BIOMEDICAL & CLINICAL TECHNOLOGY

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

FACULTY OF HEALTH SCIENCES

2024 HANDBOOK

ENVISION2030

transparency • honesty • integrity • respect • accountability
fairness • professionalism • commitment • compassion • excellence

CREATIVE. DISTINCTIVE. IMPACTFUL.

HANDBOOK FOR 2024

FACULTY of HEALTH SCIENCES

DEPARTMENT of
BIOMEDICAL and CLINICAL TECHNOLOGY

The above department offers two programmes:
Biomedical Technology/Medical Laboratory Science &
Clinical Technology

This handbook offers information on both 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' appeals.

FACULTY of HEALTH SCIENCES
FACULTY VISION, MISSION, GOALS & VALUES

The faculty and the department are committed to upholding the ENVISION2030 values and principles which can be summarised as follows:

Vision:
"Leading Transformative and Innovative Health Sciences Education"

Mission Statement:
"Developing Holistic Professionals responsive to Healthcare needs"
through Excellence in:
- Teaching and Learning
- Research, Innovation and Engagement
- Fostering Entrepreneurship

Values

Transparency (To conduct ourselves with openness and honesty through shared governance.)

Honesty (To do what is free from deceit or fraud, and show truthfulness, frankness, sincerity.)

Integrity (To conduct ourselves with strong moral principles. To be honest and authentic. To do what is ethical and just.)

Respect (to have due regard for the feelings, wishes and rights of others)

Accountability
(To accept responsibility for one's actions.)

Principles
Fairness (To treat people justly and individually)
Professionalism (To work within regulatory frameworks of professional conduct. To maintain and develop professional expertise and good work ethic.)
Commitment (The state of being dedicated to a cause or work)
Compassion (To show concern/be sympathetic to the suffering or wellbeing of others)
Excellence (The quality of being outstanding or extremely good)

Goals

The Faculty aims to:

1. Respond to the National health 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 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 / 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

DEPARTMENTAL MISSION & GOALS

The department offers two programmes:

Biomedical Technology and Clinical Technology

The department subscribes to the institutional strategic envision 2020-2030 four strategic perspectives which are:

Society …that leads to mutually beneficial collaborations, the practical application of knowledge and future ready graduates

Sustainability… resulting in the delivery of distinctively DUT experience within an environmentally responsible and financially sustainable environment.

Systems and Processes…We will build an enabling environment that supports dynamic curricular that inspire innovation and entrepreneurship.

Stewardship, Lived values…by living our values and principles within a culture of shared responsibility and accountability and embracing creativity

VISION

Globally recognised for Medical Laboratory Science and Clinical Technology Education

MISSION

"Developing Professionals for Diagnosis and Disease Management"

Through excellence in

- Teaching and Learning
- Research
- Engagement
- Entrepreneurship

VALUES

Professionalism

(To conduct oneself within established standards and norms. To demonstrate professional skills and behaviours.)

Accountability

(To be answerable for one's actions. To be accountable to our society. To be committed.)

Integrity
(To be honest and trustworthy. To be ethical and fair in critical analysis and reporting.)

Respect
(Treat people with courtesy, politeness, and kindness.)

Patients' Lives Matter

Graduate attributes:

1. Use a range of information technologies to identify, gather and disseminate information.
2. Engage in the generation of new knowledge in their specialist professional disciplines and academic fields which will be investigated and recorded scientifically.
3. Work independently, identify, critically analyse and solve problems in their professional, individual and societal environments
4. Lead and effectively manage team members in an organisation and within their communities.
5. Be aware of cultural diversity and show respect to indigenous knowledge, cultures and values
6. Think critically and have excellent decision making skills including awareness of personal strengths and limitations.
7. Communicate effectively within the health care and educational environment, using visual, mathematical and/or language skills in the modes of oral and or written presentation
8. Use science and technology effectively and critically, showing responsibility towards the environment and health of others
9. Participate as responsible citizens in the life of local, national and global communities

Goals

The department aims to:

1. Provide quality teaching, learning and support to students
2. Respond to national human resource and industry needs
3. Provide excellent professional value-driven education, promote entrepreneurship and leadership skills.
4. Produce graduates that are independent thinkers functioning within a team
5. Foster professional and ethical conduct
6. Keep abreast with current and future technological trends
7. Enhance the quality management frameworks to support teaching, learning, assessment and research.
8. Encourage research responsive to community and health needs
9. Position the Department of Biomedical and Clinical Technology nationally and internationally.
10. Attract and retain diverse quality staff while promoting advancement of individual potential
11. Maintain relationships within the institution, relevant professional bodies, industry, educational institutions, alumni and other stakeholders.
12. Foster national and international collaboration and partnerships
13. Strive for excellence and success
14. Embrace an attitude of life-long learning with the aim to improve professional clinical practice through research

CONTENTS

1. DEPARTMENTAL & FACULTY CONTACT DETAILS

All departmental enquiries to:

Secretary:	Mrs Bongekile Nene
Tel No:	(031) 373 5411
Fax No:	(031) 373 5295
Email:	nenebg@dut.ac.za
Location of Department:	ABO209 ML Sultan Campus

All Faculty enquiries to:

Faculty Officer:	Miss FT Mayisela
Tel No:	(031) 373 2701
Email:	thembim@dut.ac.za
Location:	Health Faculty Office, Gate 8, Steve Biko Road, Mansfield Site Area, Ritson Campus

Executive Dean:	Prof GG Mchunu
Executive Dean's Secretary	Mrs Bilkish Khan
Tel No:	(031) 373 2704
Fax No:	0866740237
Email:	bilkishk@dut.ac.za
Location:	Executive Dean's Office, Gate 8, Steve Biko Road, Mansfield Site Area, Ritson Campus

2. DEPARTMENTAL STAFF

Staff	NAME AND QUALIFICATION
Head of Department	Dr J N Mbatha PhD: Medical Micro (UKZN)
Senior Lecturers	Dr B T Mkhize, PhD: Medical Microbiology (UKZN) Dr P Pillay, PhD: Public Health (UKZN) Dr S C Benjamin DTech: Clin Tech (DUT) Dr D R Prakaschandra, PhD (Cardiology) (UKZN)
Lecturer	Mr. M E Memela[1], MTech: Clin Tech (DUT) Miss T S Ndlovu, MTech: Biomed Tech (DUT) Mr. D Govender, M HSc in MLS Mr. C Sydney[2], M Med Sc (UKZN) Mr. DC Mdluli (MSc Med; BTech: Clin Tech)
N Gap Lecturer	Miss S Govender MTech: Clin Tech (DUT)
Senior Lab Technician	Mrs N Naidoo ND Biomed Tech Clin Path and Blood Transfusion; BTech Biomed Tech
Laboratory Technicians	Mr J Mbuyazi, ND: Pharmaceutical Marketing (MLST) Ms T C Qangule, ND: Med Tech Micro (Pen Tech) Ms S. Z. Msane ND Biomed Tech (Cyto); BTech Biomed Tech
Laboratory Assistant	Miss H Ramphal, BTech: OMT (DUT)
Departmental Secretary	Mrs B G Nene, BTech: OMT (DUT)

[1] Head of Programme : Clinical Technology
[2] Head of Programme : Biomedical Technology and Medical Laboratory Science

3. DEPARTMENTAL INFORMATION & RULES

3.1 PROGRAMMES OFFERED BY THE DEPARTMENT

This department offers two programmes, namely:

- Biomedical Technology/Medical Laboratory Science
- Clinical Technology

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	Qualification Code	SAQA NLRD Number	Important Dates
Biomedical Technology Programme			
Master of Health Sciences in Medical Laboratory Science	MHMLS1	96822	Not applicable
Doctor of Medical Laboratory Science	DRMLS1	96805	Not applicable
BHSc in Medical Laboratory Science		101689	
Clinical Technology Programme			
Masters of Health Sciences in Clinical Technology	MHCLT1	96956	Not applicable
Doctor of Medical Clinical Sciences	DRMCS1	96809	
BHSc in Clinical Technology	BHCLT1	96409	

3.3. DEPARTMENTAL INFORMATION

3.3.1. *Academic Integrity*

Please refer to the General Rules pertaining to the academic integrity G13 (1)(o). 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 sessions with the Faculty of Health Sciences, at all times.

3.3.3. *Uniforms*

Students must adhere to instructions regarding specific dress code required during practical sessions and/ hospital visits. All students are required to wear laboratory coats and closed shoes including masks and gloves during practicals.

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 competency. 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 as per programme rules. Where absence impacts on assessment, please refer to Section 3.4. (Departmental Rules) below.

3.3.5. Health and Safety

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

3.3.6. *Registration with the Professional Board*

As a Student: Within two weeks of registration with the Department, students are required to register as Student Medical Laboratory Scientist or Student Clinical Technologists with the Health Professions Council of South Africa as determined in the regulations set out in the Allied Health Service Professions Act, 1982 (Act 63 of 1982) (Regulation R629, Government Gazette No 11221 of 31 March 1988).

As a Graduate (*Medical Laboratory Science)*

A graduate, on successful completion of the qualification and the required internship, and after passing a competency assessment to satisfy the requirements of the Professional Board for Medical Technology, may register as a Medical Laboratory Scientist (as applicable) with the Health Professionals Council of South Africa (HPCSA). After registration with the HPCSA, graduates may work in government, private health care laboratories and research laboratories. Unregistered Medical Laboratory Scientists may work in non-diagnostic laboratories. To practice independently as a Medical Laboratory Scientist, two years post-registration experience is required.

As a Graduate (Clinical Technology):

A graduate, on successful completion of the qualification and after having satisfied the requirements of the Professional Board for Radiography and Clinical Technology, may register as a qualified Clinical Technologist (as applicable) with the HPCSA.

3.3.7. Student appeals:

Rule G1 (8) in the DUT General Handbook apply.

3.4. DEPARTMENTAL RULES

3.4.1 *Special Tests and condonement*

No summative assessments will be condoned. Summative means all assessment marks that contribute to the final mark of a subject, but not including examinations for the purpose of this rule.

- Due to COVID-19 related restrictions some assessment might have to be undertaken virtually. In addition some summative assessments might also have to be changed to continuous assessment methods. Clarity on the nature of assessments will be communicated to students upon receipt of relevant decisions from university management.
- 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 sit for the test. This certificate must be submitted to the lecturer or head of programme, no later than one week after the date of the missed test.
- If a student misses a summative written, oral or practical test, for reasons other than illness, a special test may be granted if the student provides a valid declaration that for unavoidable reasons it was impossible for the student to sit for the test. This declaration must be submitted to the head of programme, no later than one week after the date of the missed test.
- In addition, a special test may be granted to students with borderline academic results. The special test which may take the form of an oral test, may be set at the end of the period of registration, and may include a wider scope of work than the original test.
- Any student who misses an assessment and who does not qualify for a special test, and any student who qualifies for a special test but fails to write it, shall be allocated 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 allocated their original results.

3.4.2 *Student Appeals*

- Rule G1 (8) of the general handbook applies.

SECTION A: BIOMEDICAL TECHNOLOGY PROGRAMME

4. BACHELOROFHEALTHSCIENCESINMEDICALLABORATORYSCIENCE

4.1. PROGRAMME INFORMATION

The Bachelor of Health Sciences in Medical Laboratory Sciences is a professional degree with a minimum number of 480 SAQA credits and is offered at NQF level 8 of the HEQSF. Whilst the majority of the modules are core, some of them are generic in nature and these are offered by both the Faculty of Health Sciences and the institution at large. At each level of study the student has an opportunity to choose from at least two of the elective modules and students will also register for research modules.

Medical laboratory Science is a profession of highly knowledgeable and skilled individuals who perform diagnostic tests on patient samples in a clinical laboratory and are skilled to conduct research. The service offered by Medical Laboratory Scientists is an important component of patient health care, as the results obtained from these laboratory tests are a vital tool in the diagnosis, treatment and prevention of disease. The qualifying student will be able to organize and perform laboratory operations in clinical diagnostic laboratories and related fields in compliance with statutory requirements for ethics, safety and quality assurance. Supervisory, management and research skills are developed.

4.1.1 Duration of the Programme

Successful applicants for study towards a BHSc: Medical Laboratory Science will be accepted into a four-year minimum programme of study. This four year degree level 8 curriculum has been designed in order to enhance student development produce a holistic, diagnostic and research grounded graduate who will directly articulate to the Master's degree.

Students in Medical Laboratory Science must attend formal lectures and practical sessions at the Durban University of Technology in all modules for the duration of their studies. The minimum study period for the BHSc: Medical Laboratory Sciences is four years, including a six (6) months of work integrated learning component and one year clinical training in a Clinical Diagnostic Laboratory. The maximum period of study for this four year degree is six years.

4.1.2 Assessment and Moderation

Most modules in this programme have main and supplementary final examinations. Certain modules in this programme do not have a final examination. The results for these modules are determined through a weighted combination of assessments. As such, there are no supplementary examinations. Students are encouraged to work steadily through the period of registration in order to achieve the highest results possible. Some assessments might have to be changed in keeping with COVID-19 related restrictions at the time at which

assessments are scheduled as explained in Section 3.4.1 of this handbook. Assessment details are listed under each module at the back of this handbook. Moderation follows the DUT requirements.

4.1.3 Registration with the Professional Board

As a Student: Within two weeks of registration with the Department, students are required to register as Student Medical Laboratory Scientist with the Health Professions Council of South Africa as determined in the regulations set out in the Allied Health Service Professions Act, 1982 (Act 63 of 1982) (Regulation R629, Government Gazette No 11221 of 31 March 1988).

As a Graduate

A graduate, upon successful completion of the qualification and the required industry exposure, and having passed a final competency assessment in the fourth year to satisfy the requirements of the Professional Board for Medical Laboratory Science, may register as a qualified Medical Laboratory Scientist (as applicable) with the HPCSA. After registration with the HPCSA, graduates may work in government, private health care laboratories and research laboratories. Unregistered Medical Laboratory Scientist may work in non-diagnostic laboratories. To practice independently as a Medical Laboratory Scientist, two years post-registration experience is required.

4.1.4 Work Integrated Learning Rules

The WIL component includes a 24 week placement which occurs in the sixth semester and a one year placement which occurs in the seventh and eighth semesters. This is a compulsory component of the programme. The student must be registered at the Durban University of Technology for the duration of this period. The student must comply with the rules and regulations as set out in the diagnostic laboratory where placed.

