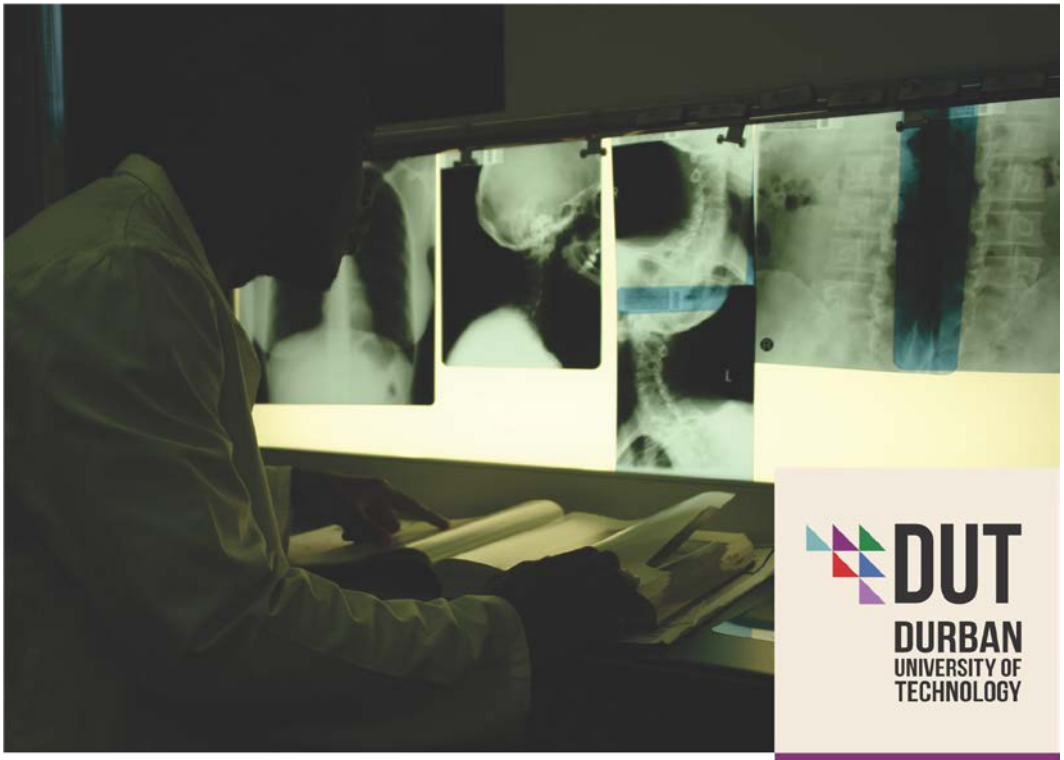

DUT
DURBAN UNIVERSITY OF TECHNOLOGY

FACULTY OF HEALTH SCIENCES

2016 HANDBOOK
RADIOGRAPHY

HANDBOOK FOR 2016

FACULTY OF HEALTH SCIENCES

DEPARTMENT of RADIOGRAPHY

The above department offers four programmes

- Diagnostic Radiography
- Nuclear Medicine
- Radiotherapy
- Diagnostic Sonography

This handbook offers information on all four programmes.

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.

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.

IMPORTANT NOTICES

The rules in this Departmental handbook must be read in conjunction with the General Rules (G Rules) contained in the DUT General Handbook for Students as well as the relevant subject Study Guides.

Your attention is specifically drawn to Rule G1 (8), and to the process of dealing with students issues

FACULTY of HEALTH SCIENCES
FACULTY VISION, MISSION, GOALS & VALUES
(November 2012 for 2013 - 2017

Vision
The vision of the Faculty of Health Sciences at the Durban University of Technology is to be a leading Faculty in transformative and innovative education for health professionals, guided by National imperatives and a strong commitment to socially responsive education. We will strive to excellence in professional and teaching scholarship, as well as in the development of National and global linkages in education, and in the research and development of health.

Mission Statement
Within a value —driven centered ethos, the Faculty is committed to develop, quality health professionals that are practice oriented; receptive and responsive to health care needs of the people of South Africa and Africa as a whole. This will be achieved by providing the highest standards of learning, teaching, research, and community engagement, underpinned by a commitment to creating space for students and staff to succeed.

Goals
The Faculty aims to:
1. Respond to National human resource and industry needs within the health sector.
2. Ensure the offering of entrepreneurial and leadership skills as a core component of all programmes within the Faculty of Health Sciences.
3. Continue to develop community based projects to foster social responsibility through collaborative projects between programmes.
4. Enhance established quality management frameworks to support teaching and learning.
5. Develop applied research that is responsive to community and industry needs.
6. Develop mechanisms for the dissemination and application of research outcomes to inform teaching and learning, assessment, community engagement and further research.
7. Improve research participation and output through increased post graduate student enrolment, publications and establishment of research groups.
8. Enable the generation of third stream income through research and innovation (patents and or / artifacts) in order to supplement existing sources of income for the next five years.
9. Attract and retain diverse quality staff while promoting advancement of individual potential.
10. Position DUT Health Sciences Nationally.

Values

- The Faculty is guided by the following core values:
- Transparency, openness, honesty, and shared governance
- Professional and personal respect for others
- Educational relevance, equity and transformation (curriculum, access and success)
- Loyalty, accountability, dignity and trust

DEPARTMENTAL MISSION & GOALS

Mission:

The Department is committed to promoting a values-driven ethos sustainable with industry, community and society; by developing quality health professionals that are practice oriented, receptive and responsive to the health care needs of the people of South Africa and Africa as a whole by providing the highest standards of teaching, learning and community engagement underpinned by a commitment to empowering staff and students to succeed.

Goals:

- To be a leading Department of Radiography that exists to embrace the holistic education of the student by:
- Providing advancement of knowledge, skills and attitudes to enable effective teaching, learning, research, community engagement and entrepreneurship, thereby,
- Producing quality radiographers that will become useful members of society, and by this means,
- Serving the needs of the community and industry within a regional, national and global context.

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DEPARTMENTAL AND FACULTY CONTACT DETAILS

All departmental queries to:

Secretary:	Mrs Zamanguni Gumede
Tel No:	031 3732450
Fax No:	0865508774
Email:	zamangunig@dut.ac.za
Location of department:	DH1102, Ritson Campus, Durban

All Faculty queries to:

Faculty officer:	Mr Vikesh Singh
Tel No:	031 3732701
Fax No:	031 3732407
Email:	vikeshs@dut.ac.za
Location of Faculty office:	Gate 8, Ritson Campus, Steve Biko Road, Mansfield Site Area

Executive Dean:	Professor Threethambal Puckree
Executive Dean's Secretary	Mrs Bilkish Khan
Tel No:	031 3732704
Fax No:	031 3732620
Email:	bilkishk@dut.ac.za
Location of Executive Dean:	Gate 6, Ritson Campus, Steve Biko Road, Floor above the Faculty office

2. STAFFING	Name and Qualification
Head of Department:	Mrs R Sunder MTech: Rad (DUT); Project Management (DUT)
Senior Lecturer:	Mrs S Naidoo Master of Applied Sciences (USyd); ND: Rad: D; HED: Tech (UNISA)
Lecturers:	Mr NP Gam MTech: Rad: D (DUT)
	Mrs PB Nomnga MTech: Rad (UJ); ND: Rad: D; Master in Business Leadership (UNISA)
	Mr T Motaung MBA (DUT), BTech: Rad: D
Specialist Instructors	Mrs ZC Dludla-Hlubi BTech: Rad: US (TN); HDE (UKZN)
Clinical Instructors	Mrs P Kismath ND: Rad: D (TN); ND: Rad: RT (TN)
	Ms RM Naidoo BTech: Rad (DUT)
	Mrs A Nothling ND: Rad: D (CPUT)
	Mrs NP Khuluse B Tech: Rad: US (TN) ND: Rad: US
	Mrs N Shaik B.Tech: Rad: D (TN) ND: Rad: D
Technical Staff/Technician	Miss P Ngwenya ND: Office Management (DUT)
Admin Assistant	Mrs LN Zwane B Tech: Business Administration ND: Public Management

3. DEPARTMENTAL INFORMATION & RULES

3.1. Programmes offered by the Department

This Department offers four programmes, namely;

- Diagnostic Radiography
- Nuclear Medicine
- Radiotherapy
- Diagnostic Sonography

3.2. Qualifications offered by the Department

Learning programmes are offered in this Department which will, upon successful completion, lead to the award of the following qualifications:

QUALIFICATION	Qual. Code	SAQA Qual ID Number	Important Dates
ND: Radiography: Diagnostic: Mainstream ND: Radiography: Diagnostic: ECP ND: Radiography: Nuclear Medicine ND: Radiography: Therapy ND: Radiography: Ultrasound	NDRDD1 NDRDF1 NDRDN1 NDRDT1 NDRDU1	72258 72258 72259 72260 79386	Teach-out date - 2019
BTech: Radiography: Diagnostic BTech: Radiography: Nuclear Medicine BTech: Radiography: Therapy BTech: Radiography: Ultrasound	BTRAD1 BTRDN1 BTRDT1 BTRDU1	73690 73690 73690 73690	Teach-out date - 2019
Bachelor of Health Sciences in Diagnostic Radiography Bachelor of Health Sciences in Diagnostic Sonography Bachelor of Health Sciences in Nuclear Medicine Bachelor of Health Sciences in Radiotherapy	BHDRD1 BHDSN1 BHNMD1 BHRDT1	94832 94679 94803 94800	
Master of Health Sciences in Radiography	MHRAD1	72200	
Doctor of Radiography	DRRAD1	72111	

3.3. Departmental Information

3.3.1. Academic Integrity

Please refer to the General Rules pertaining to academic integrity G13 (1)(0). These will be enforced wherever necessary to safeguard the worthiness of our qualifications, and the integrity of the Faculty of Health Sciences at the DUT.

3.3.2. Code of Conduct for Students

In addition to the General Rules pertaining to Student Conduct SR3(3), a professional code of conduct pertaining to behaviour, appearance, personal hygiene and dress shall apply to all students registered with the Faculty of Health Sciences, at all times. Refer to the Radiography WIL Code of Conduct for the additional requirements for the Radiography clinic and/or clinical training centres.

3.3.3. Uniforms

Students must adhere to instructions regarding specific uniforms required during practicals and hospital/clinic sessions. Uniform specifications are supplied by the Department and all orders are placed with the preferred supplier who will take measurements on campus during the orientation week. Refer to the WIL Code of Conduct for more details.

3.3.4. Attendance

Students are encouraged to achieve 100% attendance for all planned academic activities as these are designed to provide optimal support for the required competencies. Where absence is unavoidable, the student must timeously advise the Department of the reason. Only exceptional reasons will be accepted for absence from guest lectures, industry or field trips. Poor attendance records may lead to penalties.

3.3.5. Health and Safety

Students must adhere to all Health and Safety regulations both while at DUT and in WIL placements. Failure to do so will be treated as a breach of discipline.

3.3.6. Lectures

Lectures are offered at the Ritson and Steve Biko Campuses of the DUT. Clinical training / placement could be in any HPCSA accredited clinical training centre in KwaZulu-Natal. Lectures are conducted during the day; however some lectures may be conducted during the evenings and on weekends.

3.3.7. Work Integrated Learning (WIL)

All diploma students have to register for experiential training/WIL each year. The compulsory WIL component, which comprises a minimum of 2500 hours over the three-year cycle, is required in order to complete the National Diploma qualifications. The Department of Radiography's WIL hours may exceed the minimum hours recommended by the Health Profession Council of South Africa (HPCSA).

The Bachelor of Health Sciences' qualifications will also have a WIL component which will be detailed in the study guide. Student placement at the HPCSA accredited clinical training centres will be the responsibility of the Department of Radiography at the DUT. However, all travel, accommodation, uniform and other related costs would be the responsibility of the student. These need to be budgeted for prior to registration. All rules and regulations associated with attendance, behaviour, and attitude of students during WIL will be adhered to (refer to WIL Code of Conduct). Disciplinary action will be taken when the WIL Code of Conduct is contravened. (Verbal and written warnings, as well as possible expulsion will be the consequences of any individual who does not respect the rules and regulations whilst a registered student in any programme).

3.3.8. Assessment and Moderation

The continuous (ongoing) assessment method is used for all subjects in all the programmes. As such, there are no Final and Supplementary examinations. The results for these subjects are determined through a weighted combination of assessments, which includes theory and practical assessments; individual and group assignments/projects; written and oral presentations; portfolios and OSCEs. Students are encouraged to work steadily through the period of registration in order to achieve the desired academic results. The assessment plan/schedule for each subject is included at the back of this handbook. Moderation follows the DUT assessment policy and assessment guidelines. Detailed information on each subject can be found in the relevant subject study guides. A student who fails a subject more than once is deemed to be making unsatisfactory academic progress and may not be allowed to re-register for the subject.

3.3.9. Special Tests and Condonement

No summative assessments will be condoned. Summative means all assessment marks that contribute to the final mark of a subject.

- If a student misses a summative written, oral or practical test, for reasons of illness, a special test may be granted if the student provides a valid medical certificate specifying the nature and duration of the illness, and a declaration that for health reasons it was impossible for the student to complete an assessment. This certificate must be submitted to the programme coordinator, no later than one week after the date of the missed assessment.
- In addition, a special test may be granted to students with borderline academic results.
- The special assessment may take the form of an oral, may be set at the end of the period of registration, and may include a wider scope of work than the original assessment.
- Any student who misses an assessment and who does not qualify for a special assessment, and any student who qualifies for a special assessment but fails to write it, shall be awarded a zero mark for the missed assessment.
- A student who qualifies for a special test granted for borderline academic results, but fails to write it, or achieves lower than their original results, shall be awarded their original results.

3.3.10. Student Appeals

Rule G1 (8), in the DUT General Handbook applies.

SECTION A: UNDERGRADUATE QUALIFICATIONS

4. NATIONAL DIPLOMA: RADIOGRAPHY: Diagnostic, Nuclear Medicine, Therapy, Ultrasound

4.1 Programme Information

Diagnostic Radiography
Radiography is the creation of radiographs; photographs made by exposing a photographic film or other image receptors to X-rays. Since X-rays penetrate solid objects, but are slightly attenuated by them, the picture resulting from the exposure reveals the internal structure of the object. A radiographer should be able to apply scientific knowledge and technologies, applicable to the clinical presentation, for the production of optimum image quality in a chosen elective; be able to plan, develop and apply total quality management with consideration for equipment, human resources, quality assurance and health care needs; be able to manage a radiographic service; be able to apply research skills and principles, and be able to apply advanced ethical principles to daily practice.

