Recognise problems related to boot processes; Viruses and malware; Determine appropriate action for troubleshooting	**HCINF1**	**NQF: 5 HEQSF: 12**
SYSF101	**Systems Fundamentals** Computational Paradigms; Cross-Layer Communications; State and State Machines; Parallelism; Evaluation; Resource Allocation and Scheduling; Proximity; Virtualization and Isolation; Reliability through Redundancy; Quantitative Evaluation.	**BINCT1**	**NQF: 5 HEQSF: 12**
TIPP301	**Theory of ICT Professional Practice III** 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.	**DIIAD1;DIIAF1**	**NQF: 6 HEQSF: 12**
VSSE401	**Virtual Systems and Services** 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).	**BICTH1**	**NQF: 8 HEQSF: 16**
WBTC102	**Web Technology** Internet principles; Web development tools; Using a package to create sound and animations; Security.	**HCINF1**	**NQF: 5 HEQSF: 12**
WEBP102	**Web Project** Internet principles; Web development tools; Using a package to create sound and animations; Security.	**HCINF1**	**NQF: 5 HEQSF: 24**
WMSD401	**Web and Mobile Systems Development** 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.	**BICTH1**	**NQF: 8 HEQSF: 16**

SUBJECT CODE	NAME	QUALIFICATION CODE/S	CREDITS
WSYT301	**Web Systems and Technology III**	**BINCT1**	**NQF: 7 HEQSF: 16**
	Web Technologies; Information Architecture; Digital Media; Web Development; Vulnerabilities		