4.2 Learning Programme Structure: Bachelor of Health Sciences in Medical Laboratory Science

Module code	Module Title	Year of Study	HEQSF level	HEQSF Credit	Period of Study	HEMIS credits	Pre-requisite
CMTR101	Chemistry	1	5	16	1a	0.111	
PHIS111	Physics (Module 1)	1	5	8	1a	0.057	
PHIS121	Physics (Module 2)	1	5	8	1b	0.057	
FMLS101	Fundamentals of Medical Laboratory Science	1	5	12	1a	0.086	
STTS101	Statistics	1	5	8	1b	0.051	
ANPA102	Anatomy and Physiology 1A	1	5	12	1a	0.086	
ANPB102	Anatomy and Physiology 1B	1	5	12	1b	0.086	
CBIO101	Cell Biology	1	5	16	1a	0.112	
IMLG101	Immunology	1	5	16	1a	0.111	
CSTN101	Cornerstone 101	1	5	12	1a	0.094	

VWKP101 CLDV101	Values in the workplace Cultural Diversity	1 1	5	8	1 a	0.067	
EVAH101 IGSH101	Environmental Awareness for healthcare Practitioners Issues of Gender & Society within Health care	1	5	12	1	0.082	
CLCM101	Clinical Chemistry I	2	6	16	2 a	0.107	Cell Biology
MMCR101	Medical Microbiology I	2	6	8	2 a	0.053	Anatomy & Physiology
MDMA201	Medical Microbiology IIA	2	7	16	2 b	0.106	Medical Microbiology I
HMTL101	Haematology I	2	6	16	2 b	0.107	Immunology
IMHT101	Immunohaematology I	2	6	16	2a	0.106	Immunology
HPTH101	Histopathology I	2	6	16	2 b	0.106	Anatomy & Physiology
CYTL101	Cytology I	2	6	16	2 b	0.106	Anatomy & Physiology
MLCB101	Molecular Biology	2	6	8	2 a	0.053	Cell Biology
FPTH101	Fundamentals of Pathology	2	6	8	2 a	0.054	Anatomy & Physiology
SYSP101	Systemic Pathophysiology	2	6	8	2 b	0.054	Anatomy & Physiology
TENE101 GENV101 EQDV101	The entrepreneurial edge The global environment Equality and diversity	2	6	8	2 a	0.067	
CLCM201	Clinical Chemistry II	3	7	16	3 a	0.138	Clinical Chemistry I
MDMB201	Medical Microbiology IIB	3	7	16	3 a	0.138	Medical Microbiology 2A
HMTL201	Haematology II	3	7	16	3 a	0.138	Haematology I
CYTL201	Cytology II	3	7	16	3 a	0.138	Cytology I
CLLP101	Clinical Laboratory Practice I	3	7	16	3 b	0.139	All year 1 and year 2 modules
PMTG101	Principles of management	3	7	8	3 b	0.068	
RSJS101	Restorative justice	3	7	8	3 a	0.069	
EDUT101 ETML101	Educational Techniques** Ethics and Medical Law	3	7	12	3 a	0.103	
PRRS101	Principles of Research	3	7	8	3 b	0.069	Pass all third year modules
RPTA101	Research Project 1st Registration	4	8	20	4 a	0.167	Principles of Research
RPTB101	Research Project	4	8	16	4 b	0.139	Principles of Research
IPPA101	Integrated Pathophysiology 1st Registration	4	8	12	4 a	0.089	Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2
IPPB102	Integrated Pathophysiology	4	8	8	4 b	0.086	Clinical Chemistry 2 Cytology 2 2 Haematology

							2 Medical Microbiology 2
LBTM101	Laboratory Management	4	8	12	4 a	0.106	Principles of management
	Clinical Laboratory Practice 2: includes the following specialisation options from 1 – 10 below (the student will have to select one of these advanced specialization modules at 52 credits):	4	8			0.433	
CPHA101	Clinical Pathology 1st Registration	4	8	28	4 a		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology
CPHB101	Clinical Pathology	4	8	24	4 b		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2
CLCA301	Clinical Chemistry III 1st Registration	4	8	28	4 a		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology
CLCB301	Clinical Chemistry III	4	8	24	4 b		
MDMA301	Medical Microbiology III st Registration	4	8	28	4 a		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2
MDMB301	Medical Microbiology III	4	8	24	4 b		
CYTA301	Cytology III 1st Registration	4	8	28	4 a		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2
CYTB301	Cytology III	4	8	24	4 b		
HMTA301	Haematology III 1st Registration	4	8	28	4 a		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2
HMTB301	Haematology III	4	8	24	4 b		

							Cytology 2
HISA201	Histopathology II 1st Registration	4	8	28	4 a		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2
HISB201	Histopathology II	4	8	24	4 b		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2
IHMA201	Immunohaematology II 1st Registration	4	8	28	4a		
IHMB201	Immunohaematology II	4	8	24	4b		Clinical Chemistry 2 Medical Microbiology 2 Haematology 2 Cytology 2

*A pre-req means this subject must be passed prior to registration (prerequisite)
a denotes first semester, b denotes second semester
** this module will not be offered in 2022

4.3 Programme Rules

4.3.1 Minimum Admission Requirements

In addition to Rule G7, the minimum entrance requirement is a National Senior Certificate (NSC) valid for entry into a Bachelor's Degree endorsement and must include the following at the stated minimum ratings below:

NSC REQUIREMENTS		**SENIOR CERTIFICATE REQUIREMENTS**	
Compulsory subjects	**NSC Rating**	**Compulsory subjects**	**SC Symbol**
English (Home language) **OR** English (1st additional language)	4	English HG	D
Mathematics	4	Mathematics HG	D
Life Sciences Physical Sciences	4 4	Biology HG Physical Science HG	D D
And two other 20 credit subjects of which only one may be a language	3		

In addition to Rule G7, the minimum entrance requirement for a holder of a valid National Certificate (Vocational) for entry into a Bachelor's Degree must include the following subjects as the stated minimum ratings below:

Compulsory Subjects	**NC (V)**
English	60%
Mathematics	60%
Physical Sciences	70%
Life sciences	70%
Four other subjects, only one of which may be a language	60%

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

The DUT general rules G7(3) and G7(8) respectively will apply.
The DUT's Admissions Policy for International Students and General Rules G4 and G7 (5) will apply.

4.3.3 Selection Criteria

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 process will apply:

- Initial shortlisting for selection is based on the applicant's academic performance in Grade 12 (Grade 11, or Grade 12 trial marks, will be used for current grade 12 learners).
- Applicants obtaining more than 23 points in their matriculation examination stand a better chance of selection.
- The point scores for each **National Senior Certificate (NSC)** subject or the **Senior Certificate (SC)** results is obtained by using the table below:

Senior Certificate (SC)

Symbol	**A**	**B**	**C**	**D**	**E**	**F**
Higher Grade	8	7	6	5	4	3
Standard Grade	6	5	4	3	2	1

National Senior Certificate (NSC)

8	=	90 – 99%
7	=	80 – 89%
6	=	70 – 79%
5	=	60 – 69%
4	=	50 – 59%
3	=	40 – 49%
2	=	30 – 39%
1	=	0 –29%

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

- Applicants who meet the minimum departmental admission requirements for the Bachelor of Health Sciences in Medical Laboratory Science will be ranked according to the points scored in Grade 11 and Grade 12 and may be invited to participate in the selection process.

Assessment	Weighting
Results of the Senior Certificate or National Senior Certificate	60%
Interview Score	40%

- The percentage weighting assigned to each of these scores will be as follows:

- Selected applicants will be placed into either the four-year degree or an Extended Curriculum Programme.
- Provisional acceptance is given to selected applicants awaiting (NSC) and National Certificate (Vocational) results. If the final Grade 12 NSC/ National Certificate (Vocational) results do not meet the minimum entrance requirements, this provisional acceptance will be withdrawn.
- In addition to grade 12, graduates with ND: Biomedical Technology may also apply for admission into the BHSC: Medical Laboratory Sciences. These applicants will need to apply directly to the department rather than applying to the CAO.

4.3.4 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.

- In addition to the DUT General Rule G17*, a first year student who fails six or more of the modules with an average of less than 40% in the failed

modules during that year is not permitted to re-register for the Bachelor of Health Sciences in Medical Laboratory Science programme. A student who fails 6 modules with an average of 40% in the failed modules, is not precluded from proceeding to the second semester. De-registration from any module is subject to the provisions of Rule G6 (2)*.

- Promotion to Level 2 of study requires a pass in at least 50% of the previous level modules, i.e. year 1 modules; notwithstanding prerequisites and co-requisites. Students' academic progress is considered unsatisfactorily if they have passed less than 50% of their modules in a level.
- Promotion to Level 3 of study requires a pass in at least 50% of Level 2 modules; notwithstanding prerequisites. Students who have passed less than 50% of their modules in a level are considered to be not making satisfactory academic progress.
- Promotion to Level 4 of study requires a pass in at least 50% of the previous level modules, i.e. Level 3 modules; notwithstanding prerequisites. Students who have passed less than 50% of their modules in a level are considered to be not making satisfactory academic progress.
- Prior to commencing with Clinical Laboratory Practice 1, a student must have passed all Level 1 to Level 3 modules.
- Promotion to Level 4 requires successful completion of all lower level modules.

4.3.5 Re-registration Rules

Rule G16 applies

4.3.6 Exclusion Rules

In addition to Rule G17, the following departmental rule applies:

- A first year student who fails six or more modules with a final mark of less than 40% will not be allowed to re-register for the programme: BHSc: Medical Laboratory Science.
- Deregistration from any module is subject to the provisions of Rule G6 (2).

4.3.7 Interruption of Studies

In accordance with Rule G21A (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 MASTER OF HEALTH SCIENCES IN MEDICAL LABORATORY SCIENCE (MHMLS1)

5.1 PROGRAMME INFORMATION

This full research qualification is aligned to Rule G24 and the guidelines in the Post Graduate Student Handbook.

- The student who successfully completes this qualification will be able to apply advanced problem solving skills and critical, reflective thinking to perform independent research in a chosen field and report their findings in a dissertation that meets the accepted criteria and ethical principles for the profession. In this way they will make a contribution to the existing body of knowledge and initiate change that will help develop and advance the profession of medical technology.
- The qualifying student will be able to conduct independent research under minimal guidance in a chosen field, and contribute to knowledge production in that field. The research problem, its justification, process and outcome is reported in a dissertation which complies with the generally accepted norms for research at that level.

8.1.1 Assessment and Moderation

In addition to Rule G24 (4), postgraduate assessment of dissertations will be aligned to Postgraduate policies and guidelines. Please refer to the General Student Handbook and the Postgraduate Student Handbook.

5.2 LEARNING PROGRAMME STRUCTURE

Code	Module	Year of Study	Assessment Type	NATED Credits	Pre-requisites	Co-requisites
MHMLS1	Dissertation	2	External Examination	1.0	None	none

5.3 PROGRAMME RULES

5.3.1 *Minimum Admission Requirements*

In addition to the General Handbook for Students Rule G24 (I), candidates must be in possession of a Bachelor's Degree in Medical Laboratory Science (NQF Level 8), or must have been granted conferment of status according to Rule G10A if they possess a Bachelor of Technology in Biomedical Technology.

Candidates may also apply for admittance via Recognition of Prior Learning (RPL) in accordance with Rule G7 (8) and / or G10B.

5.3.2. Selection Criteria

In accordance with Rule G5, acceptance into the programme is limited and entry into the Master of Health Sciences in Medical Laboratory Science is not automatic. Students are selected into the programme once they have submitted an intention to study / a concept paper and the department has

discussed and approved of the suitability of the proposed topic for the Masters Qualification. The intention to study/ concept page must include the following: Problem statement or Title of the intended study, Objectives / sub-problems / Research Questions, Rationale/motivation of the study, Brief literature review, Brief methodology.

5.3.3 ***Pass Requirements***

Rule G24 and the Postgraduate Student Guide 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.

5.3.4 ***Re-registration Rules***

Rule G24 (2), Rule G26 (5) and the Postgraduate Student Guide apply.

5.3.5 ***Exclusion Rules***

Rule G24 (1) (d); Rule G24 (2), and the Postgraduate Student Handbook apply.

5.3.6 ***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.

6. DOCTOR OF MEDICAL LABORATORY SCIENCE (DRMLS1)

6.1 PROGRAMME INFORMATION

This full research qualification is aligned to Rule G25 and G26 and the guidelines in the Post Graduate Student Handbook. The purpose of this qualification is to ensure that the student who successfully completes this qualification will be able to apply advanced problem-solving skills and critical, reflective thinking to perform independent research in a chosen field and report their findings in a dissertation that meets the accepted criteria and ethical principles for the profession. In this way they will make a contribution to the existing body of knowledge and initiate change that will help develop and advance the profession of medical technology.

6.1.1 Assessment and Moderation

Post graduate assessment will be aligned to Postgraduate policies and guidelines. Rule G25 (4) and the Postgraduate Student Handbook apply.

6.2 PROGRAMME LEARNING STRUCTURE

Code	Module	Duration of Study	Assessment Type	HEMIS Credits	Pre-requisites	Co-requisites
DRMLS1	Dissertation	3	External Examination	2.0	None	none

6.3. PROGRAMME RULES

6.3.1 Minimum Admission Requirements

In addition to Rule G25 (1), candidates must be in possession of a Master in Health Science in Medical Laboratory Science degree (NQF 9), or have been granted status or advanced standing according to Rule G10 when in possession of a Master's degree in Biomedical Technology. Please also refer to the Postgraduate Student Handbook.

6.3.2 Selection criteria

Students are selected into the programme once they have submitted an intention to study/ concept page and the department has discussed and approved of the viability of the proposed topic for the qualification. A sound knowledge of the fundamental principles and concepts of research and statistical methods is required.

6.3.3 Re-registration Rules

Rule G26 (5) and the Postgraduate Student Handbook apply.

6.3.4 Exclusion Rules

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

6.3.5 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 four (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.

SECTION B: CLINICAL TECHNOLOGY PROGRAMMES

7. BACHELOR OF HEALTH SCIENCES IN CLINICAL TECHNOLOGY

7.1 PROGRAMME INFORMATION

This qualification develops a learner to possess the necessary knowledge, skills, attitudes and values to practice as a Clinical Technologist, as a part of a multi-disciplinary team, in one of the following specialist categories: Cardiology, Cardiovascular Perfusion, Critical Care, Nephrology, Neurology, Pulmonology or Reproductive Biology. The qualifying learner will be able to independently perform diagnostic, therapeutic and corrective procedures on patients using specialised health technology and techniques for the treatment of patho-physiological conditions in a hospital-based or in a private practice setting.

This qualification will enable the learner to engage in research and contribute to the creation of new knowledge within the field. Lastly the qualification is designed to provide learners with specific clinical technology skills and competencies that are included in management and research.
The programme will be delivered full-time at DUT, with exposure to the clinical environment from first year to fourth year. The grounding for basic medical and clinical sciences will be provided in the first year, comprising of both theoretical and practical components. The theoretical component will be integrated with the practical component in the Skills Laboratory and through clinical rotational observations in the specialist categories of Clinical Technology. These clinical rotations will be undertaken at HPCSA and DUT accredited training units, and will take place on a fort-nightly basis.
The second level of study will equip the student with more complex knowledge by applying introductory concepts to understand the anatomical and physiological systems, as well as pathogenesis and progression of diseases and conditions, related to Clinical Technology.

In the 3rd level of study, the student is placed in the specific specialist category and rotates through various accredited training units up to the 4th level. Both these levels (i.e. III and IV) will employ an integrated teaching and learning approach where the student will be able to apply scientific and technological knowledge to perform diagnostic, therapeutic and life support procedures, and the evaluation thereof. The delivery of the 3rd and 4th level will be offered in both block lectures and block practical in a 50:50 ratio. The practical block will be facilitated by DUT-appointed clinical instructors and specialist lecturers in an integrated teaching and learning approach (using e-learning, case studies, journaling, for example) to ensure that the learning outcomes are achieved, and that the quality of the delivery is maintained.

7.1.1 Duration of the programme (4 years)

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

7.1.2 Assessments and Moderation

Some modules in this programme do not have a final examination. The results for these modules are determined through a weighted combination of assessments. As such, there are no supplementary examinations. Other modules do have final examinations. However, there might be a need to deviate from the current provisions due to COVID-19 related restrictions as explained in Section 3.4.1 of this handbook. Students are encouraged to work steadily through the period of registration in order to achieve the highest results possible. Assessment details are listed under each module at the back of this handbook. Moderation follows the DUT requirements.

7.1.3 Registration with the Professional Board

As a Student: On enrolment, it is mandatory that a student register as a student Clinical Technologist with the Health Professions Council of South Africa as determined in the regulations set out in the Government Gazette (No. R.1608 dated 24 July 1987).

As a Graduate: A graduate who has completed the qualification successfully and has complied with all the conditions as set out may register as a qualified Clinical Technologist with the Health Professions Council of South Africa in terms of the current rules for registration.

7.1.4 Clinical Practice Level 1 - 4

All components of the Clinical Technology Practice modules assessment are compulsory as this module is continually assessed. Failure to submit any component of the assessment will lead to a fail in the module.

7.1.5 Clinical Technology Practice (Clinical Proficiency assessment component)

The subminimum pass mark is 70%. This applies to level 3 and 4 of study.