Nuclear Medicine
This is a medical specialty that uses small amounts of radioactive substances to show the function of a body organ, as well as its anatomy. It has diagnostic as well as therapeutic applications. Nuclear medicine technologists administer radiopharmaceuticals to patients and then monitor the characteristics and functions of tissues or organs in which the drugs localize, with the use of specialized equipment. The radiographers also perform a number of laboratory related procedures. They should be able to apply scientific skills and technologies to the clinical presentation for the production of optimum image quality in the specialised fields and research units of Nuclear Medicine. They need to also plan, develop and manage a nuclear medicine department as well as apply strategic management and administration to ensure a quality Nuclear Medicine service.

Radiotherapy
Treatment of disease with radiation, especially by selective irradiation with x-rays or other ionizing radiation and by ingestion of radioisotopes. Radiotherapy radiographers deliver doses of X-rays and other ionising radiation to patients, many of whom are suffering from various forms of cancer. Radiotherapy radiographers may be involved in the care of the cancer patient from the initial referral clinic stage, where pre-treatment information is given, through the planning process, treatment and eventually post-treatment review (follow-up) stages.

Diagnostic Sonography

Ultrasound uses high-frequency sound waves and a computer to create images of blood vessels, tissues, and organs. An ultrasonographer is a radiographer who is qualified to perform abdominal and transvaginal ultrasound to determine the size, shape and dimensions of pelvic organs, ovarian follicle production, and the existence of tumours,

enlargements or inflammations. Doppler and 3-D ultrasound help identify pathologies such as gallstones, kidney stones, cancers, hematomas and tumours. . An ultrasound radiographer must operate various types of diagnostic ultrasound equipment and care for patients competently. He or she does not make a diagnosis, as this falls within the scope of a qualified doctor such as a radiologist, obstetrician, surgeon or physician. The ultrasound radiographer reports his or her findings.

4.2 Learning Programme Structure

NATIONAL DIPLOMA: Radiography: Diagnostic, Nuclear Medicine, Therapy, and Ultrasound (3yr Minimum). Listed below are the 6 common subjects for all four programmes (excluding the extended curriculum programme)

Code	Subjects	Year of Study	*CA/E	Credits	Pre-requisition
ANAT101	Anatomy I	1	CA	18	None
PHSI101	Physiology I	1	CA	18	None
RSCI101	Radiation Sciences I	1	CA	24	None
PDPM101	Psychodynamics of Patient Management I	1	CA	12	None
RSCI201	Radiation Sciences II	2	CA	42	RSCI101
RPAT201	Radiographic Pathology II	2	CA	24	ANAT101; PHSI101

NATIONAL DIPLOMA: Radiography: Diagnostic.
Includes the 6 common subjects plus the 11 subjects listed below.

Code	Subjects	Year of Study	*CA/E	Credits	Pre-requisition
RPRA101	Radiographic Practice 1D	1	CA	24	None
CRPR101	Clinical Radiographic Practice I D	1	CA	24	None
EXRD101	Experiential Learning: D (Year 1)	1	CA	-	None
RPRD201	Radiographic Practice II D	2	CA	30	RPRA101; CRPR101
CRPD201	Clinical Radiographic Practice II D	2	CA	24	RPRA101; RSCI101; CRPR101
EXRD201	Experiential Learning: D (Year 2)	2	CA	-	None
RSCI301	Radiation Sciences III	3	CA	30	RSCI201
RMGT301	Radiographic Management III	3	CA	12	RPRD201; CRPD201
RPRD301	Radiographic Practice III D	3	CA	42	RPRD201; RPAT201; CRPD201
CRPD301	Clinical Radiographic Practice III D	3	CA	36	RPRD201; RPAT201; CRPD201
EXRD301	Experiential Learning: D (Year 3)	3	CA	-	None

NATIONAL DIPLOMA: Radiography: Nuclear Medicine.

Includes the 6 common subjects plus the 11 subjects listed below.

Code	Subjects	Year of Study	*CA/E	SAQA Credits	Pre-req
RPRA101	Radiographic Practice 1NM	1	CA	24	None
CRPR101	Clinical Radiographic Practice 1NM	1	CA	24	None
EXRN101	Experiential Learning: NM (Year 1)	1	CA	-	None
RPRN201	Radiographic Practice II NM	2	CA	30	RPRA101; CRPR101
CRPN201	Clinical Radiographic Practice II NM	2	CA	24	RPRA101; RSCI101; CRPR101
EXRN201	Experiential Learning: NM (Year 2)	2	CA	-	None
NMIN301	Nuclear Medicine Instrumentation III	3	CA	30	RSCI201
RPHM301	Radiopharmacy III	3	CA	12	RPRN201; CRPN201
RPRN301	Radiographic Practice III NM	3	CA	42	RPRN201; RPAT201; CRPN201
CRPN301	Clinical Radiographic Practice III NM	3	CA	36	RPRN201; RPAT201; CRPN201
EXRN301	Experiential Learning: NM (Year 3)	3	CA	-	None

NATIONAL DIPLOMA: Radiography: Therapy.

Includes the 6 common subjects plus the 12 subjects listed below.

Code	Subjects	Year of Study	*CA/E	SAQA Credits	Pre-req
RPRA101	Radiographic Practice I T	1	CA	24	None
CRPR101	Clinical Radiographic Practice I T	1	CA	24	None
EXRT101	Experiential Learning: T (Year 1)	1	CA	-	None
RPRT201	Radiographic Practice II T	2	CA	30	RPRA101; CRPR101
CRPT201	Clinical Radiographic Practice II T	2	CA	24	RPRA101; RSCI101; CRPR101
EXRT201	Experiential Learning: T (Year 2)	2	CA	-	None
RSCT301	Radiation Sciences III T	3	CA	30	RSCI201
RBIO301	Radiobiology III		CA	18	RSCI201
APST301	Applied Psychology III	3	CA	12	RPRT201; CRPT201
RPRT301	Radiographic Practice III T	3	CA	30	RPRT201; RPAT201; CRPT201
CRPT301	Clinical Radiographic Practice III T	3	CA	30	RPRT201; RPAT201; CRPT201
EXRT301	Experiential Learning: T (Year 3)	3	CA	-	None

NATIONAL DIPLOMA: Radiography: Ultrasound.
Includes the 6 common subjects plus the 10 subjects listed below.

Code	Subjects	Year of Study	CA/E	Credits	Pre-req
RPRA101	Radiographic Practice I US	1	CA	24	None
CRPR101	Clinical Radiographic Practice I US	1	CA	24	None
EXRU101	Experiential Learning: US (Year 1)	1	CA	-	None
RPRU201	Radiographic Practice II US	2	CA	30	RPRA101; CRPR101
CRPU201	Clinical Radiographic Practice II US	2	CA	24	RPRA101; RSCI101; CRPR101
EXRU201	Experiential Learning: US (Year 2)	2	CA	-	None
UPEQ301	Ultrasound Physics & Equipment III	3	CA	24	RSCI201
RPRU301	Radiographic Practice III US	3	CA	48	RPRU201; RPAT201; CRPU201
CRPU301	Clinical Radiographic Practice III US	3	CA	48	RPRU201; RPAT201; CRPU201
EXRU301	Experiential Learning: US (Year 3)	3	CA	-	None

4.3 Programme Rules

4.3.1 Minimum Admission Requirements

The following information applies to all four National Diplomas: Diagnostic, Nuclear Medicine; Therapy and Ultrasound.

Minimum admission requirements:

	Senior Certificate		NSC
COMPULSORY SUBJECTS	**HG**	**SG**	**Rating**
English (1st Additional language)	E	C	3
Biology/Life Sciences	D	B	4
Mathematics	D	B	4
Physical Sciences	D	B	4

4.3.2 Admission requirements based upon Work Experience, Age and Maturity and RPL

The DUT general rules G7 (3) and G7 (8) respectively, will apply.

4.3.3 Admission of International students

The DUT's Admissions Policy for International Students and General Rules G4 and G7 (5) will apply.

4.3.4 Selection Criteria

- All applicants must apply through the Central Applications Office (CAO).
- The initial selection is based on the applicant's academic performance in Grade 12 (Grade 11 or Grade 12 trial marks will be used for current matriculants), with a minimum of 28 academic points.

- All the applicants that meet the above requirement must complete eight (8) hours of voluntary service in a Radiography clinical environment.
- The candidates will then write reports on their observations and experiences whilst in the clinical environment, as well as reasons for choosing radiography as a career.
- All the applicants that have successfully completed the above stages will be invited to sit for a placement testing.
- On the basis of the placement test results successful candidates may be invited to the interview process.
- Candidates that are successful in the interview process may be provisionally accepted into the programme pending their final Senior Certificate (SC) or National Senior Certificate (NSC) results.
- In the event that the final Grade 12 SC/NSC results do not meet the minimum entrance requirements, this provisional acceptance will be withdrawn.
- Final Selection for placement will be based on the SC / NSC results and using the following ranking scale:

Ranking Scale:

Assessment	**Weighting**
Results of the Senior Certificate (SC) of National Senior Certificate (NSC)	30%
Written Essays	20%
Eight (8) hour Hospital Visits	5%
School/work characteristic questionnaire	10%
Department Interview	35%

4.3.5 Pass Requirements

Notwithstanding the DUT pass requirements (G14 and G15), and those detailed as follows, students are encouraged to apply themselves to their learning, and strive for the best academic results possible in order to adequately prepare themselves for their future careers, and to maximize possible employment opportunities. A student must pass all pre-requisite subjects before he/she is admitted to the next level. Notwithstanding anything contrary to the General Rules, no supplementary examinations shall be available for any continuous assessment subject in this Department.

4.3.6 Re-registration Rules

In addition to Rule G16, the following programme rule applies:
A first year student who fails with a final mark of less than 40% in each of three failed subjects will not be allowed to re-register for the programme. This rule is also to be read in conjunction with Rule G6 from the General Rule Book for students.

4.3.7 Interruption of Studies

In accordance with Rule G21A(b), the minimum duration for this programme will be three (3) years of registered study and the maximum duration will be five (5) years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the Department for permission to re-register and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

4.3.8 Exclusion Rules

Rule G17 in the Student General Handbook applies.

4.3.9 Work Integrated Learning (WIL)

All students are required to complete WIL in the workplace as part of their training. Placements are coordinated and managed by the Department of Radiography and students may be placed in any of the HPCSA accredited training facilities situated in KwaZulu-Natal. Some facilities are outside of the Durban area and students will be required to arrange their own transport and accommodation where necessary.

The student must comply with the rules and regulations as set out in the clinical environment where placed. The student must adhere to rules and regulations, as indicated in the WIL Code of Conduct. A student shall achieve the required level of clinical competency, determined by the employers/ clinical training centres and Department, before application for the issuing of the diploma will be made. This includes completion of the required clinical hours.

4.3.10 Registration as a radiation worker

- It is mandatory that all students are registered as trainee radiation workers with the Radiation Protection Services at SABS. The following are requirements for registration:
- First year students must undergo medical examinations – blood, urine and eye testing as well as a chest x-ray, within a period of 30 days preceding registration as a trainee radiation worker.
- First time entering female students are required to sign a declaration that they are not pregnant at the time of registration. Should it be ascertained that a student was pregnant at the time of first registering; such student will have to deregister from the programme with immediate effect.
- Any returning student who may be or suspects that she is pregnant must notify the HOD immediately, in order to ensure that appropriate safety

measures are taken both in the Radiography clinic and during clinical training. Students who fail to disclose their pregnancy absolve the DUT from any consequences of non- disclosure.

- A pregnant student may need to be exempt from certain clinical training placements in the radiography clinic and clinical training centres, which may extend their clinical training completion time.
- All pregnant students must comply with the standard radiation monitoring requirements and in addition, use a direct reading pocket alarm dosimeter.
- The event of a radiation occurrence to a student may result in a delay of completion of the student's studies.

4.3.11 Registration with the Professional Board

As a Student: Within two weeks of registration with the Department, students are required to apply for registration as Student Radiographers with the Health Professionals Council of South Africa (HPCSA) as determined in the regulations set out in the Health Professions Act, 1974 (Act 56 of 1974) [Government Notice R1855 (Dated 16/9/77); No R 1379 (12/7/94)].This is the responsibility of the student.

As a Graduate: On successful completion of the qualification and required WIL, and who has satisfied the requirements of the Professional Board for Radiography may register as a qualified Radiographer (Community service) with the HPCSA. After completion of the compulsory one year of community service, the registration must be changed to "Independent Practice". This is the sole responsibility of the graduate.

4.3.12 Minimum and maximum duration of study

In accordance with the DUT Rule G21 A (2)* and Rule G21A (3)*, the minimum duration of study is three (3) years, and the maximum duration will be five (5) years of registered study, including any periods of work integrated learning.

4.3.13 Assessment and Moderation

The continuous (on-going) assessment method is used for all subjects in all the programmes. As such, there are no final and supplementary examinations. The results for these subjects are determined through a weighted combination of assessments, which includes theory and practical assessments; individual and group assignments/projects; written and oral presentations; portfolios and OSCEs. Students are encouraged to work steadily through the period of registration in order to achieve the desired academic results. Moderation is aligned to the DUT assessment policy and assessment guidelines. Detailed information can be found in the relevant subject study guides. A student who fails a subject more than once is deemed to be making unsatisfactory academic progress and may not be allowed to re-register for the subject.

4.3.14 Special Tests and Condonements.

- No summative assessments will be condoned. Summative means all assessment marks that contribute to the final mark of a subject.
- If a student misses a summative written, oral or practical test, for reasons of illness, a special test may be granted if the student provides a valid medical certificate specifying the nature and duration of the illness, and a declaration that for health reasons it was impossible for the student to complete an assessment. This certificate must be submitted to the programme coordinator, no later than one week after the date of the missed assessment.
- In addition, a special test may be granted to students with borderline academic results.
- The special assessment may take the form of an oral, may be set at the end of the period of registration, and may include a wider scope of work than the original assessment.
- Any student who misses an assessment and who does not qualify for a special assessment, and any student who qualifies for a special assessment but fails to write it, shall be awarded a zero mark for the missed assessment.
- A student who qualifies for a special test granted for borderline academic results, but fails to write it, or achieves lower than their original results, shall be awarded their original results.