7.1.6 Clinical Technology Practice IIb (Oral Structured

Clinical Examination component)
The subminimum pass mark for Oral Structured Clinical Examination component is 70%. This applies to level 4 of study, Clinical Technology practice 2B modules

7.2 PROGRAMME LEARNING STRUCTURE

Insert programme name

Module code	Module Title	HEQSF level	HEQSF Credit	Period of Study	Block Code	Pre-requisite module/s	HEMIS credits
ICLT101	Introduction to Clinical Technology	5	8	1	21	N	0.0645
CMTR 101	Chemistry	5	16	1	21	N	0.129
PHIS111	Physics 101	5	8	1	22	N	0.065
PHIS121	Physics 201	5	8	1	22	N	0.065
AAMY101	Anatomy	5	16	1	21	N	0.129
PYSL101	Physiology	5	16	1	21	N	0.129
PTPY101	Pathophysiology I	5	8	1	22	N	0.0645
ITCT101	Instrumentation and Techniques for Clinical Technology I	5	12	1	22	N	0.0968
CSTN101	Cornerstone module	5	12	1	22	N	0.0968
IZAP101	Isizulu I	6	12	2	22	N	0.094
ITCH101	Introduction to Technopreneurship	5	8	1	22	N	0.0645
VNVL101	Violence and non-violence*	5	8	1	22	N	0.0645
IGSH101	Issues of Gender and Society	5	12	1	21	N	0.0968
PPDV101	Personal and Professional Development I	5	12	1	21	N	0.0968
AAPA101	Applied Anatomy and Physiology I a	6	12	2	21	Anatomy Physiology	0.094
AAPB101	Applied Anatomy and Physiology I b	6	12	2	22	Anatomy Physiology	0.094
CLTP101	Clinical Technology Practice	6	12	2	22	Introduction to Clinical Technology	0.094
ITCT201	Instrumentation and Techniques for Clinical Technology II	6	16	2	21	Instrumentation and Techniques for Clinical Technology I	0.125
PTPY201	Pathophysiology II	6	16	2	22	Pathophysiology I; Physiology	0.125
PRCL101	Pharmacology	6	16	2	21	Anatomy & Physiology	0.125
	Research Methodology I	6	16	2	22	N	0.125
HCDK101	HIV and communicable diseases in KZN	6	8	2	21	N	0.062

EQDV101	Equality and Diversity	6	8	2	21	N	0.062
PPRM 101	Professional Practice & Management	6	12	2	22	N	0.094
IZAP201	Isizulu II	6	12	2	22	N	0.094
RMTD201	Research Methodology II	7	16	3	21	Research Methodology I	0.129

HLCM101	Health care management I	7	8	3	22	N	0.0645
RSJS101	Restorative Justice	7	8	3	21	N	0.0645
ETML 101	Ethics & Medical Law	7	12	3	22	N	0.096
PPDV103	Personal and Professional Development III	7	12	3	22	N	0.096
IZAP301	Isizulu III	6	12	2	22	N	0.094
	ELECTIVES						
	Specialisation in Cardiology						
PTCD101	Pathophysiology for Cardiology	7	16	3	21	Pathophysiology II	0.129
PMCD101	Pharmacology for Cardiology	7	8	3	22	All Level 2 subjects	0.0645
CTCA101	Clinical Technology Practice in Cardiology Ia	7	12	3	21	All Level 2 subjects	0.096
CTCB101	Clinical Technology Practice in Cardiology Ib	7	16	3	22	All Level 2 subjects	0.129
ITCA101	Instrumentation and Techniques for Clinical Technology in Cardiology Ia	7	12	3	21	All Level 2 subjects	0.096
ITCB101	Instrumentation and Techniques for Clinical Technology in Cardiology Ib	7	16	3	22	All Level 2 subjects	0.129
	Specialisation in Critical care						
PPCC101	Pathophysiology for Critical Care	7	16	3	21	All Level 2 subjects	0.129
PHCC101	Pharmacology for Critical Care	7	8	3	22	All Level 2 subjects	0.0645
CCCA101	Clinical Technology Practice in Critical Care Ia	7	12	3	21	All Level 2 subjects	0.096
CCCB101	Clinical Technology Practice in Critical Care Ib	7	16	3	22	All Level 2 subjects	0.129
ICRA101	Instrumentation and Techniques for Clinical Technology in Critical Care Ia	7	12	3	21	All Level 2 subjects	0.096

ICRB101	Instrumentation and Techniques for Clinical Technology in Critical Care Ib	7	16	3	22	All Level 2 subjects	0.129
	Specialisation in Neurophysiology						
PTNP101	Pathophysiology for Neurophysiology	7	16	3	21	All Level 2 subjects	0.129
PHNP101	Pharmacology for Neurophysiology	7	8	3	22	All Level 2 subjects	0.0645
CTNA101	Clinical Technology Practice in Neurophysiology Ia	7	12	3	21	All Level 2 subjects	0.096
CTNB101	Clinical Technology Practice in Neurophysiology Ib	7	16	3	22	All Level 2 subjects	0.129

ITNA101	Instrumentation and Techniques for Clinical Technology in Neurophysiology Ia	7	12	3	21	All Level 2 subjects	0.096
ITNB101	Instrumentation and Techniques for Clinical Technology in Neurophysiology Ib	7	16	3	22	All Level 2 subjects	0.129
	Specialisation in Nephrology						
PTNR101	Pathophysiology for Nephrology	7	16	3	21	All Level 2 subjects	0.129
PHNR101	Pharmacology for Nephrology	7	8	3	22	All Level 2 subjects	0.0645
CTPA101	Clinical Technology Practice in Nephrology Ia	7	12	3	21	All Level 2 subjects	0.096
CTPB101	Clinical Technology Practice in Nephrology Ib	7	16	3	22	All Level 2 subjects	0.129
ITPA101	Instrumentation and Techniques for Clinical Technology in Nephrology Ia	7	12	3	21	All Level 2 subjects	0.096
ITPB101	Instrumentation and Techniques for Clinical Technology in Nephrology Ib	7	16	3	22	All Level 2 subjects	0.129
	Specialisation in Perfusion						
PTPF101	Pathophysiology for Perfusion	7	16	3	21	All Level 2 subjects	0.129
PHPF101	Pharmacology for Perfusion	7	8	3	22	All Level 2 subjects	0.0645
CPPA101	Clinical Technology Practice in Perfusion Ia	7	12	3	21	All Level 2 subjects	0.096
CPPB101	Clinical Technology Practice in Perfusion Ib	7	16	3	22	All Level 2 subjects	0.129
ITFA101	Instrumentation and Techniques for Clinical Technology in Perfusion Ia	7	12	3	21	All Level 2 subjects	0.096
ITFB101	Instrumentation and Techniques for Clinical Technology in Perfusion Ib	7	16	3	22	All Level 2 subjects	0.129

	Specialisation in Pulmonology						
PTPL101	Pathophysiology for Pulmonology	7	16	3	21	All Level 2 subjects	0.129
PHPL101	Pharmacology for Pulmonology	7	8	3	22	All Level 2 subjects	0.0645
CTLA101	Clinical Technology Practice in Pulmonology Ia	7	12	3	21	All Level 2 subjects	0.096
CTLB101	Clinical Technology Practice in Pulmonology Ib	7	16	3	22	All Level 2 subjects	0.129
ITLA101	Instrumentation and Techniques for Clinical Technology in Pulmonology Ia	7	12	3	21	All Level 2 subjects	0.096
ITLB101	Instrumentation and Techniques for Clinical Technology in Pulmonology Ib	7	16	3	22	All Level 2 subjects	0.129
	Specialisation in Reproductive biology						
PTRB101	Pathophysiology for Reproductive Biology	7	16	3	21	All Level 2 subjects	0.129
PHRB101	Pharmacology for Reproductive Biology	7	8	3	22	All Level 2 subjects	0.0645
CTRA101	Clinical Technology Practice in Reproductive Biology Ia	7	12	3	21	All Level 2 subjects	0.096
CTRB101	Clinical Technology Practice in Reproductive Biology Ib	7	16	3	22	All Level 2 subjects	0.129
ITBA101	Instrumentation and Techniques for Clinical Technology in Reproductive Biology Ia	7	12	3	21	All Level 2 subjects	0.096
ITBB101	Instrumentation and Techniques for Clinical Technology in Reproductive Biology Ib	7	16	3	22	All Level 2 subjects	0.129
HCMP101	Healthcare Management Practice	8	12	4	22	All Level 3 subjects	0.091
PPDV 104	Personal and Professional Development IV	8	12	4	22	Community Healthcare and Research III	0.091
RPJA101	Research Project a	*8*	12	4	21	All Level 3 subjects	0.091
RPJB101	Research Project b	*8*	16	4	22	RPJA101	0.12
HLCM201	Health care management II	*8*	16	4	21	All Level 3 Subjects	0.12
CLIN101	Clinical Instruction	*8*	16	4	21	All Level 3 Subjects	0.12
SBSM101	Small Business Management	*8*	16	4	21	All Level 3 Subjects	0.12
IZAP401	Isizulu IV	6	12	2	22	N	0.094

	Specialisation in Cardiology						
CTCA201	Clinical Technology Practice in Cardiology IIa	*8*	16	4	21	All Level 3 Subjects	0.12
CTCB201	Clinical Technology Practice in Cardiology IIb	*8*	16	4	22	All Level 3 Subjects	0.12
ITCA201	Instrumentation and Techniques for Clinical Technology in Cardiology IIa	*8*	12	4	21	All Level 3 Subjects	0.091
ITCB201	Instrumentation and Techniques for Clinical Technology in Cardiology IIb	*8*	16	4	22	All Level 3 Subjects	0.12
	Specialisation in Critical care						
CCCA201	Clinical Technology Practice in Critical Care Iia	*8*	16	4	21	All Level 3 Subjects	0.12
CCCB201	Clinical Technology Practice in Critical Care Iib	*8*	16	4	22	All Level 3 subjects	0.12
ICRA201	Instrumentation and Techniques for Clinical Technology in Critical Care IIa	*8*	12	4	21	All Level 3 subjects	0.091
ICRB201	Instrumentation and Techniques for Clinical Technology in Critical Care IIb	*8*	16	4	22	All Level 3 subjects	0.12
	Specialisation in Neurophysiology						
CTNA201	Clinical Technology Practice in Neurophysiology IIa	*8*	16	4	21	All Level 3 subjects	0.12
CTNB201	Clinical Technology Practice in Neurophysiology IIb	*8*	16	4	22	All Level 3 subjects	0.12
ITNA201	Instrumentation and Techniques for Clinical Technology in Neurophysiology IIa	*8*	12	4	21	All Level 3 subjects	0.091
ITNB201	Instrumentation and Techniques for Clinical Technology in Neurophysiology IIb	*8*	16	4	22	All Level 3 subjects	0.12
	Specialisation in Nephrology						
CTPA201	Clinical Technology Practice in Nephrology IIa	*8*	16	4	21	All Level 3 subjects	0.12
CTPB201	Clinical Technology Practice in Nephrology Iib	*8*	16	4	22	All Level 3 subjects	0.12
ITPA201	Instrumentation and Techniques for Clinical Technology in Nephrology IIa	*8*	12	4	21	All Level 3 subjects	0.091
ITPB201	Instrumentation and Techniques for Clinical Technology in Nephrology IIb	*8*	16	4	22	All Level 3 subjects	0.12

	Specialisation in Perfusion						
CPPA201	Clinical Technology Practice in Perfusion IIa	*8*	16	4	21	All Level 3 subjects	0.12
CPPB201	Clinical Technology Practice in Perfusion IIb	*8*	16	4	22	All Level 3 subjects	0.12
ITFA201	Instrumentation and Techniques for Clinical Technology in Perfusion IIa	*8*	12	4	21	All Level 3 subjects	0.091
ITFB201	Instrumentation and Techniques for Clinical Technology in Perfusion IIb	*8*	16	4	22	All Level 3 subjects	0.12
	Specialisation in Pulmonology						
CTLA201	Clinical Technology Practice in Pulmonology Iia	*8*	16	4	21	All Level 3 Subjects	0.12
CTLB201	Clinical Technology Practice in Pulmonology IIb	*8*	16	4	22	All Level 3 Subjects	0.12
ITLA201	Instrumentation and Techniques for Clinical Technology in Pulmonology IIa	*8*	12	4	21	All Level 3 subjects	0.091
ITLB201	Instrumentation and Techniques for Clinical Technology in Pulmonology IIb	*8*	16	4	22	All Level 3 subjects	0.12
	Specialisation in Reproductive Biology						
CTRA201	Clinical Technology Practice in Reproductive Biology IIa	*8*	16	4	21	All Level 3 subjects	0.12
CTRB201	Clinical Technology Practice in Reproductive Biology IIb	*8*	16	4	22	All Level 3 subjects	0.12
ITBA201	Instrumentation and Techniques for Clinical Technology in Reproductive Biology IIa	*8*	12	4	21	All Level 3 subjects	0.091
ITBB201	Instrumentation and Techniques for Clinical Technology in Reproductive Biology IIb	*8*	16	4	22	All Level 3 subjects	0.12

7.3 PROGRAMME RULES *(Approved by SENATE August 2014)*

7.3.1 Minimum admission requirements

In addition to Rule G7*, the minimum entrance requirements for the holder of a valid National Senior Certificate (NSC) or a Senior Certificate or National certificate (Vocational) for entry into a Bachelor's Degree and must include the following subjects at the stated minimum ratings in Table 1

Table 1: Minimum Admission Requirements

NSC REQUIREMENTS		SENIOR CERTIFICATE		NC (V)	
Compulsory subjects	**NSC Rating**	**SC Symbol HG SG**			
English (Home language) **OR** English (1st additional language)	4	D	B	70%	
Mathematics	4	D	B	70%	
Life Sciences	4	D	B	70%	
Physical Sciences	4	D	B	70%	
And two other 20 credit subjects of which only one may be a language	3			Four other subjects, only one of which may be a language	70%

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

The DUT General Rules G7 (3)* and G7 (8)* respectively will apply. The DUT's Admission Policy for International Students and General Rules G4* and G7 (5)* will

apply.

7.3.3 Selection procedures

All applicants must apply to 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.
- Applicants obtaining more than 25 points increase their chance of selection into the programme.
- The point scores for the **NSC** or the **SC** or the **NC(V)** results is obtained by using the table 2.

Table 2: Point Scores

	NSC	SC		NC(V)
RESULTS		**HG**	**SG**	
90 – 99%	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	2	
40 – 49%	3	3	1	
30 – 39%	2	2		
0 – 29%	1	1		

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

- Applicants who meet the minimum departmental admission requirements for the Bachelor of Health Sciences in Clinical Technology will be ranked according to the points scored in Grade 12, and may be invited to participate in the selection process.
- The selection is based on the criteria and weightings in the Table 3:

Table 3: Weighting of assessments

Assessment	Weighting (%)
Results of the Senior certificate/National Senior Certificate	**60**
Interview scores	**40**

- Applicants invited to the selection process should have a sound knowledge of the Clinical Technology profession.
- Successful applicants will be placed into either the four-year degree or the five-year Extended Curriculum Programme.
- Provisional acceptance is given to selected applicants awaiting National Senior Certificate (NSC) and National Certificate (Vocational) results. If the final Grade

12 NSC/ NC (V) results do not meet the minimum entrance requirements, the 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.
- In addition to the minimum requirements explained above, graduates in receipt of ND: Clinical Technology may also be considered for entry into the BHSC: Clinical Technology.

7.3.4 Progression rules

In addition to Rules G16*, students must pass all prerequisite modules as per Table 1 before progressing to a higher level.

7.3.4 Exclusion rule

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

7.3.5 Re-registration

Rule G17* of the General Handbook for Students applies.

7.3.6 Interruption of studies

Should a student interrupt their studies for a period or more than three 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.

7.3.7 Clinical Technology Practice (CTP)

In addition to Rule G28*, the following should be noted:

1. The department is responsible for placement of students for Clinical Practice Learning from level I – IV. Transportation arrangements to the clinical training sites is the responsibility of individual students from level III and IV.
2. It must be note that placement for CPL in level III and IV is based on the industry demands for each year.
3. Students will not be allowed to change specialist categories in the third and the fourth registered level.
4. Disciplinary matters occurring in the unit will, in the first instance, be subject to the disciplinary code of conduct of that specific unit, and then be referred to DUT for student disciplinary action.
5. Students must achieve clinical competencies in a Health Professions Council

of South Africa (HPCSA)-accredited training unit.

7.3.8 Registration with the Health Professions Council of South Africa

Students are required to register as a student Clinical Technologist with the Health Professions Council of South Africa (Board of Radiography and Clinical Technology) in their first year of study. Registration fees and submission of registration documents will be for the responsibility of the student. Upon successful completion of studies, including CPL period, student must register with HPCSA as a Graduate Clinical Technologist under independent Practice category

8. MASTERS OF HEALTH SCIENCES IN CLINICAL TECHNOLOGY (MHCLT1)

8.1 PROGRAMME INFORMATION

This full research qualification is aligned to Rule G24 and the guidelines in the Post Graduate Student Handbook.

- The Student who successfully completes this qualification will be able to apply advanced problem solving skills and critical, reflective thinking to perform independent research in a chosen field and report their findings in a dissertation that meets the accepted criteria and ethical principles for the profession. In this way they will make a contribution to the existing body of knowledge and initiate change that will help develop and advance the profession of medical technology.
- The qualifying Student will be able to conduct independent research under minimal guidance in a chosen field, and contribute to knowledge production in that field. The research problem, its justification, process and outcome is reported in a dissertation which complies with the generally accepted norms for research at that level.

8.1.1 Assessment and Moderation

In addition to Rule G24 (4), postgraduate assessment of dissertations will be aligned to Postgraduate policies and guidelines. Please refer to the General Student Handbook and the Postgraduate Student Handbook.

8.2 PROGRAMME LEARNING STRUCTURE

Code	Module	Year of Study	Assessment Type	NATED Credits	Pre-requisites	Co-requisites
MHCLT1	Dissertation	2	External Examination	1.0	None	none

8.3. PROGRAMME RULES *(Approved by SENATE August 2014)*

8.3.1 Minimum Admission Requirements

In addition to the General Handbook for Students Rule G24 (I), candidates must be possession of a Bachelor's Degree in Clinical Technology (NQF Level 8), or must have been granted conferment of status according to Rule G10A. Candidates may also apply for admittance via Recognition of Learning (RPL) in

accordance with Rule G7 (8) and / or G10B.

8.3.2 Selection Criteria

In accordance with Rule G5, acceptance into the Masters of Health Sciences programme is limited, and not automatic. Students are selected into the programme once they have completed an intention to study and the department has discussed the viability of the proposed topic for the Masters Qualification. The intention to study/ concept page must include the following: Problem statement or Title of the intended study, Objectives / sub-problems / Research Questions, Rationale/motivation to do the study, Brief literature review, Brief methodology.

Applicants must have an aggregate of 60% overall for the B Tech Degree.

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 (2), Rule G26 (5) and the Postgraduate Student Handbook apply.

8.3.5 Exclusion Rules

Rule G24 (1)(d); Rule G24 (2), and the Postgraduate Student Handbook apply.

8.3.6 Minimum and maximum duration

The minimum duration for this programme shall be one (1) year of registered study and the maximum duration shall be three (3) years of registered study.

8.3.7 Interruption of Studies

Should there be bona fide reasons for the interruption of studies for a period of one (1) year or more once the candidate is formally registered, the student may apply for an interruption of registration. Registration may be interrupted under exceptional circumstances only and is not done retrospectively.

9. DOCTOR OF MEDICAL CLINICAL SCIENCES (DRMCS1)

9.1 PROGRAMME INFORMATION

This full research qualification is aligned to Rule G25 and G26 and the guidelines in the Post Graduate Student Handbook. The purpose of this qualification is to ensure that the student who successfully completes this qualification will be able to apply advanced problem-solving skills and critical, reflective thinking to perform independent research in a chosen field and

report their findings in a dissertation that meets the accepted criteria and ethical principles for the profession. In this way they will make a contribution to the existing body of knowledge and initiate change that will help develop and advance the profession of Clinical Technology.

9.1.1 Assessment and Moderation

Post graduate assessment will be aligned to Postgraduate policies and guidelines.

Rule G25 (4) and the Postgraduate Student Handbook apply.

9.2 LEARNING PROGRAMME STRUCTURE

Code	Module	Duration of Study	Assessment Type	HEMIS Credits	Pre-requisites	Co-requisites
DRMCS1	Dissertation	2	External Examination	2.0	None	none

9.3 PROGRAMME RULES

9.3.1 Minimum Admission Requirements

In addition to the General Handbook for Students Rule G24 (I), candidates must be possession of a Master's Degree in Clinical Technology (NQF Level 9), or must have been granted conferment of status according to Rule G10A. Candidates may also apply for admittance via Recognition of Learning (RPL) in accordance with Rule G7 (8) and / or G10B. Students are selected into the programme once they have completed an intention to study and the department has discussed the viability of the proposed topic for the qualification. A sound knowledge of the fundamental principles and concepts of research and statistical methods is required.

9.3.2 Re-registration Rules

Please refer to Rule G26 (5) and the Postgraduate Student Handbook.

9.3.3 Exclusion Rules

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

9.3.4 Minimum and maximum duration

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 four (4) years of registered study.

9.3.5. Interruption of Studies

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.

10. SUBJECT CONTENT AND ASSESSMENTS

NB:

- **The information below might change from time to time to suite national, institutional, faculty and departmental needs as may be approved by the Department of Higher Education, the HPCSA and the DUT relevant committees.**
- **Students are to read this section in conjunction with the relevant study guide.**

10.1 BIOMEDICAL TECHNOLOGY

10.1.1 BACHELOR OF HEALTH SCIENCES IN MEDICAL LABORATORY SCIENCE

CHEMISTRY	Apply knowledge and principles of general and organic chemistry. Explain with examples the role of chemistry in everyday life. Perform calculations required for solution chemistry. Prepare solutions following accurate procedures. Demonstrate understanding of the periodic table of elements and apply knowledge to general principles of chemistry. Draw up balanced chemical reaction equations.	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
PHYSICS (MODULE 1)	MECHANICS Fundamental Units & Dimensional Analysis Vectors and Scalars One Dimension Kinematics Newton's Laws of Motion Work, Energy & Power Impulse and Momentum Rotational Dynamics PROPERTIES OF MATTER Phases of Matter Elasticity Density and Specific Gravity Pressure in Fluids Atmospheric Pressure and Gauge Pressure Pascal's Principle Buoyancy and Archimedes' Principle Surface Tension Capillary Action Viscosity Poiseuille's Law	Theory tests (average of all): 26% Practical tests 14% Examination: 60%
PHYSICS (MODULE 2)	THERMAL PHYSICS Temperature Heat and Temperature Change Thermal Expansion of Solids	Theory tests (average of all): 26% Practical tests 14% Examination: 60%

	Heat and Phase Change Calorimetry Heat Transfer Mechanisms WAVES & SOUND Oscillatory Motion Wave Motion & Types of Waves Frequency, Amplitude and Wavelength Speed of Waves on Strings Reflection of Waves Sound Waves Energy and Intensity of Sound Waves Doppler Effect GEOMETRICAL OPTICS Reflection Refraction & Snell's Law Dispersion Critical Angles & Total Internal Reflection Images Formed by Plane Mirrors Images Formed by Spherical Mirrors Images Formed by Refraction: Thin Lenses ELECTRICITY& MAGNETISM Electric Charge Insulators and Conductors Charging by Friction, Conduction and Induction Coulomb's Law Electric Field & Electric Field Lines Electric Current & Potential Difference Resistance & Ohm's Law Series & Parallel Circuits Fundamentals of Magnetism RADIOACTIVITY & RADIATION Properties of Nuclei Binding Energy Decay Processes (Alpha, Beta & Gamma) Decay Constant & Half-Life Activity Medical Applications of Radioactivity Biological Effects of Ionizing Radiation QUANTUM PHYSICS Blackbody Radiation and Plank's Hypothesis Photoelectric Effect Photons & Electromagnetic Waves Wave Properties of Particles C	
FUNDAMENTALS OF MEDICAL LABORATORY SCIENCE	Pipetting. Use of balances. Units, measurements and calculations related to solution preparation. Operate specified equipment in accordance with standard operating procedures, using different equipment including spectrophotometers, pH meters, weighing of chemicals. Laboratory equipment made of glass and plastic appropriately Sterilization procedures applicable to different medical laboratory equipment, reagent and surfaces. Apply and uphold safety procedures and correct disposal of waste in accordance with safety regulations acknowledging occupational health and safety principles. Quality Assurance procedures and principles of maintenance of equipment & test analysis.	CONTINUOUS ASEESSMENT Theory test: 50% Practical Tests: 20% Practical Reports: 10% Assignment/project: 10% Lab maths +tuts: 10%

	Role and function of the medical laboratory scientist. Apply ethical, professional, and medico-legal principles and rules in the laboratory as applied when dealing with different laboratory specimen testing Stock control procedures in the laboratory. Communicate within a group using verbal, written and electronic means of communication. Fundamental knowledge of statistical techniques **TOPICS** HPCSA SMLTSA OHS act Hierarchy Course structure CPD Bathopele principles Specimen types Transportation Anticoagulants Storage Decontamination Disinfection Biological, physical and chemical hazards Evacuation drills General laboratory safety rules Centrifuges and centrifugation Balances and weighing Spectrophotometer and photometry pH meter and pH measurement Laboratory glassware and plastic ware Autoclaving Microscopes Water purification (distillation and deionisation) Refrigeration Use of quality control (QC) Terminology used in QC Record books Filing	
STATISTICS	Introduction to Statistics (The learners will be exposed to the differences between descriptive and inferential statistics and its use in the Applied Sciences and the use of computers in statistics) Collection of Data (The different types data and its method of collection will be discussed) Presentation of Data (The presentation of data in the form of frequency distributions, graphs and charts will be discussed) Measures of Location and Variation (The learners will be taught the various calculation methods on the data collected and presented) Correlation and Regression Analysis (An understanding of the relationships between variables will be accomplished through these analyses and its use in the Applied Sciences) Basic Probability and its distributions (The learners will be exposed to the basic probability concepts and its various distributions that exist and its relevance to Applied Sciences)	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
ANATOMY AND	The human body. The cell: Fluids and electrolytes,	2 X two hour theory test

PHYSIOLOGY 1A	Histology Describe the language relating to anatomy and physiology. Describe the organisation of the body, metabolism, and the structure and function of the cell Identify, describe, label & draw tissue types Explain homeostasis at cellular level Explain the importance and role of electrolytes and fluids in cells and tissues. Skeletal system. Joints. Skin. Thermoregulatory system Describe the integumentary system is in terms of structure and function Classify & describe the anatomy of the skeleton Describe the anatomy and physiology of the voluntary muscles. Explain the structure of the skin & its components. Consider the role of the skeletal system muscle & skin as it relates to issues that may occur in the environmental health scenario .e.g. ergonomics Nervous and endocrine systems. Senses. Describe the nervous system in terms of organization, structure and function. Explain the four special senses and their relationship to each other (taste, smell, hearing and sight) Describe the endocrine system terms of hormones and their effects.	A supplementary test will be made available. Each theory test will carry a weighting of 50%
ANATOMY AND PHYSIOLOGY 1B	Heart and circulatory system. Lymphatic system. Respiratory system. Immunology Explain the composition of blood is identified and essential functions are explained. Describe anatomy and physiology of the heart and vascular systems. Describe anatomy and physiology of the lungs and respiratory tree. Explain gas exchange in the lungs and body tissues. Explain mechanism of breathing. Urinary system & reproductive system Describe he anatomy and physiology of the urinary system. Explain the anatomy of the male and female reproductive systems is described. Discuss the essential functions of the male and female reproductive systems Digestive system & nutrition.	2 X two hour theory test A supplementary test will be made available. Each theory test will carry a weighting of 50%

	Describe the anatomy and physiology of the digestive tract and associated organs. Explain the process of digestion. Consider the effects of food and nutrition on the human body as it relates to digestion. E.g. Food poisoning/ chemicals. Describe the role of good nutrition in terms of macro & micro nutrients and the importance of good diet. Discuss the effects of poor nutrition on the human body e.g. malnutrition.	
CELL BIOLOGY	pH and buffers biomolecules and bio elements carbohydrates nucleic acids amino acids proteins enzymes lipids metabolism introduction to Polymerase Chain Reaction (PCR)	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
IMMUNOLOGY	Development if immunology as a science; specific immune response; non-specific immune response; adaptive and innate immune response; antigen; antibody; self and non self; primary and secondary immune response; lymphoid organs; cells; functions and structure Structure of antigen and antigen receptor; growth factors; relationship between growth factors and immune response Structure of the antibody; functions; induction of antibody; effector functions; switch between classes; classification and function of classes Humoural immunity; cell mediated immunity; human lymphocytic antigens; Histocompatibility Shielding of antigen – recognition as self; disorders of compliment deficiencies; hypersensitivity autoimmune disorders; immune deficiencies; human immunodeficiency virus Properties of complement; nomenclature; complement cascade; amplification loop; tick over; regulation	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
CORNERSTONE 101	The module content will be developed around the concept of journeys, across time, across space, and across human relationships; the first use of the concept will take the journey of the Umgeni River (which is close to all DUT campuses) as a metaphor. The module will bring different disciplinary perspectives to this content. The module will start with the analysis of a particular issue or metaphor (one critical event or development will be and analysed; the event in focus will be selected on the basis of its connections to the theme of journeys and its relevance to the issues of ethics, diversity and critical citizenry). The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning. At each stage of	A weekly blog written by each student 20% Tutorial attendance (forfeited if student attends less than 80% of tutorials) 10% Visual artefact 15% Written report 30% Oral presentation 15% Peer assessment 10%

	the module, students will be required to engage in activities that involve reflection and build communicative practices. There will be a concluding section in which students will identify their learning and examine the implications for their roles as students and as citizens.	
VALUES IN THE WORKPLACE	The module will begin with a reflection on personal values and move to a discussion on how they intersect with values in the workplace. Small group discussions will be formed around how to build positive values in the workplace and the vital themes of ethics, respect, interconnectedness, honesty, creativity and human diversity will form the basis for building "sacred spaces at work." This will set the tone to unpack issues around leadership values and ethics and ethical decision making. The final section of the module will integrate all these aspects and students will be required to identify the implications of what they have learnt to develop social responsibility and their roles as citizens.	Assignments 40 % Presentation 20% Reflection 20% Peer assessment. 20%
LAW FOR LIFE	Introduction Civil and criminal law Law of insurance Road accident fund Law of contract Marriage Succession	Assignment 60% Poster 20% Will document 20%
WORLD OF WORK	Traditional and Modern CV Writing; Who Am I?; (DISC, MBTI etc) Job Searching; Job Applications; Networking; Interviewing; Body Language; Verbal Communication; Visual/Graphical Presentation; What Is "Business"? Career Path Options; Work Readiness Expectations Business Processes and Goals; Organisational Aspects; Stress; Business Ethics Etiquette - Telephone; Social Media, General Goal Setting & Time Management; Personal Finance Numeracy Project Management; Meetings Technical Report Writing; Productivity in the Workplace Quality in the Workplace Health & Safety in the Workplace; Housekeeping; Computer and Technology Applications Problem Identification & Solving; Creativity, innovation and questioning Interpersonal Skills; Power & Conflict Management, (Johari) Planning; Organising; Motivation; Leadership and Teamwork	Tests (average of all) 60% Assignment 30% Classwork 10%
Cultural diversity	The module will be introduced by defining culture and	Assignments: 20%

	establishing the salience of culture in the local and global context. There is also some attention paid to diverse cultural groups in the SA and global context. The core content focuses on aspects of social responsibility and gives strong attention to issues of anti- discriminatory and anti- oppressive practices. Social justice is unpacked and the effect of marginalization on oppressed groups discussed. Consciousness raising and social action and dialoguing across differences is used to interweave the introductory and main aspects of the module. It forms an appropriate way to conclude the module as it requires students to engage in activities that involve reflection and personal commitment to anti-oppressive practices.	Oral presentation 40% Portfolio: 40%
Environmental Awareness for healthcare Practitioners	Introduction to concepts of the environment i.e social, professional and natural. Psychological health issues of the environment. Public health issues relating to the environment. Health care issues in situations of natural or anthropogenic disasters. Health care and the social environment.	- Project report and presentation: 70% weighting. - Assignment: 30% weighting.
Issues of Gender & Society within Health care	Gender and related concepts: gender power relations, gender roles, manifestation of gender bias, gender as one of the many social determinants of health. The effects of gender discrimination on health matters of the individual. Effective communication with patients in a health care setting, demonstrating an awareness of the practitioner-patient power differential and gender and cultural differences. The impact of health care delivery systems in relation to gender. The workplace impact of gender-based societal and cultural roles and beliefs on health care practitioners.	• Project report and presentation: 50% weighting. • Assignment 1: 30% weighting. • Assignment 2: 20% weighting.
CLINICAL CHEMISTRY I	Anticoagulants and preservatives Collection and handling of specimens Spectrophotometry Quality Assurance Reference ranges Automation principles and methods Amino acids, Plasma protein and albumin Principles of electrophoresis Kidney function tests including urinalysis, osmolality, urine tests, calculi Liver metabolites Use and maintain lab equipment Electrochemical techniques Electrolytes. Uric acid Acid/base balance Laboratory mathematics/calculations	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
MEDICAL MICROBIOLOGY I	Introduction to medical microbiology Good laboratory practices in the microbiology	Theory tests (average of all): 24% Practical tests 10%