5 NATIONAL DIPLOMA: Radiography: Diagnostic-Extended Curriculum Programme (ECP)

5.1 Programme Information

This programme has been designed to help certain students to be successful in their studies at DUT. The students will complete their first year over two years and will be helped with academic and other support that will be integrated into their normal academic work.

5.2 Programme Structure

Subject code	Subject	Year of Study	*CA/E	Nated Credits	Pre-requisite
ANAT101	Anatomy I	1	CA	0.150	**None**
PHSI101	Physiology I	1	CA	0.150	
PDPM101	Psychodynamics of Patient Management	1	CA	0.100	
IRPP101	Introduction to Radiographic Practice and Procedures	1	CA	0.200	
	General Education 101	1	CA	0.400	
RPRA101	Radiographic Practice I	2	CA	0.100	**None**
CRPR101	Clinical Radiographic Practice I D	2	CA	0.150	
RSCI101	Radiation Sciences I	2	CA	0.050	
EXRR101	Experiential Learning (Year 1)	2	CA	-	
IRPP201	Introduction to Radiographic Procedures, Practice and Pathology	2	CA	0.100	
	General Education 201	2	CA	0.300	
RPRD201	Radiographic Practice II	3	CA	0.150	*All first level subjects.*
RSCI201	Radiation Sciences II	3	CA	0.200	
RPAT201	Radiographic Pathology II	3	CA	0.150	
CRPD201	Clinical Radiographic II D	3	CA	0.150	
EXRR201	Experiential Learning (Year 2)	3	CA	-	
RMGT301	Radiographic Management III (D)	4	CA	0.150	*All first and second level subjects.*
RSCD301	Radiation Sciences III (D)	4	CA	0.150	
RPRD301	Radiographic Practice III (D)	4	CA	0.15	
CRPD301	Clinical Radiographic Practice III (D)	4	CA	0.20	
EXRR301	Experiential Learning (Year 3)	4	CA	-	

* CA= Continuous Assessment/E= Examination

5.3 Programme Rules

5.3.1 Minimum Admission Requirements.

Students applying for the National Diploma in Diagnostic Radiography: ECP must comply with the minimum entrance requirements listed in the table below.

Compulsory Subjects	NSC Rating	Senior Certificate (SC)	
		HG	SG
English (1st additional)	3	E	C
Life Sciences	4	D	B
Physical Science	4	D	B
Mathematics	4	D	B

5.3.2 Admission requirements based upon Work Experience, Age and Maturity and RPL.

The DUT General Rules G7 (3) and G7 (8) will apply for admission requirements based upon Work Experience, Age and Maturity and Recognition of Prior Learning.

5.3.3 Admission of International Students.

The DUT's Admissions Policy for International Students and General Rules G4 and G7 (5) will apply for admission of International students.

5.3.4 Selection Criteria.

In accordance with Rule G5, acceptance into the ECP programme is limited
All applicants must apply through the Central Applications Office (CAO).
The initial selection is based on the applicant's academic performance in Grade 12 (Grade 11 or Grade 12 trial marks will be used for current matriculants).
All the applicants that meet the above requirements must complete eight (8) hours of voluntary service in a Radiography clinical environment.
The candidates will then write reports on their observations and experiences whilst in the clinical environment, as well as reasons for choosing radiography as a career.
All the applicants that have completed the above stages will be invited to sit for a placement testing.
On the basis of the placement test results successful candidates will be invited to the interview process.
Candidates that are successful in the interview process will be provisional accepted into the programme pending their final National Senior Certificate (NSC) results.
If the final Grade 12 NSC results do not meet the minimum entrance requirements, this provisional acceptance will be withdrawn.
Final selection for placement will be based on the SC / NSC results and using the ranking scale.

5.3.5 Pass Requirements.

Notwithstanding the DUT pass requirements (G14 and G15). Students registered in the extended curriculum program, will only be eligible for subsequent registration provided that:

5.3.5.1 The following non- credit bearing subjects are passed at their first attempt:

- Introduction to Radiographic Practice & Procedures
- General Education 101

5.3.5.2 At least one of the following credit-bearing subjects are passed in the first year.

- Anatomy I
- Physiology I
- Psychodynamics of Patient Management

Notwithstanding anything contrary to the General Rules, no supplementary examinations shall be available for any continuous assessment subject in this Department. From level 2 the normal progression rules as per the three year National Diploma programme will apply.

5.3.6 Registration Rules

In addition to Rule G16, the following programme rule applies: A first year student who fails with a final mark of less than 40% in each of three failed subjects will not be allowed to re-register in the Department of Radiography. This rule is also to be read in conjunction with Rule G6 from the General Rule Book for students.

5.3.7 Interruption of Study

In accordance with Rule G21B(b), the minimum duration for this programme will be four (4) years of registered study and the maximum duration will be five (5) years of registered study, including any periods of WIL. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the Department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

5.3.8 Exclusion Rules.

Rule G17 in the Student General Handbook applies.

5.3.9 Work Integrated Learning Rules.

Rules as per item 4.3.9 apply.

5.3.10 Registration with the Professional Board.

Rules as per item 4.3.11 apply.

5.3.11 Minimum and Maximum duration of study.

In accordance with the DUT Rule G21 A (2)* and Rule G21A (3)*, the minimum duration of study is four (4) years, and the maximum duration will be five (5) years of registered study, including any periods of work integrated learning.

6. BTECH: RADIOGRAPHY: Diagnostic, Nuclear Medicine, Therapy, Ultrasound.

6.1 Programme Information

6.1.1 Lectures

Lecture are offered at the Ritson Road Campus of the DUT. Lectures are usually conducted over weekends; however some lectures may be conducted during the day and in the evenings.

6.1.2 Work Integrated Learning (WIL)

Currently, there is no WIL component in this programme. However; the student must be clinically placed according to the specific learning outcomes. If not clinically placed, permission must be obtained from appropriate clinical centre for access. Written proof must be submitted at time of registration.

6.2 Learning Programme Structure

Code	Subjects	Year of Study	NQF Level	SAQA Credits	Pre-requisite
MPRD101	Management Principles and Practice I	4	7	12	ND: Radiography: D, NM, T, US
RMTQ203	Research Methods and Techniques	4	7	12	ND: Radiography: D, NM, T, US
RPRD401	Radiographic Practice IV: Diagnostic or	4	7	96	ND: Radiography: D
RPRN401	Radiographic Practice IV: Nuclear Medicine or	4	7	96	ND: Radiography: NM
RPRT401	Radiographic Practice IV: Radiotherapy or	4	7	96	ND: Radiography: T
RPRU401	Radiographic Practice IV: Ultrasound	4	7	96	ND: Radiography: US

6.3 Programme Rules

6.3.1 Assessment and Moderation

The continuous (ongoing) assessment method is used for all subjects in all the programmes, except Management Principles and Practice 1. As such, there are no final and supplementary examinations. The results for these subjects are determined through a weighted combination of assessments, which includes theory and practical assessments; individual and group assignments/projects; written and oral presentations; portfolios and OSCEs. Students are encouraged to work steadily through the period of registration in order to achieve the highest results possible. Assessments are listed under each subject at the back of this handbook. Moderation follows the DUT assessment policy and assessment guidelines. Detailed information can be found in the relevant subject study guides.

6.3.2 Special Tests and Condonements

- No summative assessments will be condoned. Summative means all assessment marks that contribute to the final mark of a subject.
- If a student misses a summative written, oral or practical test, for reasons of illness, a special test may be granted if the student provides a valid medical certificate specifying the nature and duration of the illness, and a declaration that for health reasons it was impossible for the student to complete an assessment. This certificate must be submitted to the programme coordinator, no later than one week after the date of the missed assessment.
- In addition, a special test may be granted to students with borderline academic results.
- The special assessment may take the form of an oral, may be set at the end of the period of registration, and may include a wider scope of work than the original assessment.
- Any student who misses an assessment and who does not qualify for a special assessment, and any student who qualifies for a special assessment but fails to write it, shall be awarded a zero mark for the missed assessment.

A student who qualifies for a special test granted for borderline academic results, but fails to write it, or achieves lower than their original results, shall be awarded their original results

6.3.3 Minimum Admission Requirements

In addition to Rule G7, the following programme rules apply:

i. Persons must be in possession of a three year National Diploma: Radiography: Diagnostic or equivalent.
ii. The two (2) year National Diploma: Diagnostic is no longer accepted as an entrance requirement. Candidates who possess this qualification and who wish to obtain the BTech: Radiography should contact the Head of Department, Radiography.
iii. Students must be eligible for registration with the Health Professions Council of South Africa (HPCSA).
iv. A student wishing to register for the BTech Radiography programme must have a minimum of 1 year post-diploma clinical experience.
v. A student must be placed or employed in the relevant clinical environment, for e.g. CT/MRI, PET/CT, MSK Ultrasound, IMRT/VMAT,/Stereo, etc. in order to meet the outcomes of the programme.

6.3.4 Selection Criteria

In accordance with Rule G5, acceptance into the programme is limited to 20 places. The following selection process will determine placement in the programme:

i. Applications are made through the Department.
ii. Selection will be on the basis of previous academic performance as determined by a ranking system.
iii. Interviews may be conducted to assess the suitability of the individual for the BTech programme.

6.3.5 Pass Requirements

Notwithstanding the DUT pass requirements (G14 and G15),and those detailed as follows, students are encouraged to effectively engage with their learning, and strive for the best academic results possible in order to adequately prepare themselves for their future careers, and to maximize possible employment opportunities. A student shall obtain a minimum of 50% in a subject to pass that subject. Notwithstanding anything to the contrary in the General Rules, no supplementary examinations shall be available for any continuous (on-going) assessment subjects in this Department.

6.3.6 Re-registration Rules

Please refer to Student General Handbook for re-registration information (Rule G16). A student who fails a subject more than once is deemed to be making unsatisfactory academic progress and may not be allowed to re-register for the subject.

6.3.7 Interruption of Studies

In accordance with Rule G23A (a), the minimum duration for this programme will be one (1) year of registered study and the maximum duration will be two (2) years of registered study. Should a student interrupt their studies by more than one (1) year, the student will need to apply to the Department for permission to re-register and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration.

6.3.8 Exclusion Rule(s)

In addition to Rule G17, the following programme rules apply: A student who fails more than one subject will not be allowed to repeat the programme and will be instructed to leave the Institution.

6.3.9 Minimum and maximum duration of study

The minimum duration is one year of full time registered study or two consecutive years of registered part-time study, including any periods of work integrated learning.

Should be read in conjunction with the DUT Rule G21 A (3)* and Rule G 21 A (4)*.

7 BACHELOR OF HEALTH SCIENCES (BHSc): Diagnostic Radiography; Diagnostic Sonography; Nuclear Medicine; Radiotherapy

7.1 Programme Information.

This Department may offer four programmes (in 2016) at the Honours level and the areas of specialisation include:

- Bachelor of Health Sciences (BHSc) in Diagnostic Radiography
- Bachelor of Health Sciences (BHSc) in Diagnostic Sonography
- Bachelor of Health Sciences (BHSc) in Nuclear Medicine
- Bachelor of Health Sciences (BHSc) in Radiotherapy

For information relating to lectures, assessment, special tests and condonement, code of conduct, uniforms, health and safety issues, please refer to the Departmental Information (**Section 3**).

7.2 Learning Programme Structure: all four programmes

7.2.1 Bachelor of Health Sciences (BHSc) in Diagnostic Radiography – (BHDRD1: Qualification Code) (4yr Minimum)

YEAR OF STUDY - 1						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP1	Anatomy I	ANTM101	5	12	C	
SP1	Physiology Ia	PYSA101	5	12	C	
SP1	Physics I: Module 2	PHIS101	5	8	C	
SP1	Professional Practice & Management I	PPRM101	6	8	C	
SP1	Diagnostic Practice & Procedures Ia	DPPA101	6	12	C	
SP1	**Faculty GenEd – student to select 1:** Community Health Care & Research I Issues of Gender & Society within Health Care	CHCR101 IGSH101	5	12	E	
SP2	Physiology Ib	PYSB101	5	12	C	
SP2	Chemistry I	CSTY101	5	8	C	
SP2	Diagnostic Imaging Sciences I	DGIS101	5	8	C	
SP2	Diagnostic Practice & Procedures Ib	DPPB101	6	16	C	
SP2	Cornerstone 101	CSTN101	5	12	C	
SP2	**DUT GenEd – student to select 1:** Values in the Workplace Cultural Diversity ICT Literacy Skills	VWKP101 CLDV101 ICTL101	5	8	E	
YEAR OF STUDY - 2						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP3	Anatomy II	ANTM201	5	12	C	ANTM101
SP3	General Pathology	GNLP101	6	8	C	ANTM101, PYSA101, PYSB101
SP3	Professional Practice& Management II	PPRM201	6	8	C	PPRM101
SP3	Diagnostic Practice & Procedures IIa	DPPA201	6	28	C	ANTM101, PYSA101, PYSB101, DPPA101, DPPB101
SP3	**DUT GenEd – student to select 1:** HIV & Communicable Diseases in KZN Equality & Diversity The Global Environment	HCDK101 EQDV101 GENV101	6	8	E	
SP4	Diagnostic Imaging Sciences II	DGIS201	6	16	C	DGIS101
SP4	Diagnostic Practice & Procedures IIb	DPPB201	6	24	C	ANTM101, PYSA101, PYSB101, GNLP101 DPPA101, DPPB101
SP4	Health Sciences Research I	HSRS101	6	12	C	
SP4	**Faculty GenEd – student to select 1:** Community Health Care & Research II Environmental Awareness for Health Care Professionals	CHCR201 tbc	6	12	E	CHCR101