	laboratory Instrumentation and its application in the laboratory Development of microbiological techniques and application Taxonomy and nomenclature of microorganisms Microscopy and staining Bacterial cultivation and measurement Microbial metabolism (biochemical tests) Symbiotic relationship and establishment of disease Control of microorganisms Microbial genetics and recombinant DNA technology	Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
MEDICAL MICROBIOLOGY 2A	**BACTERIOLOGY** Microbiology terminology and personnel responsibilities Collection, transport, processing of biological specimens Storage and disposal of biological specimen and waste Classification of medically important bacteria Laboratory identification of microorganisms Microbiological tests and techniques(routine and specialised) **PARASITOLOGY** Classification of medically important parasites Life cycles of medically important parasites Parasites pathogenesis Epidemiology Laboratory identification **VIROLOGY** Classification of medically important viruses Epidemiology Replication cycles Cell culture preparation and identification of medically important viruses **MYCOLOGY** Classification of medically important fungi Fungal structures and reproduction Classification of mycoses	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
HAEMATOLOGY I	Blood formation, Cell development: Red cells, white cells, platelets Structure and function of the bone marrow, cells, haemoglobin Growth factors and their effects: erythropoietin, thrombopoietin, Interleukins, cytokines, other growth factors Factors affecting release of mature cells from the marrow Nutritional requirements in cell development: iron, vitamin B_{12}, folate Metabolic requirements of cells: Hexose monophosphate shunt; Rapaport-Leubering pathway; Glycolytic pathway; Methaemoglobin reduction pathway; Glutathione metabolism pathway Processes leading to red cell destruction, features of haemolysis Structure and function of organs involved in haematopoiesis: spleen, thymus, lymph nodes, liver The immune system: types of immune mechanisms, immune responses The process of haemostasis including the coagulation	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%

	cascade and fibrinolysis Properties of a good anticoagulant and their effects on specimens, good quality samples Sites of blood and bone marrow collection, principles and methods of tests and techniques: full blood count, differential count, reticulocyte count, coagulation studies, polymerase chain reaction, diagnostic usefulness of bone marrow specimens Storage protocol and the effects of storage on haematological specimens Protocols on reporting of laboratory results Good laboratory practice including ethics, safety principles Principles of quality control programmes in haematology	
IMMUNOHAEMATOLOGY I	Blood donation criteria and testing. Procedures for the collection, processing and testing. Storage and issuing of blood and blood products. Clinical indications for the use of blood and blood products Haemovigilance and biovigilance Apheresis. Clinical significance of blood group system antigens and antibodies. Basic serological techniques. Blood group interpretation Causes of false results in laboratory testing Blood group reaction patterns and interpretation Compatibility and transfusion testing. Selection of blood for cross-match Risks and benefits associated with blood transfusion. Transfusion transmitted diseases. Haemolytic disease of the foetus and new-born (HDFN) Quality management systems.	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
HISTOPATHOLOGY I	Laboratory administration – collection, logging, distribution, data recording, reporting, accession and retrieval of data. Safety in the histopathology laboratory – recognize dangers by fresh, unfixed tissue biopsies. Storage and safe handling of chemical and dyes. Light and electron microscopy – behaviour of light and electrons. Fixation and fixatives – effects of specific fixatives on tissue and organs. Poor fixation and fixation artefacts and corrective action. Tissue processing – familiar with the handling of the tissue processor and reagents used. Recognize processing artefacts and take corrective action. Tissue embedding – embedding techniques of various tissue biopsies. Microtomy – familiar with the safety features and how to use a microtome for sectioning of various tissue types. Staining – preparation and use of reagents used to stain specific tissue components and structures to contribute to diagnosis.	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
CYTOLOGY I	The origins and role of Cytology as a discipline as well as outline the professional and ethical role of a	Theory tests (average of all): 24% Practical tests 10%

	cytotechnologist functioning in a Cytology laboratory. Quality Assurance programme in a Cytopathology LaboratoryThe role of automation in a cytology laboratory, including Liquid- based Cytology and Automated Screening Systems. Growth and differentiation of cells and tissues. The normal cells and tissues found lining the female genital tract (FGT). Collection and processing of cytological samples specimens from the FGT. Cytological evaluation of specimens of the FGT including normal constituents of the cervical smear, infective agents (bacteria, fungi, parasitic and viral agents), inflammatory, degenerative and regenerative changes and other non-neoplastic changes, (Acute inflammation, chronic inflammation, Tissue repair, follicular cervicitis, atrophic vaginitis, metaplasia, parakeratosis and hyperkeratosis) The effects of the reproductive hormones on the cells of the FGT The morphogenesis and cytological presentation of premalignant and malignant conditions of the FGT (Natural history of cervical cancer, Pathogenesis of cervical cancer, LSIL, HSIL, Squamous carcinoma, ,Adenocarcinoma, Rare Tumours (Clear cell carcinoma, Hydatidiform mole; Choriocarcinoma; Adenosquamous carcinoma, Lymphomas; Melanoma; Sarcomas/ Mixed Mesodermal Tumours, Extrauterine malignancies (ovary/ vulva); Metastatic tumours) Treatment of pre-malignant lesions, cytologic effects of radiation and chemotherapy. General diagnostic application of immunocytochemical techniques and molecular biology to cytological samples including PCR of HPV and genotyping.	Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
MOLECULAR BIOLOGY	Basic overview of DNA and RNA, the history and their structure Prokaryotic and Eukaryotic Genomes and DNA replication DNA extraction; PCR Working with RNA; RNA extraction; Reverse Transcription and RT-PCR Gel Electrophoresis DNA Sequencing Restriction enzymes, Restriction mapping Cloning Vectors: plasmids, bacteriophages, cosmids Cloning: Ligation, transformation; construction of Gene (genomic) libraries Cloning of cDNA libraries; Screening for recombinant DNA	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
FUNDAMENTALS OF PATHOLOGY	Medical terminology and internationally recognised acronyms Cell adaptation and injury Inflammation and healing. Classification, types and nomenclature of neoplasia Body fluid regulation and disturbances	Theory tests (average of all): 32% Assignments/oral presentation: 5% Tutorials, class/homework 3% Examination: 60%
SYSTEMIC PATHOPHYSIOLOGY	Classification of body organs and systems Disorders and diseases in the following systems: - Cardiovascular system - Respiratory system - Lymphatic system - Digestive system - Endocrine system - Renal system - Skeletal system	Theory tests (average of all): 32% Assignments/oral presentation: 5% Tutorials, class/homework 3% Examination: 60%

<table>
<tr><td></td><td>The physiological effects of each disorder.
The effects of the disorders on other body systems</td><td></td></tr>
<tr><td>The global environment</td><td>Environmental Pollution (Air, water and soil)
Differences between air, water and soil pollution in terms of cause and effect.
Social, economic and personal impact on environmental pollution.
Pollution control strategies.
Local case studies.

Population growth vs. natural resources
Population growth trends in developed vs developing countries.
Social, economic and environmental impacts of human population growth in the global context.
Strategies to curb population growth

Climate change and global warming
Causes of increased global mean temperatures.
Impact of climate change on extreme weather conditions.
Consequences of climate change on human health, natural resources and biodiversity.

Sustainable development
Concept of sustainable development within the South African and global context
Inter-relationships between sustainable development, social responsibility, economic development and environmental protection.</td><td>1) Presentation at a Student Nations Summit. PowerPoint Presentation on a given topic at mock conference (30%)
2) Web based assignment on carbon footprint (30%)
3) Problem based learning assignment on the interrelationships between the different issues affecting the environment (40%)</td></tr>
<tr><td>Equality and diversity</td><td>Concepts and terminology – e.g. diversity, equality, inclusion, power, oppression
Parameters of diversity as listed in section 9 of the SA Constitution
Prejudice, discrimination and inequality
The diversity competence continuum
Steps to develop competence/sensitivity in relation to diverse others
Selected topics</td><td><table><tr><td>Theory test</td><td>100/300</td></tr><tr><td>Reflective writing assignment</td><td>50/300</td></tr><tr><td>Group presentation</td><td>50/300</td></tr><tr><td>Diversity festival</td><td>100/300</td></tr><tr><td>TOTAL</td><td>300</td></tr></table></td></tr>
</table>

THE ENTREPRENEURIAL EDGE	BECOMING AN ENTREPRENEUR Understanding yourself What kind of business will suite me best A vision for the business Why become an entrepreneur Who are entrepreneurs Entrepreneurial Resources Entrepreneurial myths Entrepreneurial transition ADDRESSING RISK Risks the banks are concerned with From the perspective of the bank Risks and interest rates Researching to reduce my risks Understanding my risks and prospects Problem solving Competitive advantage Business successes and failures UNDERSTANDING MY MARKET What does my market look like Sharing the market Competitors Suppliers Customer Relations Management PLANNING The environment Strategic planning Operation al planning Types of plans Setting the business vision Determining the business mission Setting business objectives Finding and evaluating suppliers FINANCIAL OBJECTIVES Costing a product / service Funding the business MARKETING What you should now about products and services Considering the price Finding the proper location What to consider when advertising and doing promotions ETHICS AND SOCIAL RESPONSIBILITY Considering ethical issues to address Drawing up an ethics standard Being held ethically responsible Being responsible to your stakeholders	two tests and one assignment. The weighting of all three assessments are equal. These three marks need to exceed 50% for a pass.
THE GLOBAL	The module content will include the following themes:	

ENVIRONMENT	***Environmental Pollution (Air, water and soil)*** Differences between air, water and soil pollution in terms of cause and effect. Social, economic and personal impact on environmental pollution. Pollution control strategies. Local case studies. ***Population growth vs. natural resources*** Population growth trends in developed vs developing countries. Social, economic and environmental impacts of human population growth in the global context. Strategies to curb population growth • *Climate change and global warming* Causes of increased global mean temperatures. Impact of climate change on extreme weather conditions. Consequences of climate change on human health, natural resources and biodiversity. ***Sustainable development*** Concept of sustainable development within the South African and global context Inter-relationships between sustainable development, social responsibility, economic development and environmental protection.	
EQUALITY AND DIVERSITY	Concepts and terminology – e.g. diversity, equality, inclusion, power, oppression Parameters of diversity as listed in section 9 of the SA Constitution Prejudice, discrimination and inequality The diversity competence continuum Steps to develop competence/sensitivity in relation to diverse others Selected topics	Theory 33% Reflective writing assignment 17% Group presentation 17% Diversity festival 33%

CLINICAL CHEMISTRY 2	Endocrinology Secretion and regulation, hormones of hypothalamus, pituitary, pineal, thyroid, adrenal, gonads, pancreas, GIT Carbohydrate metabolism Intermediary carbohydrate metabolism, hormonal regulation, disorders [glucose, lactate], ketogenesis, glycosylated Hb, fructosamine, xylose Lipid metabolism Lipid constituents, lipoproteins and disorders, serum lipid and lipoprotein analyses, total fecal fat/steatocrit/oral fat loading test Body fluid analysis CSF [glucose, proteins], amniotic fluid [congenital disease, neural tube defects, hemolytic disease, gestational age, fetal pulmonary development], sweat [inc sweat analysis], synovial fluid, serous fluid [pleural, pericardial, peritoneal], transudates and exudates Tumour markers Properties, classification, markers: PSA, AFP, CEA, CA 125, 153, 199 Pharmacology Introduction [classification, routes of administration, terminology], receptor theory, elementary pharmakokinetics, drugs subjected to TDM [Digoxin, Phenytoin, Phenobarbitol, Carbamazapine, Theophylline, Valproic acid, Lithium, Paracetamol, Salicylates, Tricyclic Antidepressants, Cyclosporin, Amikacin, Gentamycin and Vancomycin], techniques of drug analysis [EMIT, ELISA, EI, HPLC, GLC, TLC], toxicology [ethanol, salicylates, paracetamol, barbiturates]	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
MEDICAL MICROBIOLOGY 2B	Laboratory administration – collection, logging, distribution, data recording, reporting, accession and retrieval of data. Safety in the histopathology laboratory – recognize dangers by fresh, unfixed tissue biopsies. Storage and safe handling of chemical and dyes. Light and electron microscopy – behaviour of light and electrons. Fixation and fixatives – effects of specific fixatives on tissue and organs. Poor fixation and fixation artefacts and corrective action. Tissue processing – familiar with the handling of the tissue processor and reagents used. Recognize processing artefacts and take corrective action. Tissue embedding – embedding techniques of various tissue biopsies. Microtomy – familiar with the safety features and how to use a microtome for sectioning of various tissue types.	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%

	Staining – preparation and use of reagents used to stain specific tissue components and structures to contribute to diagnosis.	
Ethics and Medical Law	Study Unit 1: Professional ethics. Study Unit 2: International ethics principles. Study Unit 3: Professional body and National Health requirements. Study Unit 4: Scope of practice. Study Unit 5: Multidisciplinary and interdisciplinary interactions. Study Unit 6 Legal aspects of medical care. Study Unit 7: Applications in authentic settings.	Theory tests: 60% Projects/ Case Studies/ Assignments : 40%
HAEMATOLOGY 2	Classification and clinical features, causes, laboratory features and management of anaemias, leukaemias, malignancies, platelet and haemostatic disorders and disorders associated with systemic non-haematological disorders Principles of quality control and quality assurance and troubleshooting Assessment of specimen suitability Correct terminology when reporting results The clinical significance of laboratory results, including reticulocyte counts, full blood counts, coagulation tests, screening tests, confirmatory tests	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%
CYTOLOGY 2	Collection and preparation of cytological specimens and the normal cells and tissues found lining the following sites in the body: - respiratory tract -serous effusions -urinary tract -central nervous system -gastro intestinal tract. Cytological evaluation of specimens including normal constituents , infective agents (bacteria, fungi, parasitic and viral agents), inflammatory, degenerative and regenerative changes and other non-neoplastic changes of the respiratory tract , serous effusions, urinary tract, central nervous system and gastro intestinal tract. The morphogenesis and cytological presentation of premalignant and malignant conditions of the respiratory tract, serous effusions, urinary tract, central nervous system and gastro intestinal tract. General diagnostic application of immunocytochemical techniques and molecular biology to cytological samples including PCR as applicable. **Respiratory Tract**: collection and microscopic features in sputa and bronchial brushings/ lavages and FNAB. Inflammation: Non-specific inflammation, Tuberculosis, Eosinophilia Common infective agents and characteristic cytopathic effect for each agent, including Entamoeba sp, Actinomyces sp, Candida sp, Blastomyces sp, Cryptococcus sp, Aspergillus sp, Histoplasmosis sp, Coccidioides sp, Cryptococcus sp, Pneumocystis sp, Echinococcus sp, Entamoeba sp. Other elements: Ferruginous bodies, Curshmann's spirals, Vegetable cells, Charcot-Leyden crystals. Benign reactive: Bronchial hyperplasia and bronchial	Theory tests (average of all): 24% Practical tests 10% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 60%

	metaplasia, without/ with atypia. Lung cancer and its pathogenesis, including known carcinogens Malignant: Squamous carcinoma, Bronchogenic adeno and Bronchoalveolar carcinoma ,Small cell (neuro carcinoma, Large cell undifferentiated carcinoma, Ou primary/ metastatic tumours The effects of radiation and chemotherapeutic agents on benign and malignant cells **Urinary tract**: Collection techniques, Cytological changes that occur with different inflammatory processes, including those associated with pathogens (esp. Schistosoma haematobium) Casts (e.g. hyaline, granular, cellular) and pathologically significant crystals. Potential sources of diagnostic error in evaluating urinary tract specimens including ileal bladder urine, lithiasis, malakoplakia, etc Malignancies of kidney and urinary tract: (urine/ FNAB): Epithelial tumours of renal pelvis, ureter and urinary bladder: Transitional cell carcinoma, Adenocarcinoma, Squamous carcinoma, Renal cell carcinoma, Wilms' tumour, Other, Metastases. Effects of radiation and chemotherapeutic agents on benign/ malignant cells, transplant rejection. atypia and its causes, including lithiasis and malakoplakia. latrogenic changes (incl. ileal conduits) and potential pitfalls. Transplant rejection changes. **Central nervous system**: Anatomy of brain and spinal cord Macroscopic presentation and significance, fixation, preparatory techniques. "Normal" cells (shunt picture). Meningitis: Bacterial, Viral, TB, Cryptococcal; Parasites. Primary tumours of the CNS; Neural crest tumours; Lymphoma/ leukaemia, midline tumours and miscellaneous 1^0 tumours, metastatic malignancy. **Gastro intestinal tract** Anatomy of brain and spinal cord. Macroscopic presentation and significance, fixation, preparatory techniques. "Normal" cells (shunt picture). Meningitis: Bacterial, Viral, TB, Cryptococcal; Parasites Primary tumours of the CNS; Neural crest tumours; Lymphoma/ leukaemia. Miscellaneous 1^0 tumours. Metastatic malignancy	