YEAR OF STUDY - 3						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP5	Professional Practice & Management III	PPRM301	7	8	C	PPRM201
SP5	Management for Health Professionals	MNHP101	6	8	C	
SP5	Diagnostic Imaging Sciences III	DGIS301	7	16	C	DGIS201
SP5	Diagnostic Practice & Procedures IIIa	DPPA301	7	24	C	DPPA201, DPPB201
SP5	**DUT GenEd – students to select 1:** Restorative Justice Other modules to be developed	RSJS101	7	8	E	
SP6	Diagnostic Practice & Procedures IIIb	DPPB301	7	24	C	DPPA201, DPPB201
SP6	Health Sciences Research II	HSRS201	7	12	C	HSRS101
SP6	Leadership & Supervisory Development	LDSD101	7	16	C	
SP6	**Faculty GenEd – student to select 1:** Community Health Care & Research III Educational Techniques I	CHCR301	7	12	E	CHCR201
YEAR OF STUDY - 4						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP7	Health Sciences Research IIIa	HSRA301	8	8	C	HSRS201
SP7	Professional Practice & Management IV	PPRM401	8	16	C	PPRM301
SP7	Diagnostic Imaging Sciences IV	DGIS401	8	16	C	DGIS301
SP7	Diagnostic Practice & Procedures IVa	DPPA401	8	16	C	DPPA301, DPPB301
SP7	**DUT GenEd – student to choose 1:** Modules still to be developed		8	8	E	
SP8	Health Sciences Research IIIb	HSRB301	8	12	C	HSRS201, HSRA301
SP8	Diagnostic Practice & Procedures IVb	DPPB401	8	20	C	DPPA301, DPPB301
SP8	Small Business Management	SBSM101	6	8	C	
SP8	Clinical Mentoring & Assessment	CLMA101	8	12	C	
SP8	**Faculty GenEd – student to select 1:** Community Health Care& Research IV Other modules to be developed	CHCR401	8	12	E	CHCR301

(SP) – Study Period

7.2.2 Bachelor of Health Sciences (BHSc) in Diagnostic Sonography (BHDSN1: Qualification Code) (4yr Minimum)

YEAR OF STUDY - 1						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP1	Anatomy I	ANTM101	*5*	12	C	
SP1	Physiology Ia	PYSA101	*5*	12	C	
SP1	Physics I: Module 2	PHIS101	*5*	8	C	
SP1	Professional Practice & Management I	PPRM101	*6*	8	C	
SP1	Ultrasound Practice & Procedures Ia	UPPA101	*6*	12	C	
SP1	**Faculty GenEd – student to select 1:** Community Health Care & Research I Issues of Gender & Society within Health Care	CHCR101 IGSH101	*5*	12	E	
SP2	Physiology Ib	PYSB101	*5*	12	C	
SP2	Chemistry I	CSTY101	*5*	8	C	
SP2	Ultrasound Imaging Sciences I	UMIS101	*5*	8	C	
SP2	Ultrasound Practice & Procedures Ib	UPPB101	*6*	16	C	
SP2	Cornerstone 101	CSTN101	*5*	12	C	
SP2	**DUT GenEd – student to select 1:** Values in the Workplace Cultural Diversity ICT Literacy Skills	VWKP101 CLDV101 ICTL101	*5*	8	E	
YEAR OF STUDY - 2						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP3	Anatomy II	ANTM201	5	12	C	ANTM101
SP3	General Pathology	GNLP101	*6*	8	C	ANTM101, PYSA101, PYSB101
SP3	Professional Practice& Management II	PPRM201	6	8	C	PPRM101
SP3	Ultrasound Practice & Procedures IIa	UPPA201	6	28	C	ANTM101, PYSA101, PYSB101, UPPA101, UPPB101
SP3	**DUT GenEd – student to select 1:** HIV & Communicable Diseases in KZN Equality & Diversity The Global Environment	HCDK101 EQDV101 GENV101	6	8	E	

SP4	Ultrasound Imaging Sciences II	UIMS201	6	16	C	UIMS101
SP4	Ultrasound Practice & Procedures IIb	UPPB201	6	24	C	ANTM101, PYSA101, PYSB101, GNLP101 UPPA101, UPPB101
SP4	Health Sciences Research I	HSRS101	6	12	C	
SP4	**Faculty GenEd – student to select 1:** Community Health Care & Research II Environmental Awareness for Health Care Professionals	CHCR201	6	12	E	CHCR101

YEAR OF STUDY - 3

(SP)	MODULE TITLE	Module code	HESQF Level	SAQA Credit	C/E	Prerequisites
SP5	Professional Practice & Management III	PPRM301	7	8	C	PPRM201
SP5	Management for Health Professionals	MNHP101	6	8	C	
SP5	Ultrasound Imaging Sciences III	UIMS301	7	16	C	UIMS201
SP5	Ultrasound Practice & Procedures IIIa	UPPA301	7	24	C	UPPA201, UPPB201
SP5	**DUT GenEd – students to select 1:** Restorative Justice Other modules to be developed	RSJS101	7	8	E	
SP6	Ultrasound Practice & Procedures IIIb	UPPB301	7	24	C	UPPA201, UPPB201
SP6	Health Sciences Research II	HSRS201	7	12	C	HSRS101
SP6	Leadership & Supervisory Development	LDSD101	7	16	C	
SP6	**Faculty GenEd – student to select 1:** Community Health Care & Research III Educational Techniques I	CHCR301	7	12	E	CHCR201

YEAR OF STUDY - 4

(SP)	MODULE TITLE	Module code	HESQF Level	SAQA Credit	C/E	Prerequisites
SP7	Health Sciences Research IIIa	HSRA301	8	8	C	HSRS201
SP7	Professional Practice & Management IV	PPRM401	8	16	C	PPRM301
SP7	Ultrasound Imaging Sciences IV	UIMS401	8	16	C	UIMS301
SP7	Ultrasound Practice & Procedures IVa	UPPA401	8	16	C	UPPA301, UPPB301

SP7	**DUT GenEd – student to choose 1:** Modules still to be developed		8	8	E	
SP8	Health Sciences Research IIIb	HSRB301	8	12	C	HSRS201, HSRA301
SP8	Ultrasound Practice & Procedures IVb	UPPB401	8	20	C	UPPA301, UPPB301
SP8	Small Business Management	SBSM101	6	8	C	
SP8	Clinical Mentoring & Assessment	CLMA101	8	12	C	
SP8	**Faculty GenEd – student to select 1:** Community Health Care& Research IV Other modules to be developed	CHCR401 tbc	8	12	E	CHCR301

(SP) – Study Period

7.2.3 Bachelor of Health Sciences (BHSc) in Nuclear Medicine (NM) – (BHNMD1: Qualification Code) (4yr Minimum)

YEAR OF STUDY - 1						
(SP) [1]	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP1	Anatomy I	ANTM101	*5*	12	C	
SP1	Physiology Ia	PYSA101	*5*	12	C	
SP1	Physics I: Module 2	PHIS101	*5*	8	C	
SP1	Professional Practice & Management I	PPRM101	*6*	8	C	
SP1	NM Practice & Procedures Ia	NMPA101	*6*	12	C	
SP1	**Faculty GenEd – student to select 1:** Community Health Care & Research I Issues of Gender & Society within Health Care	CHCR101 IGSH101	*5*	12	E	
SP2	Physiology Ib	PYSB101	*5*	12	C	
SP2	Chemistry I	CSTY101	*5*	8	C	
SP2	NM Imaging Sciences I	NMIS101	*5*	8	C	
SP2	NM Practice & Procedures Ib	NMPB101	*6*	16	C	
SP2	Cornerstone 101	CSTN101	*5*	12	C	
SP2	**DUT GenEd – student to select 1:** Values in the Workplace Cultural Diversity ICT Literacy Skills	VWKP101 CLDV101 ICTL101	*5*	8	E	
YEAR OF STUDY - 2						
(SP) [2]	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP3	Anatomy II	ANTM201	5	12	C	ANTM101
SP3	General Pathology	GNLP101	*6*	8	C	ANTM101, PYSA101, PYSB101
SP3	Professional Practice& Management II	PPRM201	6	8	C	PPRM101
SP3	NM Practice & Procedures IIa	NMPA201	6	28	C	ANTM101, PYSA101, PYSB101, NMPA101,NMPB101

SP3	**DUT GenEd – student to select 1:** HIV & Communicable Diseases in KZN Equality & Diversity The Global Environment	HCDK101 EQDV101 GENV101	6	8	E	
SP4	NM Imaging Sciences II	NMIS201	6	16	C	NMIS101
SP4	NM Practice & Procedures IIb	NMPB201	6	24	C	ANTM101, PYSA101, PYSB101, GNLP101 NMPA101, NMPB101
SP4	Health Sciences Research I	HSRS101	6	12	C	
SP4	**Faculty GenEd – student to select 1:** Community Health Care & Research II Environmental Awareness for Health Care Professionals	CHCR201	6	12	E	CHCR101

YEAR OF STUDY - 3

(SP)	MODULE TITLE	Module code	HESQF Level	SAQA Credit	C/E	Prerequisites
SP5	Professional Practice & Management III	PPRM301	7	8	C	PPRM201
SP5	Management for Health Professionals	MNHP101	6	8	C	
SP5	NM Imaging Sciences III	NMIS301	7	16	C	NMIS201
SP5	NM Practice & Procedures IIIa	NMPA301	7	24	C	NMPA201, NMPB201
SP5	**DUT GenEd – students to select 1:** Restorative Justice Other modules to be developed	RSJS101	7	8	E	
SP6	NM Practice & Procedures IIIb	NMPB301	7	24	C	NMPA201, NMPB201
SP6	Health Sciences Research II	HSRS201	7	12	C	HSRS101
SP6	Leadership & Supervisory Development	LDSD101	7	16	C	
SP6	**Faculty GenEd – student to select 1:** Community Health Care & Research III Educational Techniques I	CHCR301	7	12	E	CHCR201

YEAR OF STUDY - 4

(SP)	MODULE TITLE	Module code	HESQF Level	SAQA Credit	C/E	Prerequisites
SP7	Health Sciences Research IIIa	HSRA301	8	8	C	HSRS201

SP7	Professional Practice & Management IV	PPRM401	8	16	C	PPRM301
SP7	NM Imaging Sciences IV	NMIS401	8	16	C	NMIS301
SP7	NM Practice & Procedures IVa	NMPA401	8	16	C	NMPA301, NMPB301
SP7	**DUT GenEd – student to choose 1:** Modules still to be developed		8	8	E	
SP8	Health Sciences Research IIIb	HSRB301	8	12	C	HSRS201, HSRA301
SP8	NM Practice & Procedures IVb	NMPB401	8	20	C	NMPA301, NMPB301
SP8	Small Business Management	SBSM101	6	8	C	
SP8	Clinical Mentoring & Assessment	CLMA101	8	12	C	
SP8	**Faculty GenEd – student to select 1:** Community Health Care& Research IV Other modules to be developed	CHCR401	8	12	E	CHCR301

(SP) – Study Period

7.2.4 Bachelor of Health Sciences (BHSc) in Radiotherapy (RT) (BHRDT1: Qualification Code) (4yr Minimum)

YEAR OF STUDY - 1						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP1	Anatomy I	ANTM101	*5*	12	C	
SP1	Physiology Ia	PYSA101	*5*	12	C	
SP1	Physics I: Module 2	PHIS101	*5*	8	C	
SP1	Professional Practice & Management I	PPRM101	*6*	8	C	
SP1	RT Practice & Procedures Ia	RPPA101	*6*	12	C	
SP1	**Faculty GenEd – student to select 1:** Community Health Care & Research I Issues of Gender & Society within Health Care	CHCR101 IGSH101	*5*	12	E	
SP2	Physiology Ib	PYSB101	*5*	12	C	
SP2	Chemistry I	CSTY101	*5*	8	C	
SP2	Radiation Treatment Sciences I	RTSC101	*5*	8	C	
SP2	RT Practice & Procedures Ib	RPPB101	*6*	16	C	
SP2	Cornerstone 101	CSTN101	*5*	12	C	
SP2	**DUT GenEd – student to select 1:** Values in the Workplace Cultural Diversity ICT Literacy Skills	VWKP101 CLDV101 ICTL101	*5*	8	E	
YEAR OF STUDY - 2						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP3	Anatomy II	ANTM201	5	12	C	ANTM101
SP3	General Pathology	GNLP101	*6*	8	C	ANTM101, PYSA101, PYSB101
SP3	Professional Practice& Management II	PPRM201	6	8	C	PPRM101
SP3	RT Practice & Procedures IIa	RPPA201	6	28	C	ANTM101, PYSA101, PYSB101, RPPA101,RPPB101
SP3	**DUT GenEd – student to select 1:** HIV & Communicable Diseases in KZN Equality & Diversity The Global Environment	HCDK101 EQDV101 GENV101	6	8	E	
SP4	Radiation Treatment Sciences II	RTSC201	6	16	C	RTSC101
SP4	RT Practice & Procedures IIb	RPPB201	6	24	C	ANTM101, PYSA101, PYSB101, GNLP101

						RPPA101, RPPB101
SP4	Health Sciences Research I	HSRS101	6	12	C	
SP4	**Faculty GenEd – student to select 1:** Community Health Care & Research II Environmental Awareness for Health Care Professionals	CHCR201	6	12	E	CHCR101
YEAR OF STUDY - 3						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP5	Professional Practice & Management III	PPRM301	7	8	C	PPRM201
SP5	Management for Health Professionals	MNHP101	6	8	C	
SP5	Radiation Treatment Sciences III	RTSC301	7	16	C	RTSC201
SP5	RT Practice & Procedures IIIa	RPPA301	7	24	C	RPPA201, RPPB201
SP5	**DUT GenEd – students to select 1:** Restorative Justice Other modules to be developed	RSJS101	7	8	E	
SP6	RT Practice & Procedures IIIb	RPPB301	7	24	C	RPPA201, RPPB201
SP6	Health Sciences Research II	HSRS201	7	12	C	HSRS101
SP6	Leadership & Supervisory Development	LDSD101	7	16	C	
SP6	**Faculty GenEd – student to select 1:** Community Health Care & Research III Educational Techniques I	CHCR301	7	12	E	CHCR201
YEAR OF STUDY - 4						
(SP)	**MODULE TITLE**	**Module code**	**HESQF Level**	**SAQA Credit**	**C/E**	**Prerequisites**
SP7	Health Sciences Research IIIa	HSRA301	8	8	C	HSRS201
SP7	Professional Practice & Management IV	PPRM401	8	16	C	PPRM301
SP7	Radiation Treatment Sciences IV	RTSC401	8	16	C	RTSC301
SP7	RT Practice & Procedures IVa	RPPA401	8	16	C	RPPA301, RPPB301
SP7	**DUT GenEd – student to choose 1:** Modules still to be developed		8	8	E	
SP8	Health Sciences Research IIIb	HSRB301	8	12	C	HSRS201, HSRA301
SP8	RT Practice & Procedures IVb	RPPB401	8	20	C	RPPA301,RPPB301
SP8	Small Business Management	SBSM101	6	8	C	
SP8	Clinical Mentoring & Assessment	CLMA101	8	12	C	
SP8	**Faculty GenEd – student to select 1:** Community Health Care& Research IV Other modules to be developed	CHCR401	8	12	E	CHCR301

(SP) – Study Period

7.3 PROGRAMME RULES

7.3.1 MINIMUM ADMISSION REQUIREMENTS

In addition to Rule G7*, the minimum entrance requirement is a National Senior Certificate (NSC) or a Senior Certificate (SC) or a National Certificate (Vocational) NC (V) that is valid for entry into a Bachelor's Degree and must include the following subjects at the stated minimum ratings below:

Minimum admission requirements

COMPULSORY SUBJECTS	NSC Rating	Senior Certificate		NC (V)
		HG	SG	
English (1st Additional language)	4	D	B	70%
Life Sciences/Biology	4	D	B	70%
Mathematics	4	D	B	70%
Physical Sciences	4	D	B	70%

7.3.2 Minimum Admission Requirements in respect of Work Experience, Age, Maturity and RPL Students

The DUT General Rules G7(3)* and G7(8)* respectively will apply.