CLINICAL LABORATORY PRACTICE I	**Clinical Chemistry** Specimen / chemical safety procedures. Quality control and workflow. Laboratory calculations and preparation of solutions. Description of the automated instrument. Compulsory analytes: Sodium, potassium, chloride, total C02, urea, creatinine and glucose. All laboratory tests / profiles in chemical pathology. Selection of the following topics: - Atomic absorption Blood gases Chromatography Drugs Electrophoresis Endocrinology Nephelometry Urinalysis **Medical Microbiology** Biosafety protocols applicable to the Microbiology laboratory. Explain the principles of automated instruments used in the laboratory (where applicable). Process the following specimens in the laboratory: - Faeces Swabs and Pus CSF Sputum Urine (Range Statement: Includes staining, microscopy, culture, antibiotic susceptibility and identification of organism/s). Culture media preparation (Range Statement: Basic principles of selective, enriched and differential media including antibiotic containing media). Quality assurance systems. **Virology** Safety Processing of viral specimens: Culture and identify viruses in specimens Media preparation and cell cultures Serology (HIV, Hepatitis other) PCR **Blood Transfusion discipline** Donor selection ABO and Rh Crossmatching ABO and Rh blood typing **Cytology** Set up microscope incl. Kõhler illumination Female genital tract Inflammation; Benign proliferative reactions Reactive cellular changes; Microorganisms/ agents of infection Squamous abnormalities: ASCUS, LSIL, HSIL, SCC Glandular abnormalities: AGUS (outline), adenocarcinomas Urinary tract Normal, Agents of infection (esp Schistosoma)	Average mark obtained from discipline based assessments 60% Portfolio 30% Learning logs 10%

	Malignancy: transitional cell carcinoma, squamous ca, adenocarcinoma Respiratory tract Normal; Non-cellular findings (incl. ferruginous bodies); Agents of infection Inflammation (incl. asthma); Bronchial metaplasia and hyperplasia; Malignancy: adenocarcinoma, squamous carcinoma, undifferentiated Serous effusion Normal; Inflammatory/ non-malignant disease states; Malignancy 10 / 20 tumours, incl. carcinoma, lymphoma, melanoma Serous effusion: prepare and stain two samples (Pap; MGG stain) Complete assignment on filter preparations independent **Histopathology** Embedding; Microtomy; Routine H&E staining and mounting Trim blocks and cut 8 sections of kidney tissue biopsies for special staining techniques. Special staining techniques: PAS; PAS/D; Alcian blue; Verhoeff's; Methanamine silver, Toluidine blue; Reticulin, Masson's Trichrome Special techniques: Transmission electron microscope; Immunohistochemistry Frozen sections Stain two sections: one by rapid H&E method and the other for fat. Electron Microscopy. Molecular laboratory. **Haematology** Specimen processing, handling, safety procedures and ethics. Quality control principles. Perform tests and techniques, following standard operating procedures. Interpretation of laboratory results, correlation of FBC with the findings of the peripheral blood film . Professional conduct, principles of good laboratory practice including ward visits for BM, finger-prick and/or blood collection	

PRINCIPLES OF MANAGEMENT	Management Principles (Planning, leading organizing and control, problem identification & solving, decision making, communication, negotiation, conflict resolution, leadership, motivation) Organisational Development Change Management Resource Management Industrial Relations Quality Assurance and Safety including Legislation	Theory tests (average of all): 32% Assignments/oral presentation: 5% Tutorials, class/homework 3% Examination: 60%
RESTORATIVE JUSTICE	Relevance of a restorative approach in the SA context. Aspects of legislation and policy. Restorative philosophy and practice in indigenous communities. Factors in crime, violence and conflict in modern societies. The social control window. Restoration versus retribution. Shaming, integration, healing and forgiveness. The restorative practices continuum. Informal and informal restorative conferencing.	Lectures 20% Group work 10% Practicum Case studies 10% Independent study 40% Presentations 10%
PRINCIPLES OF RESEARCH	The use of the library Referencing Plagiarism Writing up of research findings; posters, publication, dissertation thesis	Theory tests (average of all) 15% Journal article 10% Poster 10% Research Proposal 10%
RESEARCH PROJECT 1st registration	Statistics reinforce Literature review Research methods Research ethics Plagiarism Writing of research report: introduction, literature review and methodology	This module will remain incomplete in Semester 1 of the fourth year of study. The module is linked to the Research Project Module B offered in Semester 2.
RESEARCH PROJECT	Research methods Literature review Writing up of research findings: posters, publication, dissertation thesis	Research project Mod A mark 30% Draft chapters 20% Complete light bound dissertation50%
INTEGRATED PATHOPHYSIOLOGY 1st registration	General aspects of disease Chromosomal disorders Pathophysiology of the following systems and integrating these with other systems and laboratory results Central nervous system Endocrine system Cardiovascular Respiratory Immunology	No exam, mark contributes to course mark calculation in Module B
INTEGRATED PATHOPHYSIOLOGY	Pathophysiology of the following systems and integrating these with other systems and laboratory results Gastrointestinal Renal Blood and bone marrow Reproductive systems Integumentary	Theory test (average of all) 24% Assignemnt/oral presentation 8% Case studies (tuts) 4% Online tuts 4% Examination 60%
LABORATORY MANAGEMENT	Legal and social aspects of Healthcare Resource management in healthcare settings Budgeting and financial management in Healthcare Leadership in Healthcare settings Relevant legislation pertaining to private practice Laboratory accreditation	Theory tests 24% Oral Presentation 8% Reflective journal 8% Examination 60%

CLINICAL LABORATORY PRACTICE 2: INCLUDES THE FOLLOWING SPECIALISATION OPTIONS FROM 1 – 10 BELOW (THE STUDENT WILL HAVE TO SELECT ONE OF THESE ADVANCED SPECIALIZATION MODULES AT 52 CREDITS):		As per the chosen elective below
CLINICAL PATHOLOGY 1st registration	Statutory regulations and ethics Specimen requirements and suitability including storage for all laboratory analysis Laboratory equipment (all types of equipment Laboratory reagents Total Quality management ; Quality control Personnel (personnel documents and records) Stock control (storage, receipt, procurement, expiry date) Documentation Laboratory safety Laboratory related mathematics Molecular biology techniques Special tests and specimens related to the following specific disciplines: **Clinical Chemistry** Safety and GLP Workflow, collection and processing of routine samples in a Chemical Pathology laboratory. Knowledge of quantitative, semi-qualitative and qualitative tests (automated or manual) for analytes on either blood, serum, plasma, urine (timed and random), CSF, aspirates/ fluids with particular reference to: Reagent, controls and calibrators preparation; Calibration and Q.C procedure; Operation of instrument/ method procedure . **Medical Microbiology** Specimen collection, transport, processing and disposal of specimen with pathogenic microorganisms Identification of pathogenic microorganisms from clinical specimens. Quality assurance system TB/HIV management system **Haematology:** The full blood count including all calculations and interpretation of scatter grams; manual and automated cell counts Preparation of all types of smears and the calculation of absolute counts; Collection and handling of blood samples pathogenesis, laboratory diagnosis and interpretation of morphology of peripheral blood and bone marrow smears of normal red cell and red cell disorders Tests used in the diagnosis and monitoring of red cell disorders haemolytic anaemias the pathogenesis, the	

	interpretation and correlation of the tests with the clinical presentation. Basic blood transfusion techniques including blood grouping and direct antiglobulin test (Coombs test).	
CLINICAL PATHOLOGY	**Clinical Chemistry** Workflow, transportation and processing of specialised tests in a Chemical Pathology laboratory. Knowledge of quantitative, semi-qualitative and qualitative tests (automated or manual) for analytes on faeces and amniotic fluid with particular reference to: Operation of instrument/ method procedure Safety and GLP. **Medical Microbiology** Infection control Laboratory accreditation and administration Water examination Milk examination **Haematology:** The full blood count including all calculations and interpretation of scatter grams; manual and automated cell counts Collection and handling of blood samples pathogenesis, laboratory diagnosis and interpretation of morphology of peripheral blood and bone marrow smears of normal white cell and haematological malignancies Tests used in the diagnosis and monitoring of white cell disorders, the interpretation and correlation of the tests with the clinical presentation. Understanding the current classifications including both WHO and FAB. CD4 counting with all gating strategies Cytochemistry, immunophenotyping (principles, application and interpretation of flow cytochemistry)	Theory tests (average of all): 15% Practical tests + workbook 30% Assignment 5% Examination: 50%
CLINICAL CHEMISTRY 1st registration	Knowledge of quantitative, semi-qualitative and qualitative tests (automated or manual) for the following analytes on either blood, serum, plasma, urine (timed and random), CSF, aspirates/ fluids, faeces and amniotic fluid with particular reference to: Reagent, controls and calibrators preparation; Calibration and Q.C procedure; Operation of instrument/ method procedure; Sodium, Potassium, Chloride, Bicarbonate (TCO_2), Urea, Creatinine, Cystatin C, Uric Acid, Calcium, Ionized Calcium, Magnesium and Inorganic Phosphorous. Glucose, Ketones, Hb A1c (Glycated Haemoglobin), Fructosamine and MAU (Microalbumin). Cholesterol, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Triglyceride, Lipoprotein (a) and Apolipoprotein A&B. Total Protein, Albumin, Globulin, Total Bilirubin, Conjugated and Unconjugated Bilirubin, ALP, GGT, AST, ALT and LDH. Amylase, Lipase & Cholinesterase (serum & red cell). CK, CKMB (mass/Activity), Troponin (T/I), Myoglobin, Pro-BNP/ BNP and Homocysteine. Iron Studies: Ferritin, Iron and Transferrin Lactate, Ammonia. Digoxin, Phenytoin, Phenobarbitol, Carbamazapine, Theophylline, Valproic acid, Lithium, Paracetamol,	No exam, assessment marks contribute to course mark.

	Salicylates, Tricyclic Antidepressants, Cyclosporin, Amikacin, Gentamycin and Vancomycin, Benzodiazepine, Cannabis, Amphetamine, Barbiturate, Cocaine, Methadone, Methaqualone, Opiate and PCP TSH, T3, T4 (Free and Total), Qualitative and Quantitative bHCG, FSH, LH, Estradiol (E2), Growth Hormone, Testosterone, Progesterone, Prolactin, Aldosterone, Cortisol, Gastrin, Histamine, Insulin, Renin, Vitamin B12, Folate, PTH and ACTH PSA, AFP, CEA, CA markers 125, 153 & 199. CRP, Ultra-sensitive CRP, PCT (procalcitonin). IgE, IgM, IgG, IgA, b2 Microglobulin, C3 and C4, Haptoglobins, SACE, Caeruloplasmin. Xylose, Phenylalanine, Ascorbic acid Osmolality Blood Gases and Co-oximetry Neonatal bilirubin Catecholamines, 5HIAA, 17 Hydroxycorticosteroids. Total Faecal Fat/ Steotocrit/ Oral Fat Loading Test.	
CLINICAL CHEMISTRY 3B	Knowledge of quantitative, semi-qualitative and qualitative tests (automated or manual) for the following analytes on either blood, serum, plasma, urine (timed and random), CSF, aspirates/ fluids, faeces and amniotic fluid with particular reference to: Reagent, controls and calibrators preparation; Calibration and Q.C procedure; Operation of instrument/ method procedure; Serum and urine Protein Electrophoresis, IFE / Kappa and Lambda free light chains. Urine bHCG and Dry Chemistry (dipstick and ketostix). Faecal & urine reducing substances, Porphobilinogen, Porphyrin. Occult Blood/ Faecal Haemoglobin/ Colon Albumin. Calculus analysis Knowledge of the following laboratory function tests or profiles with reference to: Association/ relevanc to the specific organ, Association/ correlation between the tests, The significance and interpretation of abnormal results, Procedure when results do not concur with clinical picture Renal: Sodium, Potassium, Urea and Creatinine including Creatinine Clearance, pH and Base Excess. Liver: ALT, AST, GGT, ALP, LDH, Total Protein, Total and Conjugated Bilirubin. Cardiac: CK, CKMB, Troponin and Myoglobin. Lungs: pH, PCO2, PO2, TCO2 and O_2 Saturation; Actual and Standard Bicarbonate, and Base excess. Thyroid: TSH, Free T3 & T4. Pancreas: Amylase (Total and Pancreatic), Lipase. Toxicology: Organophosphate and Salicylate poisoning. Menopausal Screen: LH, FSH and E2 (Estradial)	Theory tests (average of all): 15% Practical tests + workbook 30% Assignment 5% Examination: 50%

MEDICAL MICROBIOLOGY 1st registration	Specimen collection, transport , processing and disposal of specimen with rare / unusual microorganisms Identification of rare / unusual microorganisms from clinical specimens. TB/HIV management system Genotyping characterisation of microorganisms	
MEDICAL MICROBIOLOGY	Infection control and epidemiology Laboratory accreditation and administration Quality management system Public Health	Theory tests (average of all): 15% Practical tests + workbook 20% Assignment 5% Examination: 50%
CYTOLOGY 1st registration	Anatomy, histology, cytology, applications and techniques, benign lesions and malignant lesions from the following sites: breast and nipple secretions, thyroid, lymph nodes, salivary glands, liver, pancreas, testes, ovaries, prostate. Principles of specialised sample collection techniques from the sites of the organs listed above including fine needle aspiration biopsies (FNAB). Tests and techniques for the interpretation and distinction between normal and abnormal cytology results. Correlation of results with clinical information. Safety, ethics and quality control principles General diagnostic application of immunocytochemical techniques and molecular biology to cytological samples including PCR as applicable including PCR of HPV and genotyping.	No exam
CYTOLOGY	Anatomy, histology, cytology, applications and techniques, benign lesions and malignant lesions from the following sites: Rare Tumours of the female genital tract (Clear cell carcinoma, Hydatidiform mole; Choriocarcinoma; Adenosquamous carcinoma, Lymphomas; Melanoma; Sarcomas/ Mixed Mesodermal Tumours, Extrauterine malignancies (ovary/ vulva); Metastatic tumours). Principles of specialised sample collection techniques from the sites of the organs listed above including fine needle aspiration biopsies (FNAB). Tests and techniques for the interpretation and distinction between normal and abnormal cytology results. Correlation of results with clinical information. Safety, ethics and quality control principles. Treatment of pre-malignant gynaecologic lesions and cytologic effects of radiation and chemotherapy. General diagnostic application of immunocytochemical techniques and molecular biology to cytological samples including PCR as applicable including PCR of HPV and genotyping.	Theory tests (average of all): 24% Practical tests 20% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 50%
HAEMATOLOGY 1st registration	Routine and specialised haematology investigations: the full blood count including all calculations and interpretation of scatter grams; manual and automated reticulocyte counts; differential counts including the preparation of all types of smears and the calculation of absolute counts; erythrocyte sedimentation rate; collection and handling of blood samples; CD4 counting with all gating strategies. Pathogenesis, laboratory diagnosis and interpretation of morphology of smears of peripheral blood and bone marrow of normal; all anaemias; inclusion bodies in red cells; blood parasites; haemolysis and	

	haemolytic anaemias. Basic blood transfusion techniques including blood grouping and direct antiglobulin test (Coombs test). Good laboratory practice including laboratory safety and ethics	
HAEMATOLOGY	Routine and specialised haematology investigations: the full blood count including all calculations and interpretation of scatter grams; differential counts and the calculation of absolute counts; CD4 counting with all gating strategies. Pathogenesis, laboratory diagnosis and interpretation of morphology of smears of peripheral blood and bone marrow of normal; benign white cell disorders; myeloproliferative disorders; myelodysplasia; lymphoproliferative disorders; acute leukaemias; platelet disorders; inclusion bodies in white cells; the effects of HIV on blood smears and the theoretical knowledge of bone marrow features of disorders; tests used in the diagnosis and monitoring of haemostatic disorders including thrombosis and anticoagulant therapy; vascular disorders; factor inhibitors; theoretical knowledge of haemophilia factor V Leiden and other inherited thrombophilia disorders and PK assay. The pathogenesis and laboratory diagnosis of all haematological malignancies, the interpretation and correlation of the tests with the clinical presentation, understanding the current classifications including both WHO and FAB including cytochemistry, immunophenotyping (principles, application and interpretation of flow cytochemistry), principle of ISHAGE gating strategy of the enumeration of CD34+ stem cells, cytogenetic techniques, FISH and molecular diagnostic techniques in haematopathology. Good laboratory practice including laboratory safety and ethics	Theory tests (average of all): 24% Practical tests 20% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 50%
HISTOPATHOLOGY 1st registration	**Embedding** of various tissue biopsies according to their structural features. **Microtomy** – thorough knowledge of microtomes and microtome knives. Able to section various tissue biopsies and recognise cutting artefacts and employ corrective measures. **Frozen sections** – assist in the diagnosis of urgent biopsies that require the use of a cryostat to produce frozen sections. **Staining of specific elements** – deduce which stain to use for a specific component / structure. Recognise staining artefacts and use corrective measures. 'Trouble-shoot' out of the ordinary staining reactions. **Histology of tissues** – Identify and describe the tissue types as well as the structure of each organ system. Identify the structures specific to each organ or system.	
HISTOPATHOLOGY	**Molecular Biology** – have a thorough knowledge of the tests required in Molecular biology to diagnose tumours and bacteria. Knowledge of *in situ* hybridisation (DISH) **Enzyme histochemistry** – Simultaneous capture, post-incubation coupling,	Theory tests (average of all): 24% Practical tests 20% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 50%

	Self coloured substrate and intramolecular rearrangement. Metal precipitation for enzyme detection. **Immunocytochemistry** – able to distinguish between the various antibodies used to aid in the diagnosis of complicated cases that cannot be assessed with special staining procedures. **Electron microscopy** – fixation and processing of specimens for analyses under an electron microscope. Recognise ultrastructural organelles and components of the cells using an electron microscope.	
IMMUNOHAEMATOLOGY **1st registration**	Ethics Health and Safety Transfusion transmitted diseases Blood donation Blood Processing and component therapy Donation testing Storage and issue of blood and blood products Blood cold chain Clinical indications for the use of blood and blood products Introduction to risks and benefits associated with transfusion. Introduction to the haemolytic disease of the foetus and new-born (HDFN) Haemovigilance and biovigilance Apheresis. Clinical significance of blood group system antigens and antibodies. Basic serological techniques Causes of false results in laboratory testing Antigen antibody reactions in transfusion testing Blood group reaction patterns and interpretation Selection of blood for crossmatch Compatibility and transfusion testing. Quality management systems.	
IMMUNOHAEMATOLOGY	Risks and benefits associated with transfusion. Haemolytic disease of the foetus and new-born (HDFN) Reagent preparation and standardization Paternity testing HLA testing Transfusion reaction investigations Antenatal Investigations Postnatal (Cord and Maternal) Cases Transfusion reaction investigations Antenatal Investigations Postnatal (Cord and Maternal) Cases Quality management systems.	Theory tests (average of all): 24% Practical tests 20% Practical reports 2% Assignments/oral presentation: 2% Tutorials, class/homework 2% Examination: 50%

11. CLINICAL TECHNOLOGY

11.1. Bachelor of Health Sciences in Clinical Technology (BHCLT1)

NB: Students to read this section in conjunction with the relevant Student guides

Module	Content	Assessment plan
Introduction to Clinical Technology	1. Introduction and overview of the seven specialist categories in Clinical Technology 2. Role of the Clinical technologist in each category 3. Laboratory techniques (microscopes, incubators, refrigerators and autoclaves 4. Health care system (clinical health governance structure and Health legislative acts & policy). *5. Organizational structure of the hospital (human resource and sectors)* 6. Basic principles of health-care ethics (applied ethics, biomedical ethics, Batho Pele principles) National Health Act, Basic conditions of Employment, Health Professions Act	**Continuous assessment** • Oral presentations (20%) • Reflective journal (20%) • Written theory assessment (60%)
Chemistry	• introduction to chemistry • measurements • energy and matter • atoms and elements • compounds and their bonds • chemical reactions and quantities • gases • solutions • acids & bases • nuclear radiation • alkanes and cycloalkanes • unsaturated hydrocarbons • organic compounds with oxygen and • sulphur • carboxylic acid and esters • amines and amides	THEORY TESTS Two Tests on General Inorganic and Physical Chemistry and Two Tests on Organic Chemistry). PRACTICAL ASSESSMENT FINAL EXAM MARK = CM x 0,4 + EM x 0,6
Physics 101	• MECHANICS • PROPERTIES OF MATTER	Continuous Assessment 70 % of the average of the 2 Theory Tests 30 % of the Practical Mark, where [Practical Mark = 35% practical book + 65% practical test]
Physics 201	• thermal physics • waves & sound	Continuous Assessment 70 % of the average of the 2 Theory Tests

	• geometrical optics • electricity& magnetism • radioactivity & radiation • quantum physics • wave properties of particles	30 % of the Practical Mark, where [Practical Mark = 35% practical book + 65% practical test]
Anatomy I	• Unit I o Introduction o Respiratory Anatomy o Cardiovascular anatomy o Genitourinary Anatomy • Unit 2 o Neuroanatomy o Head and neck • Unit 3 o Limbs	Continuous assessment unit 1- theory (20%) and practical (15%) unit 2- theory (20%) and practical (15%) unit 3- practical (15%) and assignment (15%) Internally moderated
Physiology I	• Anatomy and physiology are defined. • The relationships between anatomy and physiology are explained. UNIT 1 • Cells and tissues, • Integumentary system, • Muscular system • Skeletal system UNIT 2 • Nervous system • Endocrine system, • Cardiovascular system, • Immunity and the Lymphatic system, • Blood UNIT 3 • Respiratory system, • Reproductive system	Continous Assessement Each of the three units will be assessed as follows: • A two hour theory test at the end of the unit (Minimum of 120 marks) • One practical test at the end of the course
Pathophysiology I	• Basic Immunology: introductory concepts • Cells of the immune system • Innate and adaptive immune responses (humoural and cellular) • Antigen-antibody interactions • Immunological tolerance and memory • Autoimmunity • Basic microbiology - Introduction to Medical microbiology (micobacterium bacilli, streptococcus, staphylococcus, HI virus) • Infection control, medical and surgical asepsis • Communicable disease patient control	Semester mark calculations: - Two written theory assessment (20% each) - Assignments (Essay 15%; Presentation 30%) - Reflective journaling: (15%) exam=60%; semester mark = 40%]

Instrumentation for Clinical Technology I	• Introduction to Man-instrumentation systems;
	  ○ Biometrics
	  ○ Introduction to the Man-Instrument System
	  ○ Problems Encountered in Measuring a Living System
	• Basic physiological parameters;
	• 2.1. Heart rate / pulse rate
	• 2.2. Blood pressure
	• 2.3. Stroke volume / Cardiac output
	• 2.4. Respiratory rate
	• 2.5. Tidal volume / minute volume
	• Basic Physiological transducers;
	  ○ The Transducer and Transducer Principle
	  ○ Active Transducers
	  ○ Passive Transducers
	• Electrodes
	  ○ Electrode theory
	  ○ Biopotential electrodes
	  ○ Biochemical electrodes
	• Medical terminology
	• Electrical safety.
		Semester mark calculations:
		- Two written theory assessment (20% each)
		- Assignments (Essay 15%; Presentation 15%)
		- Practical assessment (30%)
		- Moderation: Internally moderated.
		
		Final marks:
		Course mark 40%
		Exam mark 60%

Second level		
Applied Anatomy and Physiology	Unit 1: The Cardiovascular System Blood & Heart Unit 2: The Respiratory Physiology Functions of the Respiratory System Pulmonary Diseases Unit 3: Nervous system Unit 4: Endocrine System Unit 5: Reproductive systems	Continuous assessment: • A two and half hour test at the end of a unit (including theory and applied practical components). • Minimum of 150 marks of which a minimum of 10% will comprise the practical component.
Clinical Technology Practice	• Setting-up of equipment: • Basic haemodynamic monitoring • Basic Electrophysiological procedures: • Other basic diagnostic and therapeutic procedures: • Spirometry measurement. • Anthropometric measurement. • Activating clotting time testing. • Oral and axillary temperature measurement. • Non- provocative nebulisers. • Oxygen therapy (mask and nasal cannula).	Continuous assessment as follows: Proficiency assessment (60%) Hospital Visit Reports (20%) Presentations (20%)
Instrumentation for Clinical Technology II	• BIOMEDICAL INSTRUMENTATION SYSTEMS FOR CARDIOLOGY • BIOMEDICAL INSTRUMENTATION SYSTEM FOR RESPIRATORY SYSTEM	Examination Semester mark 40%; exam mark 60 %;

	• BIOMEDICAL INSTRUMENTATION SYSTEM FOR CRITICAL CARE • BIOMEDICAL INSTRUMENTATION FOR CARDIOVASCULAR PERFUSION • BIOMEDICAL INSTRUMENTATION SYSTEM FOR NEUROPHYSIOLOGY. • BIOMEDICAL INSTRUMENTATION FOR RENAL SYSTEM • BIOMEDICAL INSTRUMENTATION SYSTEM FOR REPRODUCTIVE BIOLOGY	Semester mark calculations: 3 theory tests (60%) Assignments and presentations (40%)
Clinical Pathophysiology I	• Epidemiology and related medical terminology • Overview of Blood disorders • Selected Infectious diseases • Neoplasia • Cardiovascular system • Neurological system • Respiratory system • Pathophysiology of selected disorders of Calcium Metabolism • Pathophysiology of selected Hypothalamic and pituitary diseases and overview of Thyroid disease • Diabetes Mellitus • Liver Disease • Selected Pancreatic disorders • Digestive system and Skin disorders • Selected disorders of the Renal system • Selected disorders of the male and female Reproductive system	Examination Semester 40%; exam mark 60 % semester mark calculation: 3 written theory tests (60%) 2 x assignments [presentation and written] (40%) Moderation: Internal according to DUT policies
Basic Pharmacology	This module is divided into 3 Units : UNIT 1 • General aspects of drug therapy • Pharmacokinetics • Pharmacodynamics • Administration of drugs to patients • Adverse effects of drugs • Autonomic, Somatic and Sensory Nervous systems UNIT 2 • Antimicrobials and other anti-infectives • Drugs affecting the CNS • Drugs affecting the CVS • Haemopoetic drugs • Analgesics and anti-inflammatories UNIT 3 • Hormones and Hormone antagonists • Antihistamines • Respiratory Drugs	Assessment will be continuous. • A two hour theory test at the end of each unit. • Each theory test will be weighted as follows – • Theory test 1 – 30% • Theory test 2 – 35% • Theory test 3 – 35%

	• GIT Drugs • Poisoning and emergency drug treatment	
Research Methodology I	• Research Paradigms - The 3 basic research paradigms (positivism, interprets and critical theory) • Research study design (Longitudinal, cross-sectional, bi-directional; Quantitative, qualitative, mixed-method; reliability, validity and ethics) • Research methods and methodology • Sampling methods (observations, questionnaire, interviews, surveys, case studies, laboratory experiments) • Data analysis techniques (descriptive statistics) • Introduction to the review of the Literature • Referencing styles and plagiarism	Continuous assessment Each assessment has a specific weighting i.e. counts a certain % towards the final mark: • Article critique (20%) • 2 x assignments (80%)
Research Methodology II	• The steps and stages in the research process. • The research purpose based on a problem. • The literature review • Selecting an appropriate research design • Developing an appropriate sampling plan for a hypothetical study in terms of feasibility, representativeness and available resources. • Developing an appropriate data collection plan • Statistical analysis for the data analysis process. • Ethical issues relating to the conduct of research	Continuous assessment The final marks: • Submission of a research proposal (70%) • 1 x assignment (30%) Moderation will be conducted in accordance with DUT rules.

Health Care Management I	• Basic concepts of Healthcare management (managers and management) • Basic principles of Healthcare management (organizational culture, quality management, time management, Teamwork) • Basic Healthcare information systems	Continuous assessment the final mark: 1 written theory test (60%) 1 x assignment [presentation and written] (40%)
	CARDIOLOGY	
Pathophysiology for Cardiology	• Congenital Heart disease • Arrhythmias • Valvular Heart disease • Coronary artery disease • Pericardial disease • Hypertension • Heart Failure • Oedema • Peripheral vascular disease	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Pharmacology for Cardiology	• Understand the application for the following therapeutic classes: Anti-arrhythmia therapy, Anti-anginals, Antihypertensives, Diuretic, Pressins, cardiostimulatories and inhibitors, thrombolytics, vasoconstrictors and vasodilators • Understand the pharmacological applications for the following cardiovascular disorders: • Angina • Arrhythmia • Oedema • Heart failure • Systemic and pulmonary hypertension • Hypotension • Myocardial infarction	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as follows: 2 written theory tests (60%) 1 x assignment [presentation and written] (40%)
Clinical Technology Practice in Cardiology Ia	Perform the following procedures and explain the indications, contra-indications, advantages and disadvantages or limitations and complications of the following procedures: • Exercise stress testing • Arrhythmia monitoring (Holter) • Cardiac catheterization left and right heart procedures • Intra-aortic balloon pumping • Single and dual chamber pacing • Basic electrophysiology studies • Echocardiography	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Cardiology Ib	Describe the haemodynamics related to angiography and echocardiography for the following conditions: • pericardial disease • Congestive heart failure • Coronary artery disease • Valvular heart disease	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%)

	• Congenital heart disease • Cardiac resynchronization therapy Describe the underlying pathophysiology of symptom production in the conditions in (2) above. Infection control Cardio-version. Defibrillation. General equipment management. Assist with ICU/Trauma/Theatre clinical procedures. • Physiological data management.	Compilation of a logbook of procedures (20%)
Instrumentations and Techniques for Clinical Technology in Cardiology I	• Electrocardiography Telemetry • Basic terminology relating to Biomedical instrumentation and transduction • Instrumentation used and procedures for arrhythmia monitoring or termination(non-invasive): • Exercise stress testing laboratory equipment • Holter • Internal and external defibrillation	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in Cardiology Ib	• Invasive monitoring and diagnostic instrumentation and procedures: • Monitoring and blood gas equipment in the cardiac catheterization laboratory • Catheters used and procedures in the cardiac catheterization laboratory on adult patients (diagnostic angiography and intervention, cardiac output, IVUS, IABP, pericardiocentesis, electrophysiology and pacing) • Resonance and damping; • Cardiac output measurements • Blood gas machine • Coagulation instrumentation; • Equipment bench testing, diagnostics and quality control; • Simulators; • Left ventricular assist devices	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	CRITICAL CARE	
Pathophysiology for Critical Care	• Myocardial infarction; • Heart failure (left & right); • Compensatory mechanisms for a falling CO; • Shock; • Abdominal compartment syndrome; • Liver failure; • Pancreatic failure; • Coagulopathies, DIC; • Endocrine disorders; • COPD, Asthma, Pneumonia and Aspiration;	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)

	• Pulmonary embolism, pneumothorax; • Respiratory failure; • Gaseous exchange abnormalities; • ARDS; • Neurological assessment for altered levels of consciousness	
Pharmacology for Critical Care	• Understand the application for the following: • Drugs used in Hypertension and Angina • Drugs used in Heart failure. • Resuscitation drugs • Local Anaesthetics, Anesthetic agents (Inhalational and intravenous), • Drugs acting at Neuromuscular Junction and Autonomic Nervous System. • Antibiotics, Antimicrobial, • Antifungal and Antiviral Drugs. • Understand the pharmacological applications for the following disorders: • Myocardial infarction; • Heart failure (left & right); • Compensatory mechanisms for a falling CO; • Shock; • Abdominal compartment syndrome; • Liver failure; • Pancreatic failure; • Coagulopathies, DIC; • Endocrine disorders; • COPD, Asthma, Pneumonia and Aspiration; • Pulmonary embolism, pneumothorax; • Respiratory failure; • Gaseous exchange abnormalities; • ARDS;	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as follows: 2 written theory tests (60%) 1 x assignment [presentation and written] (40%)
Clinical Technology Practice in Critical Care Ia	• Infection control • Quality Control of life Support equipment. • Statistical analysis and patient scoring. • Blood gas sampling, measurement and interpretation • Invasive heamodynamic monitoring procedures. • Set up equipment for Intra-hospital transportation of critically ill patients, non-invasive heamodynamic monitoring, monitoring of an anesthetized patient.	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)