7.3.3 Admission of International students

The DUT Admission Policy for International Students and General Rules G4* and G7(5)* will apply.

7.3.4 Selection Procedures

- All applicants must apply through the Central Applications Office (CAO). In accordance with Rule G5*, acceptance into the programme is limited. Since more applications are received than can be accommodated, the following selection processes will apply:
- Initial short listing for selection is based on the applicant's academic performance in Grade 11 and/or 12.
- Preference is given to applicants obtaining more than 28 points in their matriculation results and those who have Radiography as their first choice.
- The point scores for the **NSC** or the **SC** or the **NC (V)** results is obtained by using the table below:

Point Scores:

RESULTS	NSC	SENIOR CERTIFICATE		NC (V)
		HG	SG	
90 – 100%	8	8	6	4
80 – 89%	7	7	5	4
70 – 79%	6	6	4	4
60 – 69%	5	5	3	3
50 – 59%	4	4	0	0
40 – 49%	3	3	0	0

Note: No points are allocated for ten (10) credit subjects.

- All applicants that meet the above requirement will receive a selection package from the Department of Radiography with the following: i) character evaluation form, ii) log sheet, iii) short questionnaire, iv) assignment instruction.
- All applicants must submit the completed character evaluation form signed by their school principal or former teacher.
- All the applicants must complete eight (8) hours of voluntary service in a relevant Radiography clinical environment and submit the completed log sheet as proof of attendance.
- The applicants must write and submit reports, following the assignment instruction, on their observations and experiences whilst in the clinical environment, as well as reasons for choosing radiography as a career.
- Applicants will be ranked, as in Table 3 below and may be invited to a placement test.

Weighting of Assessments

ASSESSMENT	WEIGHTING (%)
Results of the NSC, SC or NC (V) certificate	40%
Hospital Visits - eight (8) hours	20%
Written Essays	30%
School/work characteristic questionnaire	10%

- Placement testing will include an interview.
- Final selection will be determined, based on the results of the placement testing (50%) and the interview (50%).
- Selected applicants will be placed into either the four-year degree or an Extended Curriculum Programme (5 Years).
- Successful applicants who are awaiting their final NSC, SC or NC (V) results will be provisionally accepted.
- In the event that the final Grade 12 results do not meet the minimum entrance requirements, this provisional acceptance will be automatically withdrawn.
- Applicants whose application has been declined due to poor academic achievement in grade 11 may reapply to the programme should they be able to show improved academic performance in the final grade 12 examinations.

- Those applicants who wish to reapply should immediately notify the programme of their intention to reapply. In order for the application to be reconsidered, the applicant must submit the final grade 12 results to the Department as soon as these results are available.

7.3.5 Duration of the Programme

In accordance with the DUT Rule G23 B(2)* and Rule G23B(3)*, the minimum duration of study is four (4) years, including any periods of clinical practice and the maximum duration will be six (6) years of registered study, including any periods of clinical practice.

7.3.6 Progression rules

In addition to DUT rules G14* and G16* the following rules shall apply: Students must pass all pre-requisite modules before he/ she is admitted to the next level (see Table (TBA) page (TBA) in the Department Handbook).

7.3.7 Exclusion rule

In addition to the DUT General Rule G17*, a first year student who fails three or more modules with less than 40% in the failed modules during that year is not permitted to re-register in the Department of Radiography. De-registration from any module is subject to the provisions of rule G6 (2)*.

7.3.8 Re-registration

Rule G16* of the General Handbook for Students applies.

7.3.9 Interruption of studies

Should a student interrupt their studies for a period of more than three (3) consecutive years, the student will need to apply to the Department for permission to re-register and will need to prove currency of appropriate knowledge prior to being granted permission to continue with registration.

7.3.10 Registration as a radiation worker

It is mandatory that all students are registered as trainee radiation workers with the Radiation Protection Services at SABS. The following are requirements for registration:

(i) First year students must undergo medical examinations – blood, urine and eye testing as well as a chest x-ray, within a period of 30 days preceding registration as a trainee radiation worker.

(ii) First time entering female students are required to sign a declaration that they are not pregnant at the time of registration. Should it be ascertained that a student was pregnant at the time of first registering, such student will have to deregister from the programme with immediate effect.

(iii) Any returning student who may be or suspects that she is pregnant must notify the HOD immediately, in order to ensure that appropriate safety measures are taken both in the Radiography clinic and during clinical training. Students who fail to disclose their pregnancy absolve the DUT from any consequences of non- disclosure.

(iv) A pregnant student may need to be exempt from certain clinical training placements in the radiography clinic and clinical training centres, which may extend their clinical training completion time.

(v) All pregnant students must comply with the standard radiation monitoring requirements and in addition, use a direct reading pocket alarm dosimeter.

(vi) The event of a radiation occurrence to a student may result in a delay of completion of the student's studies.

7.3.11 Clinical Practice

- The student must comply with the rules and regulations as set out in the clinical environment where placed. A student shall achieve the required level of clinical competency, determined by the employers/ clinical training centres and Department, before application for the issuing of the Degree will be made. This includes completion of the required clinical hours.
- Clinical Competency is evaluated through on site assessments.
- In addition, Rule G28* as contained in the General Handbook for Students applies. Students must familiarize themselves with this rule.
- Students must adhere to the rules and regulations, as indicated in the Department of Radiography's Clinical Practice Code of Conduct.
- Students are expected to adhere to all Health and Safety regulations and rules of ethical conduct as stipulated by the respective clinical environments.
- Disciplinary matters arising from breach of the Code of Practice will be referred to the Department for student disciplinary action, and thereafter to the DUT Disciplinary Committee.

7.3.12 Registration with the Health Professions Council of South Africa (HPCSA) – Clinical Technology and Radiography Board

Students are required to apply for registration as Student Radiographers with the HPCSA, Clinical Technology and Radiography Professional Board during Term 1 of first registration; as determined in the regulations set out in the Health Professions Act, 1974 (Act 56 of 1974) [Government Notice R1855 (Dated 16/9/77); No R 1379 (12/7/94)]. Registration fees and submission of registration documents is the responsibility of the student. Students not registered will not be permitted to complete their Clinical Practice.

On successful completion of the qualification and required Clinical Practice, and satisfaction of the requirements of the Professional Board for Clinical Technology and Radiography, a graduate may register as a qualified Radiographer (Community service) with the HPCSA. After completion of the compulsory one year of community service, the registration must be changed to "Independent Practice". This is the sole responsibility of the graduate.

SECTION B- POST GRADUATE PROGRAMMES

8. MASTERS OF HEALTH SCIENCES IN RADIOGRAPHY – (MHRAD1: Qualification Code)

8.1 Programme Information

Rule G24 and the guidelines in the Post Graduate Student Handbook will apply to this full research qualification. This is a 180 credit qualification and is offered at the SAQA NQF Level 9.

8.1.1 *Assessment and Moderation*

A dissertation may be submitted for examination only once, although in certain circumstances the examiners may invite a student to revise and re-submit the dissertation/thesis. A dissertation may be submitted at any time during the year, but prior to submission the PG7 (Intention to submit) form must be completed and submitted through the Department to the Faculty Office at least three months prior to submission. At least two examiners, will be selected by the HoD, according to the DUT requirements. Approval for the examiners will be obtained from the Faculty Research and Higher Degrees Committee (RHDC) and this will be ratified by the HDC. Postgraduate assessment is aligned to Postgraduate policies and guidelines. Please refer to the General Student Handbook and the Postgraduate Student Handbook.

8.2 Learning Programme Structure

This programme is a full research option.

Code	Subject	level	*CA/E	Credits	Pre-requisition
MHRAD1	Dissertation	9	External Examination	180	BTech in Radiography – D, NM,T,US (with Conferment of Status)

8.3 Programme Rules

8.3.1 *Minimum Admission Requirements*

In addition to Rule G24 (1), persons must be in possession of a BTech: Radiography degree. Please refer to the General Student Handbook and the Postgraduate Student Handbook. In accordance with Rule G5, acceptance into the programme is limited.

Application forms may be obtained from the Department. Entry into the MTech programme is not automatic. All applicants must submit a concept paper outlining the research topic, purpose and a concise literature review. Once the Department Research Committee (DRC) approves the topic, the student may register for the programme after which a supervisor will be selected and appointed.

[Note: the MTech: Radiography qualification has been replaced by the MHSc in Radiography]

8.3.2 Selection Criteria

All applicants should meet the minimum admission requirements stipulated under 8.3.1. All applicants must submit a concept paper outlining the research topic, purpose and a concise literature review to the Department. Once the Department Research Committee (DRC) approves the topic, the student may register for the programme after which a supervisor will be selected and appointed.

8.3.3 Pass Requirements

Rule G24 and the Postgraduate Student Handbook apply. Students are encouraged to apply themselves to their research, and strive for the best academic results possible in order to adequately prepare themselves for their future careers.

8.3.4 Re-registration Rules

Rule G24 in the General Student Handbook and the Postgraduate Student Handbook apply.

8.3.5 Interruption of Studies

In accordance with Rule G24, the minimum duration for this programme will be one (1) year of registered study and the maximum duration will be three (3) years of registered study. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the Department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration. Please refer to the General Student Handbook and the Postgraduate Student Handbook.

8.3.6 Exclusion Rules

Rule G24 in the General Student Handbook and the Postgraduate Student Handbook apply.

8.3.7 Minimum and Maximum duration of study

In accordance with the DUT Rule G24 (2a)* and Rule G24 (2b)*, the minimum duration of study is one (1) year, and the maximum duration will be two (2) years of registered study.

9 DOCTOR OF RADIOGRAPHY (DRRAD1: Qualification Code)

9.1.1 Programme Information

This full research qualification is aligned to Rule G25 and G26 and the guidelines in the Post Graduate Student Handbook. It is a 360 credit qualification and is offered at the HEQSF Level 10.

9.1.2 Assessment and Moderation

A thesis may be submitted for examination only once, although in certain circumstances the examiners may invite a student to revise and re-submit the dissertation/thesis. A thesis may be submitted at any time during the year, but prior to submission the PG7 (Intention to submit) form must be completed and submitted through the Department to the Faculty Office at least three months prior to submission. At least two examiners, will be selected by the HOD, according to the DUT requirements. Approval for the examiners will be obtained from the Faculty Research and Higher Degrees Committee RHDC and this will be ratified by the HDC. Postgraduate assessment is aligned to Postgraduate policies and guidelines. Please refer to the General Student Handbook and the Postgraduate Student Handbook.

9.2 Learning Programme Structure

This programme is a full research option.

Code	Subject	level	*CA/E	Credits	Pre-requisition
DRRAD1	Thesis	10	External Examination	360	MTech in Radiography (with Conferment of Status) or Master of Health Sciences in Radiography

9.3 Programme Rules

9.3.1 Minimum Admission Requirements

In addition to Rule G25 (1), persons must be in possession of an MTech: Radiography degree. Please also refer to the Postgraduate Student Handbook.

9.3.2 Selection Criteria

All applicants must meet the minimum admission requirements stipulated in point 9.3.1 Furthermore all applicants must submit a concept paper outlining the research topic, purpose and a concise literature review. Once the Department Research Committee (DRC) approves the topic, the student will be permitted to register for the programme and thereafter a supervisor will be selected and appointed.

9.3.3 Pass Requirements

Rule G24 and the Postgraduate Student Handbook apply. Students are encouraged to apply themselves to their research, and strive for the best academic results possible in order to adequately prepare themselves for their future careers.

9.3.4 Re-registration rules

Rule G25 (2) and the Postgraduate Student Handbook apply.

9.3.5 Interruption of Studies

In accordance with Rule G25(2), the minimum duration for this programme will be two (2) years of registered study and the maximum duration will be 4 years of registered study. Should a student interrupt their studies by more than three (3) years, the student will need to apply to the Department for permission to reregister and will need to prove currency of appropriate knowledge prior to being given permission to continue with registration. Please refer to the Postgraduate Student Handbook. Please refer to the General Student Handbook and the Postgraduate Student Handbook.

9.3.6 Exclusion Rules

Rules G25 (2) (b; c(ii)) in the General Student Handbook; and the Postgraduate Student Handbook apply.

9.3.7 Minimum and Maximum duration of study

In accordance with the DUT Rule G25 (2a)* and Rule G25 (2b)*, the minimum duration of study is one (1) year, and the maximum duration will be two (2) years of registered study.

10 SUBJECT/MODULE CONTENT

10.1 NATIONAL DIPLOMA IN RADIOGRAPHY: DIAGNOSTIC, NUCLEAR MEDICINE, THERAPY, ULTRASOUND.

Students are to read this section in conjunction with the relevant study guides

SUBJECT NAME	LEARNING AREAS/CONTENT	ASSESSMENT PLAN	%
Level 1 – D, NM, T, US			
ANATOMY 1	• Embryology • Organisation of the human body • Systems of the body • Cross-sectional anatomy	Theory tests Practicals/Assignment/s	70% 30%
PHYSIOLOGY 1	• General physiology • Systems of the body. • Introduction to biochemistry.	Theory tests Practicals/Assignment/s	80% 20%
PSYCHODYNAMICS OF PATIENT MANAGEMENT	• Professionalism and ethics • Communication • Patient care	Theory tests First Aid/Practical tests Assignment /Project/s	60% 10% 30%
RADIOGRAPHIC PRACTICE 1 (D)	• Introduction to Radiography (D, T, NM, US) o Basic terminology o Positioning: • Extremities, Skull • Chest - heart, lungs and thorax • Abdomen • Vertebral column, Pelvis and SI Joints • Normal radiographic anatomy	Theory test Practical/Projects	75% 25%
RADIOGRAPHIC PRACTICE 1 (NM)	• Introduction to Nuclear Medicine • In vivo Studies • Radiation Hazards & Protection	Theory test Practical tests/Assignment/s	75% 25%
RADIOGRAPHIC PRACTICE 1 (T)	• Oncology Modalities • General Principles of Radiotherapy	Theory test Practical tests/ Assignment/s	75% 25%

	• Side effects of Radiotherapy		
RADIOGRAPHIC PRACTICE I (US)	• Basic introduction to ultrasound • Ultrasound techniques: gynaecology, obstetrics and general abdomen – normal appearances	Theory test Practical tests/ Assignment/s	75% 25%
RADIATION SCIENCE I	Physics: • Heat • Optics • Electrostatics • Electricity • Magnetism • Solid state (detectors/electronics) • Ultrasound: Introduction to physics and principles • Introduction to radiation physics and protection Chemistry: • General principles of chemistry Medical imaging: • Basic principles • Image recording and display	Theory test Assignment	90% 10%
CLINICAL RADIOGRAPHIC PRACTICE I (D, NM, T, US)	• Patient care • Radiographic practice of axial and appendicular skeleton, chest and abdomen	Peer Assessment Clinical Tutor Ward Rotations /Nursing DUT Assessment	15% 35% 15% 35%
Level 2 – D, NM, T, US			
RADIOGRAPHIC PATHOLOGY II (D, NM, T, US)	• Introduction to pathology • Basic pathology • Integrated applications of pathology of the systems of the body	Theory test Assignments/Projects	60% 40%
RADIOGRAPHIC PRACTICE II (D)	Integrated radiographic practice with reference to: • Contrast media • High kV technique & Soft tissue applications • Gastro-intestinal system • Biliary-system • Genito-urinary system • Obstetrics and gynaecology • Respiratory system • Ward and theatre radiography - Applications to D, T, NM and US • Skull – specialized views • Tomography • Pattern Recognition - Advanced radiographic anatomy, applied physiology & radiographic pathology	Theory test Practical tests Assignment/s	50% 25% 25%
RADIOGRAPHIC PRACTICE II (NM)	• Introduction to radiopharmaceuticals • Endocrine system • Gastrointestinal system • Musculo-skeletal system • Respiratory system • Cardiovascular system • Central nervous system • Genito-urinary system	Theory test Practical test Assignment /s	50% 25% 25%
RADIOGRAPHIC PRACTICE II (T)	• Treatment of malignant disease • Introduction to basic planning • Respiratory system • Head and neck tumours • Urinary and male reproductive system • Female reproductive system	Theory test Practical test Assignment /s	50% 25% 25%

	• Alimentary tract • Treatment with radioactive isotopes		
RADIOGRAPHIC PRACTICE II (US)	• Routine gynaecology sonography • Routine obstetric sonography • General abdomen – abnormal • Contrast media • Ward and theatre radiography o Applications to US	Theory test Practical test Assignment /s	50% 25% 25%
RADIATION SCIENCE II (D, NM, T, US)	• Equipment • Mains supply • Generators • X-Ray tubes • Accessory equipment • Fluoroscopy equipment • Digital systems: Data processing • Gamma camera • Ultrasound units • Radiotherapy units • Imaging • Sensitometry • Image processing • Radiation exposure • Quality assurance • Radiation physics and protection • Radiobiology • Medical ultrasound and an introduction to the • biological effects of ultrasound	Theory test Practical test Assignment /s	50% 20% 30%
CLINICAL RADIOGRAPHIC PRACTICE II (D)	• Patient care. • Radiographic practice	Peer Assessment Clinical Tutor Assessment DUT Assessment	5% 35% 60%
CLINICAL RADIOGRAPHIC PRACTICE II (NM)	• Patient care. • Radiographic practice	Clinical Logbook Clinical Assessment DUT Assessment	30% 30% 40%
CLINICAL RADIOGRAPHIC PRACTICE II (T)	• Patient care. • Radiographic practice	Clinical Assessment DUT Assessment	50% 50%
CLINICAL RADIOGRAPHIC PRACTICE II (US)	• Patient care. • Radiographic practice	Clinical Assessment DUT Assessment	50% 50%
Level 3 – D, NM, T, US			
RADIOGRAPHIC MANAGEMENT III (D)	• Principles of the management of a diagnostic X-Ray Department • Stock control and Planning • Personnel management	Theory test Presentation Assignment	50% 15% 35%
RADIOGRAPHIC PRACTICE III (D)	• Computerized tomography • Central nervous system o Myelography o Angiography • Cardiovascular system • Paediatric radiography • Cross sectional anatomy and imaging • Pattern Recognition - Advanced radiographic anatomy, applied physiology & radiographic pathology	Theory tests Practical/tests Assignment	60% 20% 20%
RADIATION SCIENCE III (D)	• Specialized diagnostic equipment • Alternative diagnostic equipment • Quality assurance.	Theory test Practical tests Assignment	50% 20% 30%
CLINICAL	• Patient care.	Peer Assessment	5%

RADIOGRAPHIC PRACTICE III (D)	• Radiographic practice	Clinical Assessment Assessment Clinical Logbook	30% 50% 15%
NUCLEAR MEDICINE INSTRUMENTATION III	• Radiation detectors • Imaging devices • In vivo and in vitro counting devices • Counting statistics • Digital image processing • Quality control • New Departments	Theory tests Assignment /Projects	50% 50%
RADIOPHARMACYIII (NM)	• Hot laboratory and general procedures • Production of radionuclides • Radiochemistry • Radiopharmacology • Quality control	Theory tests Assignment /Projects	50% 50%
RADIOGRAPHIC PRACTICE III (NM)	• Imaging procedures and practical applications of all systems.	Theory tests Assignment /Projects	50% 50%
CLINICAL RADIOGRAPHIC PRACTICE 3 (NM)	• Patient care. • Radiographic practice	Clinical Logbook Clinical Assessment DUT Assessment	30% 30% 40%
APPLIED PSYCHOLOGY (T)	• Psycho-social aspects of cancer • Counselling skills • Interpersonal relationships • Stress management	Oral & Written Presentations Assignment	40% 60%
RADIOBIOLOGY (T)	• Oncogenesis • Tumour kinetics • Biological interaction of radiation • Dose response curves • Physical, chemical and radiation modifiers	Theory tests Assignment	75% 25%
RADIOGRAPHIC PRACTICE III (T)	• Overview of malignant disease • Treatment of systems o Non-malignant o Malignant	Theory tests Assignment/project(s)	50% 50%
RADIATION SCIENCE III (T)	• Specialized equipment, • Principles of teletherapy • Principles of brachytherapy	Theory test Practical tests Assignment /s	50% 25% 25%
CLINICAL RADIOGRAPHIC PRACTICE 3 (T)	• Patient care. • Radiographic practice	Clinical Assessmen DUT Assessment	50% 50%
RADIOGRAPHIC PRACTICE III (US)	• Advanced Obstetrics sonography • Advanced Gynaecology sonography • Advanced Abdomen imaging • Small part scanning • Vascular sonography • Paediatric sonography • Interventional imaging • Musculoskeletal US	Theory test Practical tests Assignment /s	50% 25% 25%
ULTRASOUND PHYSICS & EQUIPMENT III (US)	• Nature of ultrasound • Wave generation and detection • Ultrasound field • Ultrasound systems • Doppler ultrasound • Image artefacts • Measurements from image	Theory test Practical tests Assignment/s	50% 25% 25%
CLINICAL RADIOGRAPHIC PRACTICE 3 (US)	• Patient care. • Radiographic practice	Clinical Assessment DUT Assessment	50% 50%

10.2 BACHELOR OF TECHNOLOGY IN RADIOGRAPHY, NUCLEAR MEDICINE, THERAPY AND ULTRASOUND.

SUBJECT NAME	LEARNING AREAS/CONTENT	ASSESSMENT PLAN	%
MANAGEMENT PRINCIPLES AND PRACTICE I YEAR MARK AND EXAMINATION	• Evolution of management • The practice of management • Small business and undertakings • Planning • Organisation • Leading • Controlling • The nature of managerial work.	Theory tests/Alignment/project Final Exam	40 % 60%
RADIOGRAPHIC PRACTICE IV (D)	• Introduction to training and data presentation • Developments in radiography equipment • Quality assurance in diagnostic radiography • Advances in diagnostic radiography • New developments in diagnostic procedures	Portfolio – Case Studies Oral & Written Presentations Assignment/s Group Project Clinical Logbooks	20% 20% 20% 20% 20%
RADIOGRAPHIC PRACTICE IV (NM)	• Introduction to training and data presentation • Developments in radiography equipment • In-vitro procedures • Cell labelling • Advanced imaging procedures • Clinical competence in above	Portfolio – Case Studies Oral & Written Presentations Assignment/s Group Project Clinical Logbooks	20% 20% 20% 20% 20%
RADIOGRAPHIC PRACTICE IV (T)	• Introduction to training and data presentation • Developments in radiography equipment • Advances in oncological management • Clinical trials • Quality assurance • Departmental management • Specialized planning	Portfolio – Case Studies Oral & Written Presentations Assignment/s Group Project Clinical Logbooks	20% 20% 20% 20% 20%
RADIOGRAPHIC PRACTICE IV (US)	• Introduction to training and data presentation • Developments in radiography equipment • New trends in ultrasound procedures & Techniques • Advanced MSK imaging & vascular sonography • Echocardiography basics • Quality assurance in ultrasound	Portfolio – Case Studies Oral & Written Presentations Assignment/s Group Project Clinical Logbooks	20% 20% 20% 20% 20%
RESEARCH METHODS & TECHNIQUES	• Purpose, nature and meaning of research • The research process and general procedures • Statistical methods • Compiling of reports and research dissertations	Article Analysis SPSS assignment Proposal	10% 25% 65%

10.3 NATIONAL DIPLOMA IN RADIOGRAPHY: EXTENDED CURRICUUM PROGRAMME.

SUBJECT	LEARNING AREAS/CONTENT	ASSESSMENT PLAN	%
LEVEL I: YEAR ONE			
ANATOMY I	• Embryology • Organisation of the human body • Systems of the body • Cross-sectional anatomy	Theory test Practical tests/Assignment/s	70% 30%
PHYSIOLOGY I	• General physiology • Systems of the body. • Introduction to biochemistry.	Theory tests Practical tests/Assignment/s	80% 20%
PSYCHODYNAMICS OF PATIENT MANAGEMENT	• Professionalism and ethics • Communication • Patient care	Theory test First Aid/Practical tests Assignment /Project (s)	60% 10% 30%
INTRODUCTION TO RADIOGRAPHIC PRACTICE AND PROCEDURES	• Basic concepts, theories and terminologies related to medical imaging and treatment modalities. • Basics of radiation protection	Theory Project (s)	50% 50%
GENERAL EDUCATION 101	• Communication • Composition and note taking • Local and national diversity • Leadership principles	Theory Project (s)	50% 50%
LEVEL I: YEAR TWO			
RADIOGRAPHIC PRACTICE I	• Introduction to Radiography (D, T, NM, US) o Basic terminology • Positioning: o Extremities & Skull o Chest - heart, lungs and thorax o Abdomen o Vertebral column, Pelvis & SI Joints • Normal radiographic anatomy • Introduction to Nuclear Medicine • In vivo Studies • Radiation Hazards & Protection • Oncology Modalities • General Principles of Radiotherapy • Side effects of Radiotherapy • Basic introduction to ultrasound • Ultrasound techniques: gynaecology, obstetrics and general abdomen – normal appearances	Theory test Practical tests Assignment /s	45% 45% 10%
CLINICAL RADIOGRAPHIC PRACTICE I	• Patient care • Radiographic practice	Peer Assessment Assessment DUT Assessment	15% 50% 35%
RADIATION SCIENCES I	Physics: • Heat • Optics • Electrostatics • Electricity • Magnetism • Solid state (detectors/electronics) • Ultrasound: Introduction to physics & principles Chemistry: • General principles of chemistry Medical imaging: • Basic principles • Image recording and display • Introduction to radiation physics and protection	Theory test Assignment /s	90% 10%

INTRODUCTION TO RADIOGRAPHIC PROCEDURES, PRACTICE AND PATHOLOGY	• Advanced concepts, theories and terminologies related to medical imaging and treatment modalities • Introduction to General Pathology: Medical terminology, Cell injury and Cell Death, Infections, Environmental factors to diseases, Tissue responses to damage inflammation and healing.	Theory Assignment/project (s)	50% 50%
GENERAL EDUCATION 201	• Critical writing • Mathematics • Study methods • International diversity • Universal principles	Theory Assignment/project (s)	50% 50%
Diagnostic Student ONLY (Level 2)			
RADIOGRAPHIC PRACTICE II	See Mainstream Subject Content		
RADIATION SCIENCES II			
RADIOGRAPHIC PATHOLOGY II			
CLINICAL RADIOGRAPHIC II			
EXPERIENTIAL LEARNING (YEAR 2)			
Diagnostic Student ONLY (Level 3)			
RADIOGRAPHIC MANAGEMENT III (D)	See Mainstream Subject Content		
RADIATION SCIENCES III (D)			
RADIOGRAPHIC PRACTICE III (D)			
CLINICAL RADIOGRAPHIC PRACTICE III (D)			
EXPERIENTIAL LEARNING (YEAR 3)			

10.4.1 Bachelor of Health Sciences (BHSc) in Diagnostic Radiography; Diagnostic Sonography; Nuclear Medicine; Radiotherapy.

NB: The Modules below include the content for both Semester 1 and Semester 2 of that particular module

Anatomy I	• Introduction to Anatomy • Osteology • Muscular anatomy • Arthrology • Genitourinary anatomy	TBC	
Physiology I	• Cells & Tisues • Integumentary system • Muscular system • Nervous system & Special senses • Endocrine system • Cardiovascular system • Blood • Immunity & Lymphatic system • Respiratory system • Digestive system • Urinary system • Reproductive system	TBC	
Physics I: Module 2	• Thermal physics • Waves & sound • Radioactivity & radiation • Quantum physics	TBC	
Chemistry I	• General chemistry • Chemical elements • Structure of atoms • Atoms and molecules • Chemical reactions • Chemical compounds and life processes • Inorganic compounds • Organic compounds • Clinical applications	TBC	
Professional Practice & Management I	• Students as learners in a University of Technology • History of radiography (including the SA perspective). • Organisational and hierarchy structures in public & private institutions. • Communication and interactions with patients: • Human developmental stages - Patient types & age groups classifications • Patient care • Infection Control – Types and spread of infections • Introduction to drugs • Basic health & safety • Professional ethics • Introduction to Law in South Africa	Theory Tests Projects/Assignments/Practicals	50% 50%
Anatomy II	• Gastrointestinal Anatomy • Respiratory Anatomy • Cardiovascular anatomy • Neuroanatomy • Endocrine Anatomy	Theory Assessment Practical	50% 50%
General Pathology	• Basic Medical Terminology • Cell adaptations, cell injury & cell death • Causes of cell injury & death – environmental, nutritional, genetic disorders • Infections & parasitic diseases – bacterial, viral, fungal & opportunistic	Theory tests Assignment/s/Projects/Portfolios	60% 40%

	• Tissue Responses to injury - acute, chronic & granulomatous inflammation and healing and repair • Immunopathology – inadequate, excessive & inappropriate immune responses • Neoplasia – benign vs malignant, characteristics, spread, grading & staging, and diagnosis • Haemodynamic disorders – shock, haemorrhage, hyperaemia, thrombosis, embolism, infarction, oedema		
Professional Practice & Management II	• Communication: • Infection Control Management of drugs • Venipuncture/Phlebotomy • Principles of Imaging & Treatment for Paediatrics & Geriatrics • Health & safety: • Introduction to Human Rights • Ethics & Medical law	Theory Assessment Project/Assignment Practical	45% 40% 15%
Health Sciences Research I	• Recognising academic sources of information • Plagiarism & copyright • Selection of information using a variety of search engines • Analysis, synthesis and evaluation (processing) of information • Reviewing academic literature • Scientific writing • Report writing • Reflective writing • Mathematics and Statistics for Health Sciences • Basic concepts and principles	Theory Assessment Project/Assignment Presentation Reflective Practice	25% 40% 15% 20%
Professional Practice & Management III	Human Rights: • Human rights in South Africa and other countries • Role of the Truth and Reconciliation Commission • Human Rights in Health Ethics: • Professional Ethics guidelines in SA & other countries • Scopes of Practice and Role extension • Management of contrast media reactions • Contrast media - administration and implications Medical Law: • Access to personal information • Confidentiality in health • Informed Consent and the law • Keeping medical records • The patient as a consumer - Consumer protection • Children and the law • Medical negligence and acts of omission	Theory Assessment Project/Assignment/ Case Study Practical	40% 40% 20%

Health Sciences Research II	• Role of student, supervisor and the institution • Research terminology • Theories and principles of research • Research paradigms and types • Research problem identification and justification • Literature review • Research designs and methodologies • Sampling methods & techniques • Qualitative and quantitative data collection and instruments • Principles of research ethics, human rights and medical law • Data analysis - quantitative	Theory Assessment Critical Analysis of Literature Oral Presentation Research proposal	15% 15% 20% 50%
Management for Health Professionals: Module I	• Principles of Management - POLC • Tasks of Management • Problem identification & Solving • Decision making • Communication • Negotiation • Conflict Resolution • Leadership • Motivation	Theory Assessment Project/Assignment/ Case Study Practical	40% 40% 20%
Leadership & Supervisory Development	• Leaders verses Managers • Qualities of a leader • Leadership styles • Concepts of leadership • Behaviours • Climate and Culture of leadership • Leadership Theories • Conflict Management; Diversity • Leadership Development	Theory tests Assignments/Projects/Portfolio	50% 50%
Health Sciences Research III	• Conducting research (quantitative and qualitative): • Obtaining permission • Data collection • Management of the research process • Management of a budget • Research ethics • Data analysis • Quantitative methods • Qualitative methods • Project write-up • Preparing a scientific paper for publication • Presentation of results to peers	Theory Assessment Project/Assignment/ Project	40% 20% 40%

Professional Practice & Management IV	• Introduction to Entrepreneurship Theory • Self-awareness & Development of Personal Attributes • Industry & Business Classification • Basic Business Plan Development • Business administration • Legislation • Marketing for Entrepreneurs • Finance • Operations Management • Human Resources for Entrepreneurs • Presentation skills	Theory Assessment Project/Assignment Case Study Practical	40% 45% 15%
Small Business Management	• Introduction to Entrepreneurship Theory • Self-awareness & Development of Personal Attributes • Industry & Business Classification • Basic Business Plan Development • Business administration • Legislation • Marketing for Entrepreneurs • Finance • Operations Management • Human Resources for Entrepreneurs • Presentation skills	Theory tests Projects/Assignments/ Case studies/Presentations	40% 60%
Clinical Mentoring & Assessment	• Workplace learning – theories & principles. (Co-op learning, Experiential Learning, Work Integrated Learning). • Role of CHE, HEQC, HEQF, DoH, HPCSA, SETAs, Skills Development • Related terminology • Clinical mentoring teaching and learning strategies • Demonstration techniques • Compiling a task sheet • Communication with mentee, patients/clients • Clinical assessment strategies • Assessment tools/rubrics • Preparing for an assessment • Conducting assessments • Evaluate evidence and making judgements • Providing feedback • Quality Assurance and evaluation	Theory tests Demonstrations/ Practicals/Assignment/ Portfolio	50% 50%
Cornerstone 101 – Yr 1	TBC	TBC	
DUT General Education module*	Choices for Yr 1, 2 , 3 & 4 to be confirmed	TBC	
Faculty General Education module**	Choices for Yr 1, 2 , 3 & 4 to be confirmed	TBC	

BHSc – Diagnostic Radiography, Diagnostic Sonography, Nuclear Medicine, Radiotherapy			
LEVEL 1			
Diagnostic Imaging Sciences 1	• Basic principles of medical imaging. • X-ray tubes and x-ray production • Image formation – Scatter and latent image • Image recording– • Introduction to Digital Radiography. • Image processing • Image display – • Radiographic exposure • Radiation • Basic principles of other imaging modalities	Theory Assessment Practical Assessment Project/Assignment/ Presentation	50% 15% 35%

Diagnostic Practice and Procedures I	• Fundamentals of diagnostic practice . • Radiographic terminology • General patient positioning principles. • Basic radiographic techniques & procedures: o upper & lower limb, shoulder & pelvic girdle o thorax, lungs & heart, abdomen, o skull, spine, sacrum & coccyx. • Radiographic pathology of the: o skeletal system o respiratory system o acute abdomen. • Normal radiographic anatomy and • Image evaluation & interpretation of the: o upper & lower limb, shoulder & pelvic girdle, o thorax, lungs & heart, abdomen, o skull, spine, sacrum & coccyx	Theory Assessment Practical/Image Evaluation Project/Assignment Clinical Practice Assessment	50% 20% 10% 20%
Ultrasound Imaging Sciences I	• Basic principles of medical ultrasound • sound wave • Ultrasound wave generation and detection. • Piezo- electric effect, • Interaction of ultrasound with human body • Ultrasound Equipment • structure of a basic transducer, images display modes: o A mode, M Mode o basic principles of real time B Mode , • Hazards and safety, safe operation and limitations • Image quality • Image artefacts	Theory Assessment Project/Assignment	60% 40%
Ultrasound Practice and Procedures I	Fundamentals of ultrasound practice: Introduction to gynaecology sonography Introduction to obstetrics sonography Introduction to general abdominal sonography Principles of sonography report writing Points to be noted for the above procedures Anatomy, physiology and detailed pathology associated with the above procedures: • Principles of imaging • Definitions of terms • Indications for the examination • Information pertinent to performing the procedure • Patient Preparation, drugs or diet, before, during and after the examination. • Adhere to safe practices guided by ALARA	Theory Assessment Project/Assignment/ Clinical Practice Assessment	40% 20% 40%
Nuclear Medicine Imaging Sciences I	**Nuclear Medicine Sciences** • Radioactivity • Radionuclides • "hot-lab" rules and regulations; construction and design • Quality control tests • Mechanisms of localization of radionuclides/radiopharmaceuticals • Regulations and legal aspects of radiopharmaceuticals **Nuclear Medicine Equipment** • Fundamentals of Nuclear Medicine Equipment; basic design and principle of operation of gamma camera, Na-I crystals, photomultipliers tubes, collimators.	Theory Assessment Project/Assignment/ Portfolio/Case Study	50% 50%
Nuclear Medicine Practice and Procedures I	Radionuclides and Radiopharmaceuticals Musculoskeletal System • Technetium-99m labelled radio-pharmaceuticals for bone and joint imaging	Theory Assessment Project/Assignment/ Portfolio/Case Study Clinical Practice	45% 25% 30%

	Endocrine System: • Thyroid imaging agents Respiratory System: • Lung perfusion agents • Radioactive gases for lung ventilation agents: • Radioaerosol inhalation pulmonary agents Nuclear Medicine Procedures: (this will include a theory and practical component) • bone imaging • thyroid imaging • pulmonary ventilation • pulmonary perfusion		
RadiationTreatment Sciences I	• Radiobiology • Basic Radiation physics • Radiotherapy Equipment - (Basic design and principle of operation • Radiation Protection – principles, general philosophy, policies, protocols and limitations for safe radiation practice, • Imaging and Target volume - Imaging modalities, basic radiotherapy principles, procedures and technology • Quality Control	Theory Assessment Project/Assignment/ Portfolio/Case Study Practical Assessment	50% 30% 20%
Radiotherapy Practice and Procedures I	Common terminology relevant to radiation therapy and oncology practice and procedures. Radiographic Positions for : • Head and Neck cancers, • Cancers of the GI tract, Chest -Lung cancer, • Pelvis Cancers - male & female reproductive system, Cancers in the urinary system Treatment delivery • Mould room and Immobilisation devices • Simulation and Planning of various cancer treatments • Manual planning and calculations • Room & equipment preparation for planning & treatment delivery Modalities available for cancer treatment o Surgery, Chemotherapy, Radiation Therapy Equipment: Treatment Units, • Planning Units and CT Simulation, • Brachytherapy and Treatment Accessories	Theory Assessment Project/Assignment Clinical Practice	45% 35% 20%

BHSc – Diagnostic Radiography, Diagnostic Sonography, Nuclear Medicine, Radiotherapy			
LEVEL 2			
Diagnostic Imaging Sciences II	Basic components of medical imaging systems: • Generation and supply of electricity. • Sensitometry • Radiation exposure factors • The radiographic image • Fluoroscopy and its equipment • Digital systems • Care and maintenance Radiation physics: • Atomic structure and laws of modern physics- • Nature of electromagnetic radiation • X-ray beam quality and quantity • Attenuation of electromagnetic radiation • Interaction of X-rays with matter. • Filtration of electromagnetic radiation • Dosimetry for x - and gamma rays • Radiation protection • Radiobiology - Biological effects • Cellular response to radiation	Theory Assessment Practical Assessment Project/Presentation	50% 20% 30%
Diagnostic Practice and Procedures II	Diagnostic Procedures & Techniques for: • Additional & modified projections of the skull and respiratory system. • Contrast Media Studies – arthrography, dacrocystography, sialography, GIT, GUT, Reproductive systems, including radiographic pathology of these systems. • Critical Care Radiography – trauma & emergency, ward and theatre • Paediatric Radiography – basic general techniques and related radiographic pathology • Abnormal radiographic anatomy and image evaluation & interpretation of the musculoskeletal system, chest and abdomen. • Appropriate usage of radiographic equipment. • Application of patient care, professional practice and ethics	Theory Assessment Clinical Practice Practical/Image Evaluation/Project	40% 30% 30%
Ultrasound Imaging Sciences II	Ultrasound equipment: • structure of electronic ultrasound transducers, • operation of real time B mode scanners, principles of digital scan converters and signal processing features and • characteristics of focused and unfocused ultrasound beam. **Principles of Doppler Ultrasound:** • Doppler effect, Doppler frequency shift, • types of Doppler signal output • Principles of continuous and pulsed wave Doppler ultrasound. • Duplex scanners • Image Quality • Hazards and safety	Theory Assessment Project/Assignment	50% 50%

Ultrasound Practice and Procedures II	Gynaecology scanning: • Scanning technique : Trans vaginal • Pathologies of the female reproductive organs. • Image interpretation of abnormal organs: uterus, ovaries and adnexae • Doppler ultrasound in gynaecology Obstetric Sonography: • Appropriate scanning technique for different trimesters of pregnancy • Complications in the first trimester • Routine second trimester scanning • Foetal environment monitoring • Third trimester foetal growth monitoring scanning • Multiple pregnancy • Doppler in obstetrics General abdomen sonography: Appropriate scanning technique to evaluate abdominal organs • Clinical indications • Image interpretations of abnormal findings in the : liver and biliary system, renal tract, pancreas , spleen and associated vascular structures • Sonography report writing skills Adhere to safe practices guided by the ALARA principle	Theory Assessment Project/Assignment/ Portfolio/Case Study Clinical Practice	40% 20% 40%
Nuclear Medicine Imaging Sciences II	• Interaction of radiation with matter • Different energies used in Nuclear Medicine Imaging. • Measurement of Radiation • Radiation Detectors • Computers. • Gamma camera, • Sensitivity, Resolution, Uniformity , Resolving time • Uniformity correction, Count density, • Field uniformity & sensitivity, • Photopeak calibration, operational characteristics, • Image Recording accessories , Image formation, • CT scanners - basic principle of operation & QC • PET - Principle of operation • Radiopharmacy: o "B" and "C" type laboratory ; o rules and regulations; o principles and techniques for the separation of biological compounds, o quality control procedures associated with the eluate, generator elution, radiochemistry, radiopharmacology associated with specific organ systems	Theory Assessment Project/Assignment/ Portfolio/Case Study Clinical Practice	40% 30% 30%

Nuclear Medicine Practice and Procedures II	**Radionuclide and Radiopharmaceuticals** • Laboratory and general procedures. • Radioactive waste disposal • Endocrine System: adrenal and parathyroid imaging agents • Gastrointestinal system agents • Cardiovascular system agents • Renal agents **Nuclear Medicine Procedures** • Endocrine system • Gastrointestinal imaging • Cardiac imaging • Renal imaging	Theory Assessment Project/ Assignment Portfolio/Case Study/Clinical Practice	40% 30% 30%
Radiation Treatment Sciences II	Radiobiology **Basic Radiation physics** • Radioactive decay • Radiation physics of Radiotherapy Equipment • Linear accelerators • Absorbed dose distributions • Target volume specification • Target absorbed dose specification in: - external RT - brachytherapy Basic principles of operation; basic quality control: - CT Scanners for Virtual and CT-simulation - Radiotherapy Planning Systems for 3D planning - PET/CT Scanner Radiation Protection Imaging and Target volume Image interpretation in radiotherapy GTV, CTV, PTV and relevant ICRU recommendations Quality Control	Theory Assessment Practical Assessment Project/Assignment/ Portfolio/Case Study	50% 20% 30%
Radiotherapy Practice and Procedures II	Treatment of malignancies: Aetiology, Epidemiology, Signs and symptoms, Staging, Treatment modalities, Radiotherapy treatment, planning and treatment delivery for the following: • Integumentary system • Bone tumours • Soft tissue tumours • Breast • Haemopoeitic and lymphatic systems • Special senses: eye and ear • Endocrine system- • Nervous system • Paediatrics • Non-malignant conditions	Theory Assessment Project/Participation Clinical Practice	40% 30% 30%

BHSc – Diagnostic Radiography, Diagnostic Sonography, Nuclear Medicine, Radiotherapy			
LEVEL 3			
Diagnostic Imaging Sciences III	**Computed Tomography (CT):** Historical development: CT generations; Instrumentation; CT data acquisition, reconstruction and image manipulation; Radiation protection practices and quality control measures. **Advanced digital Imaging and exposure:** CR and DR; The imaging plate and detectors; Post processing techniques; Radiation exposure and Image quality; PACS and Teleradiology **Fluoroscopy/Fluorography:** Electromechanical injectors; Operation principles; Design and construction; Radiation dose; **Quality Assurance:** Radiation control laws, regulations and protocols in South Africa, Room Design, Equipment repair contracts, QA and QC for analogue radiography, QA and QC for DR and CR, Reject analysis. **Bone densitometry:** Basic concepts and operation principles, Historical development, Subject density and radiation absorption, Methods of x-ray production and x-ray detection, Fan and pencil beam, Precision and accuracy.: **Magnetic Resonance Imaging (MRI):** History of MRI, magnetism, properties of magnetism, MR system components, MR signal production; tissue characteristics; pulse sequencing, imaging parameters and image formation, MRI safety.	Theory Assessment Assignment/Portfolio/ Case Study Practical	50% 30% 20%
Diagnostic Practice and Procedures III	Specialised Radiographic techniques & procedures and related radiographic pathology for: • Paediatric Radiography • Basic mammography • Bone Densitometry – using DEXA, QCT, QUS • Digital Angiography Normal radiographic anatomy of the relevant applications Abnormal patterns of diseases related to paediatric, mammographic, and angiographic imaging. Systemic CT Imaging – advanced applications of the CNS, respiratory, GIT, GUT, reproductive and endocrine systems Basic MRI applications in the CNS and Musculoskeletal systems, abdomen and pelvis, thorax. Related radiographic pathology of the nervous, cardiovascular, haemopoeitic and endocrine systems. Abnormal cross-sectional anatomy & imaging evaluation & interpretation on CT & MR images. Appropriate usage and maintenance of radiographic equipment. Application of patient care, professional practice and ethics.	Theory Assessment Portfolio/Case Study/ Portfoliol/Image Evaluation Clinical Practice	40% 30% 30%
Ultrasound Imaging Sciences III	• M Mode scanning • 3 Dimension and 4 Dimension real time imaging • Elastography • Image recording devices • PACS • Principles of Doppler Ultrasound: • Doppler spectral analysis • Colour and power Doppler • Image Quality: Resolution, Hazards and safety: • Intensity and power • Biological effects and Clinical safety • Quality Control: Performance testing tests	Theory Assessment Project/Assignment	50% 50%

Ultrasound Practice and Procedures III	Advanced procedures in Gynaecology scanning: • Subfertility • Interventional procedures • 3D and 4D gynaecology scanning • Advanced image interpretation Advanced procedures in obstetric sonography: • Screening tests for chromosomal anomalies • in the first trimester and second trimester • Congenital anomalies • Interventional studies • Foetal Growth disorders Maternal diseases in pregnancy General Abdomen sonography: • Organ transplant • Male Reproductive organs • Small parts sonography Appropriate scanning technique protocols and procedures for small parts. • Breast, Neck, Chest, Eye Vascular Sonography: • Peripheral arterial upper and lower limbs, Carotid scanning • Peripheral venous upper and lower limb, Trans cranial Doppler Paediatric Sonography: • Abdomen, Cranial Quality control	Theory Assessment Project/Assignment	50% 50%
Nuclear Medicine Imaging Sciences III	Gamma camera: o Na I (T1) crystal o Photomultiplier tube o Collimators, Parallel hole, Diverging, Converging, Pinhole, Others, Sensitivity, Resolution, Uniformity , Resolving time , Uniformity correction, Count density, Field uniformity & sensitivity, Photopeak calibration o operational characteristics, Image Recording accessories , Image formation, CT scanners - principle of operation.' Quality control PET and PET/CT- Principle of operation- parts of the scanner In-vitro counting and other Imaging Modalities Radiopharmacy: o "B" and "C" type laboratory ; o rules and regulations; o principles and techniques for the separation of biological compounds, quality control procedures associated with the eluate, generator elution, radiochemistry, radiopharmacology associated with specific organ systems namely brain and cardiac.	Theory Assessment Project/Assignment/ Portfolio/Case Stud	50% 50%
Nuclear Medicine Practice and Procedures III	Radionuclide and Radiopharmaceuticals • Cardiac imaging agents- myocardial perfusion imaging • Genitourinary imaging agents- renal imaging • Nervous system - brain imaging agents • Breast imaging agents • Sentinel node imaging agents • Tumour imaging agents • Infection imaging agents Nuclear Medicine Procedures: (this will include a theory and practical component) • Cardiac imaging - myocardial perfusion imaging • Genitourinary - renal imaging • Nervous system - brain imaging • Breast imaging • Sentinel node imaging	Theory Assessment Project/Assignment/ Portfolio/Case Study Clinical Practice	45% 25% 30%

	• Tumour imaging • Infection imaging • Imaging with labelled blood products • Other newer imaging applicable to the third level of study		
Radiation Treatment Sciences III	• Clinical radiation beam dosimetry • Measurement of radiation output for radiation beams • Filters in radiotherapy • Radiotherapy treatment apparatus • Radiation protection • Particle beams in radiotherapy • Practical radiotherapy and fractionation • Radioactivity	Theory Assessment Practical Assessment Project/Assignment/ Portfolio/Case Study	50% 20% 30%
Radiotherapy Practice and Procedures III	Treatment of malignancies: Aetiology, Epidemiology, Signs and symptoms, Staging, Treatment modalities, Radiotherapy treatment, planning and treatment delivery for the following: • Integumentary system • Bone and Soft tissue tumours • Breast • Haemopoeitic and lymphatic systems • Special senses: eye and ear • Endocrine system • Nervous system • Paediatric • Non-malignant conditions	Theory Assessment Clinical Practice Project/Assignment	40% 30% 30%

BHSc – Diagnostic Radiography, Diagnostic Sonography, Nuclear Medicine, Radiotherapy			
LEVEL 4			
Diagnostic Imaging Sciences IV	**Advanced CT Technology:** • Advanced data acquisition principles: Volumetric imaging; pitch • Advanced image reconstruction & algorithms: Multidetector row spiral; longitudinal interpolation with Z-axis filtering; interlaced sampling; 3D reconstruction (including software) • Archiving & PACS • Image quality in CT: determiners; influencing factors; measurements by physicists; quality control programmes – principles & common QC tests. • Advanced Radiation Protection Practices: measuring patient radiation dose; reducing dose; paediatric doses. • Hybrid systems & fusion Imaging principles **Mammography equipment:** Design and construction, Focal spot, Heel effect, Compression devices, Filtration devices, the magnification setup, use of grids and automatic exposure controls, applications, radiation protection **Advanced Magnetic Resonance Imaging (MRI):** MR pulse sequences, image formation and image contrast, MR parameters, imaging options, and QA in MRI, Advanced MRI safety **QA and QC in Advanced Imaging Systems:** • Principles of QA and QC tests for Fluoroscopy units, CT systems, Cardiac Cath Labs, MRI • **Tendering and commissioning of imaging equipment**	Theory Assessment Practical Assessment/ Project/Assignment/ Portfolio/Case Study Presentation	40% 60%
Diagnostic Practice and Procedures IV	Specialised advanced imaging procedures & techniques:	Theory Assessment Practical/Image	40%

	• Interventional radiography – vascular & non-vascular applications • Advanced CT imaging – advanced applications in systemic imaging, advanced image processing, contrast media usage & optimisation, image quality versus radiation dose, dose optimisation techniques, advanced/abnormal cross sectional anatomy and image evaluation & interpretation. Introduction to fusion imaging and radiotherapy planning. Advanced Quality Assurance Procedures for CT. • Advanced MRI applications – thoracic and abdomino-pelvic imaging, contrast media usage & applications, MRA, spectroscopy, DWI, and Paediatric applications • Advanced Quality Assurance Procedures for MRI • Future Trends in Radiography	Evaluation and Interpretation Project/Assignment/ Portfolio/Case Study Clinical Practice	60%
Ultrasound Imaging Sciences IV	Advanced and specialised ultrasound equipment:: • Latest and future technological advances • 3 Dimension and 4 Dimension real time imaging • Elastography • Contrast agents • Image recording devices and storage devices Advanced Principles of Doppler Ultrasound: • Hazards and safety: • Policies and protocols for safe practice • Quality assurance and control: • Performance testing tests • Phantoms, test selection	Theory Assessment Project/Assignment/ Portfolio/Case Study	40% 60%
Ultrasound Practice and Procedures IV	Advanced procedures in Gynaecology scanning: • Advanced image interpretation • Advanced procedures in obstetric sonography: • Foetal medicine procedures and 3 D and real time 4 D imaging General Abdomen sonography: Interventional procedures Advanced Vascular Sonography: • Peripheral arterial & venous - upper and lower limbs • Carotid scanning • Trans cranial Doppler • Echocardiography • Scanning technique trans thoracic. B Mode, M Mode • Image interpretation normal and abnormal Musculoskeletal Sonography • Appropriate scanning technique for each joint and muscles • Upper limb and lower limb • Image interpretation of normal and abnormal findings Report Writing Detailed and concise report writing of sonographic findings Image interpretation	Theory Assessment Practical/Image Evaluation and Interpretation Project/Assignment/ Portfolio/Case Study Clinical Practice	40% 60%
Nuclear Medicine Imaging Sciences IV	Equipment and Instrumentation • Scintillation detector systems • Survey meter • Dose calibrator • PET detector materials • Terminology; Aperture size, Field of view, Overlap, Bed positions, Full ring tomograph, Partial ring tomograph, Panel detector • Gamma PET camera • Quality control; Normalization, Blank scan, Gains (singles) • Cross-calibration, System performance, Scatter	Theory Assessment Practical/Image Evaluation and Interpretation Project/Assignment/ Portfolio/Case Study	40% 60%

	fraction • Radiation Protection • PET Radiopharmacy: PET		
Nuclear Medicine Practice and Procedures IV	Radionuclides and Radiopharmaceuticals: • Physical properties of radioactive materials -PET/CT • Types of emissions (decays, . Energies, Decay rate and half-life (physical half-life), • Radiopharmaceutical quality control, • Clearance from the body (biological half-life), kinetics of distribution in the body, • Dosage determination, . Calculation of radiopharmaceutical/pharmaceutical doses, calculation of pediatric dose, volume determination Dosage preparation and administration, • Verify correct radiopharmaceutical for exam, Assay in dose calibrator¸ Proper radiopharmaceutical labeling¸ Administration technique, Administration records • PET radiopharmaceutical principles¸ Positron decay¸ Positron energy and effect on resolution¸ coincidence events¸ Bremsstrahlung radiation • Decay factors¸ (HVL) – lead and concrete Nuclear Medicine Procedures: (this will include a theory and practical component) • Colon cancer, Head/neck cancer, Oesophageal cancer, • Lung cancer, Breast cancer, Thyroid cancer, Ovarian cancer, • Melanoma, Lymphoma, Sarcoma,	Theory Assessment Practical/Image Evaluation and Interpretation Project/Assignment/ Portfolio/Case Study Clinical Practice	40% 60%
Radiation Treatment Sciences IV	Radiobiology - Other Radiation Modalities • Necessity • hypoxic problem, methods to overcome hypoxia • High LET radiation neutrons • Protons • Negative pi-mesons • Heavy charged particles Advanced Radiotherapy Equipment: Planning and Treatment with Advanced Methods and Techniques: • Advanced immobilisation devices • Thermoplastic shells, precise mouth-bite, custom head rests, vaclok, hip-fix, knee-fix, ankle-fix, breast board • Virtual simulation, CTsimulation • Contrast agents • CT / MRI fusion, PET / CT fusion • 4DTIC-Trilogy, IGRT, respiratory gating • IMRT vs 3D Conformal XRT • Rapid arc / VMAT vs IMRT • Stereotactic radiotherapy Radiation Protection • Personal, patient and personnel protection • Monitoring: radioactive source • brachytherapy, radiation delivery non-conformance • reporting and documentation Technological Advances • PACS • Image Recording Devices Quality Control and Advanced Performance Tests • Clinical Safety	Theory Assessment Practical/Image Evaluation and Interpretation Project/Assignment/ Portfolio/Case Study	40% 60%

Radiotherapy Practice and Procedures IV	Advanced treatment planning: • Intensity Modulated Radiotherapy (IMRT) vs 3D conformal radiotherapy planning, quality assurance and quality control, advantages and disadvantages). • Virtual-simulation, quality assurance and quality control, advantages and disadvantages. • Rapid arc treatment planning versus IMRT) Advanced treatment delivery: • Image Guided Radiotherapy – IGRT, quality assurance and quality control, immobilization and application • Respiratory gating, advantages and disadvantages, and application • Rapid arc treatment delivery, quality assurance ad quality control, immobilisation, advantages and disadvantages, and application • Stereotactic radiosurgery, immobilisation, quality assurance and quality control, advantages and disadvantages, and application	Theory Assessment Practical/Image Evaluation and Interpretation Project/Assignment/ Portfolio/Case Study Clinical Practice	40% 60%

* CHE – Council of Higher Education * DHET – Department of Higher Education and Training

NB: Students are to read this section in conjunction with the relevant study guide.