	• Preparation of ICU drugs. • Handling of Infusion devices and drugs. • Capnography.	
Clinical Technology Practice in Critical Care Ib	• Assists with bronchoscopy and right heart catheterization. • Advanced Cardiac Life Support (ACLS). • CPR. • Intubation, intravenous cannulation, emergency drug therapy. • Ventilation therapy: monitoring and resuscitation. • Determine blood flow (Doppler). • Cardio-version. • Defibrillation. • Electrolyte determination. • General equipment management. • Assist with ICU/Trauma/Theatre clinical procedures. • Physiological data management.	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Techniques for Clinical Technology in Critical Care Ia	• Electrocardiography Telemetry • Invasive pressure monitoring equipment; • Resonance and damping; • Cardiac output measurements • Blood gas machine • Ventilators and ventilation modes • Anesthetic machine and accessories • Hemofiltration • Thermoregulatory devices • Coagulation instrumentation; • Arterio- venous flow measurements • Infusion devices • Gas and vapour analysers • Transcutanous gas measurements • Autologous cell recovery • Thromboelastograms • Point of care analysers (Glucose, Hb, Bilirubin)	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in Critical Care Ib	• Endoscopes; • Equipment bench testing, diagnostics and quality control; • Simulators; • Left ventricular assist devices • Therapeutic gas delivery systems • Peripheral nerve stimulators; Level of consciousness monitors	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	NEUROPHYSIOLOGY	
Pathophysiology	• Abnormalities of Consciousness	Continuous assessment

for Neurophysiology	○ Abnormalities of the brain • Epilepsy • Stroke • Dementia • Parkinson • Multiple Sclerosis • Encephalopathies • Meningitis • Headaches • Hydrocephalus • Haemorrhage • Aneurysm • Coma • Brain death ○ Abnormalities of Hearing and Vision ○ Myasthenia gravis ○ Peripheral nerve disorders • Entrapment neuropathies • Guillain Barre syndrome/CIDP • Diabetic and HIV neuropathy • Brachial plexopathies • Drug related neuropathies • Critical illness neuropathy ○ Abnormalities of sleep • General neurological abnormalities	The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Pharmacology for Neurophysiology	• Understand the pharmacological application for the following: • Neurotransmitters • Blood-brain barrier • Cholinergic pharmacology • Adrenergic Pharmacology • Local anaesthetic pharmacology • Understand the pharmacological applications for the following disorders: • Abnormalities of consciousness • Abnormalities of Hearing and Vision • Myasthenia gravis • Peripheral nerve disorders • Abnormalities of sleep • General neurological abnormalities	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as follows: 2 written theory tests (60%) 1 x assignment [presentation and written] (40%)
Clinical Technology Practice in Neurophysiology Ia	• Brain mapping • Assist in Electromyography • Nerve conduction studies	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of

		procedures (20%)
Clinical Technology Practice in Neurophysiology Ib	• Evoked potentials • Polysomnography • Long-term epilepsy monitoring video studies • Memory testing and WADA testing	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentation and Techniques for Clinical Technology in Neurophysiology Ia	• ELECTROENCEPHALOGRAPHY • ELECTROMYOGRAPHY AND NERVE CONDUCTION STUDIES • Principle utilised in EMG/ENG Recordings. • MEDICAL TERMINOLOGY • ELECTRICAL SAFETY	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentation and Techniques for Clinical Technology in Neurophysiology Ib	• EVOKED POTENTIAL SYSTEMS • TRANSCRANIAL DOPPLERs • POLYSOMNOGRAPHY INSTRUMENTATION	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	Nephrology	
Pathophysiology for Nephrology	• Clinical Manifestations of Renal Diseases • Major Clinical Renal Syndromes (renal failure, tubular defects, urinary tract infections, calculi) • Diagnosis of Renal Disease (biopsy, microscopy) • Congenital abnormalities of the kidney • Glomerular disease • Nephrotic syndrome • Diabetes mellitus • Renal hypertension • Anaemia	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Pharmacology for Nephrology	• Understand the application for the following: • Drug dosing methods and influencing factors • Anti-hypertensives	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as

	• ACE-Inhibitors, Angiotensin-receptor blockers, • Diuretics • Beta Adrenergic Blocking Drugs • Calcium Channel Blockers • Dyslipidaemia management • Anaemia management • Understand the pharmacological applications for the following disorders: • Major Clinical Renal Syndromes (renal failure, tubular defects, urinary tract infections, calculi) • Diagnosis of Renal Disease (biopsy, microscopy) • Congenital abnormalities of the kidney • Glomerular disease • Nephrotic syndrome • Diabetes mellitus • Renal hypertension	follows: 2 written theory tests (60%) 1 x assignment [presentation and written] (40%)
Clinical Technology Practice in Nephrology Ia	• Handwashing technique and infection control; • Setting up of equipments for HD and PD therapies; • Organise equipments for emergencies; • Priming and disinfection; • Preparation of access sites (PD & HD); • Subcutanous administration; • Intravenous administration; • Water sampling testing; • Preassement of patient • Monitoring of hemodynamics of HD and PD; • Phlebotomy; • Commencement and discontinuation techniques of HD and PD. • Post hemodynamic monitoring of HD and PD	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Nephrology Ib	• Cannulation using sterile techniques of arteriovenous fistula; • Sterile techniques for connection of catheters; • Perform chronic hemodialysis therapy; • Perform chronic peritoneal dialysis therapy; • Hemodynamic monitoring of both above procedures; • Management of acute complications during HD and PD; • Management of chronic complications of HD and PD; • Setting up of equipments for acute HD/PD and CRRT; • Hemodynamic monitoring acute HD/PD.	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentation	• Development of dialysis equipment	Continuous assessment

and Techniques for Clinical Technology in Nephrology Ia	• Theory of haemo-dialysis and PD. • Method of solute transport and ultrafiltration. • Types Dialyzers • Blood and dialysate compartments • Monitoring devices • Calibration, servicing and disinfection of equipments • Design, operation and SOP of Hemodialysis equipments; • Design, operation and SOP of Peritoneal equipments	The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentation and Techniques for Clinical Technology in Nephrology Ib	• Optimization of dialysis with regards to acute- and chronic dialysis therapy. • Dialysate used in haemodialysis, peritoneal dialysis and continuous therapies. • Water treatment for haemodialysis • Emergency equipment; • General and health and safety in the renal unit. • Design, operation and SOP of acute dialysis and CRRT equipments; • Blood gas analysis	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	PERFUSION	
Pathophysiology for Perfusion	• Ischemic Heart Disease • Myocardial Infarction • Valvular Heart Disease (Acquired and Congenital), Congestive Heart Failure • Diseases of the Great Arteries (Dissection, Aneurysm, Pulmonary Embolism) • Pulmonary Hypertension • Bacterial Endicarditis and Rheumatic Fever • Cardiomyopathy and Heart & Lung Transplant • Congenital Heart Disease.	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Pharmacology for Perfusion	• Understand the application for the following therapeutic classes: ACE Inhibitors, Angiotensin II Receptor Blockers, Antiarrhythmic Agents, Anticoagulants, Anticoagulants Antagonist, Antiplatelet Agents, Antihistamine, Beta Blockers, Bronchodilators, Calcium Channel Blockers, Cardiac Glycosides, Diuretics, Inotropic Effectors Positive, Local Anaesthetic, Narcotic Analgesia, Narcotic Antagonists, Oxytocic Agents, Steroids, Thrombolytic, Vasoconstrictor, Vasodilators, Nitrates. • Understand the pharmacological applications for the following cardiovascular disorders: • Angina	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as follows: 2 written theory tests (60%) 1 x assignment [presentation and written] (40%)

	• Arrhythmia • Oedema • Heart failure • Systemic and pulmonary hypertension • Hypotension • Myocardial infarction	
Clinical Technology Practice in Perfusion Ia	• Assessing the Physiological Health of Patient; Use Various Cardioulmonary Components; • Electrocardiography (ECG) Measurement; • Perform Advanced Cardiac Life Support; • Spirometry Measurement, • Anthropometric Measurement; • Anticoagulation Testing (ACT), • Blood Pressure Measurement, • Temperature Monitoring, • Pulse Measurement; • Perform Bloodgas Analysis; • Oximetry Measurement; • Blenders, Vaporizers, • Perform Capnography; • Use of Non-provocative Nebulizers; • Administer Oxygen Therapy, • Calibrate the Transducers; • Use of Ventilators; • Use of Infusion Devices; • Perform Phlebotomy; • Utilize Intra-Aortic Balloon Pumps; • Perform Autologous Blood Salvage; • Monitor Haemodynamic Parameters; • Operate Flowmeters; •	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Perfusion Ib	• Perform Cardiopulmonary Resuscitation (CPR); Utilize the Left Ventricular Assist Devices (LVAD); • Administer Drugs; • Perform Basic Echocardiography (ECHO); • Perform Vascular Sonography; • Interpretation and Analysis of Diagnostic Data; • Perform External Counterpulsation (ECP), • 3-Dimensional Cardiography (3DVG) Measurement, • Perform Stress Test, • Monitor the Basic Electroencephalography (EEG); • Application of Defibrillator and Cardioversion; • Integrate Hemodialyzer; • Interpret Magnetic Resonance Imaging (MRI); • Perform Extracorporeal Membrane	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)

	Oxygenation (ECMO);	
Instrumentations and Techniques for Clinical Technology in Perfusion Ia	• Electrocardiography (ECG); • Advanced Cardiac Life Support; • Measurement of Spirometry, • Anthropometric, • Anti Coagulation Testing (ACT), • Blood Pressure, • Temperature, Pulse; • Bloodgas Analysis; • Blenders; Vaporizers; • Oximetry; • Capnography; • Non-provocative Nebulizers; • Oxygen Therapy, • Calibration of Transducers; • Ventilators; • Infusion Devices, • Phlebotomy,	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in Perfusion Ib	• Intra-Aortic Balloon Pumps; • Autologous Blood Salvage; • Cardiovascular Monitoring; • Cardiopulmonary Resuscitation (CPR); • Left Ventricular Assist Devices (LVAD); • Drug Administration, Echocardiography (ECHO); • Vascular Sonography; • Interpretation and Analysis of Diagnostic Data. External Counterpulsation (ECP), • 3-Dimensional Cardiography (3DVG), • Stress Test, • Basic Electroencephalography (EEG); • Defibrillators, • Cardioverters, • Transducers, • Cell Savers; • Flowmeters;	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	PULMONOLOGY	
Pathophysiology for Pulmonology	• Lung injury • Respiratory diseases • Infectious diseases • Immunological disorders • Cardiovascular disorders	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Pharmacology for Pulmonology	• Understand the pharmacological application for the following classes: • Pressins • cardiostimulatories and inhibitors • thrombolytics • vasoconstrictors and vasodilators • Understand the pharmacological applications for the following disorders: o Lung injury o Respiratory diseases	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as follows: 2 written theory tests (60%) 1 x assignment [presentation and written]

	○ Infectious diseases ○ Immunological disorders ○ Cardiovascular disorders	(40%)
Clinical Technology Practice in Pulmonology IA	• Pulmonary function laboratory safety • Pulmonary function measurement • Lung volume evaluation • Ventilation tests and artificial ventilation • Basic flow-volume curves • Gas distribution evaluations •	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Pulmonology IB	• Diffusion tests • Bronchial provocation • Bronchodilators • Diagnostic bronchoscopy • Allergy investigations	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Procedures for Clinical Technology in Pulmonology Ia	• Basic lung function equipment i. Spirometer ii. Flow measuring devices iii. Transcutaneous monitoring devices iv. Gas chromatography v. Mass spectrometer vi. Oxygen analysers vii. Nitrogen analysers viii. Blood gas analysers ix. Lung mechanics	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Procedures for Clinical Technology in Pulmonology Ib	• Systems for the determination of lung function i. Spirometry and flow-volume systems ii. Computerised lung function systems iii. Whole body plethysmograph iv. Diffusion capacity systems v. Exercise study equipment • Bronchoscopy	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	REPRODUCTIVE BIOLOGY	
Pathophysiology for Reproductive Biology	• Congenital Anomalies of Male and Female Reproductive tract. • Pathophysiology of Male and Female Reproductive organs & Systems	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments

	• Infertility and Persistent Pregnancy Failure • Microbiology • Ectopic pregnancy , placenta previa , sacrococcygeal teratoma • Genetic disorders (eg Klinefelter syndrome, Turner's syndrome, Down's syndrome)	[presentation and written] (40%)
Pharmacology for Reproductive Biology	• Understand the pharmacological application for the following classes: • Ovulation induction drugs • Contraception • Understand the pharmacological applications for the following disorders: • Congenital Anomalies of Male and Female Reproductive tract. • Infertility and Persistent Pregnancy Failure • Microbiology • Ectopic pregnancy , placenta previa , sacrococcygeal teratoma • Genetic disorders (eg Klinefelter syndrome, Turner's syndrome, Down's syndrome)Cardiovascular disorders	Examination Final mark = 40% course mark + 60% exam mark Course mark calculated as follows: 2 written theory tests (60%) 1 x assignment [presentation and written] (40%)
Clinical Technology Practice in Reproductive Biology Ia	• Fundamentals of Clinical Embryology • Introduction to In Vitro Fertilisation and Embryo Culture • Congenital Anomalies of Male and Female Reproductive tract. • Pathophysiology of Male and Female Reproductive organs & Systems • Semen analysis • Cervical mucus Examinations • Semen (Spermatosoa) - Cervical mucus-interaction tests • Extended antispermatosoa antibody tests in semen, cervical mucus and blood serum	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Reproductive Biology Ib	○ Sexual transmitted infections and blood borne viruses in ART ○ Identification, judgement and manipulation of ova. ○ Fertilization of ova and embryos ○ Cryopreservation of semen, ova and embryos ○ Infertility and Persistent Pregnancy Failure (a). Fertility Preservation in Cancer Patients (b). Infections and Infertility (c). Male and Female Infertility (d). Artificial Insemination (e). Induction of Ovulation ○ Quality Assurance, Risk management and Laboratory organisation ○ Patient-Technologist-Relationship	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)

Instrumentations and Techniques for Clinical Technology in Reproductive Biology Ia	○ Apparatus for the following procedures: • Semen analysis • Preparation of media • ART Laboratory Equipment • Maintenance of Apparatus • Quality control	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in Reproductive Biology Ib	• Reproductive Imaging (Hysterosalphingography, Laparoscopy) • Contraception • Hormonal Contraception • Modern Concepts in Intrauterine Devices Surgical Sterilization	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Fourth level		
Health Care Management II	• Legal and social aspects of Healthcare • Human resource management in healthcare settings • Budgeting and financial management in Healthcare • Leadership in Healthcare settings • Community relations in Healthcare settings	Continuous assessment The final mark: 2 x written theory tests (60%) 1 x assignment [presentation and written] (40%)
Research Methodology III	• Conduct a research project and collect data using appropriate research methodology. • Perform data analysis using appropriate statistical tests and packages. • Interpret findings and present these according to set criteria and formatting requirements in the form of a dissertation. • Demonstrate an ability to act professionally and ethically when conducting research	Continuous assessment The final mark: Research project =70% Presentation of research = 30% Externally moderated
Clinical Instruction (Elective I)	○ Learning Process and Models of Instruction ○ Teaching and Learning Styles ○ Teaching, Learning, Assessment, and Study Skills Strategies ○ Curriculum Development and Classroom Management ○ Academic Writing and Presentation ○ Mentorship	Continuous assessment with external moderation : Theory tests (60%) Assignments (40%)

Small business management (Elective 2)	• Introduction to Entrepreneurship Theory • Self-awareness and development of personal attributes • Industry and business classification • Business Plan development • Marketing for Entrepreneurs • Finance, business calculations and financial record keeping for Entrepreneurs • Operations Management for Entrepreneurs • Human Resources for Entrepreneurs • Presentation Skills	Continuous assessment with external moderation : - Theory Tests – Open or closed Book 70% - Individual Participation/Graduate Attributes 10% Business Plan (group work) 20%
	CARDIOLOGY	
Clinical Technology Practice in Cardiology IIa	• Setting up and monitoring of the following invasive procedures: • Intra-aortic balloon pumping • Intravascular ultrasound and fractional flow reserve • Right and left heart catheterisation on paediatrics • Electrophysiology and ablation • Bi-ventricular pacing • Implantable cardiac defibrillators • Setting up and monitoring of the following invasive procedures:	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Cardiology IIb	• Head-up tilt testing • External synchronised cardiac defibrillation • Advanced cardiopulmonary resuscitation • Perform echocardiography and correctly report on the following: adult and paediatric congenital heart disease valvular heart disease Infective endocarditis Pericardial disease • Dobutamine stress echocardiography	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Techniques for Clinical Technology in Cardiology IIa	• Intra-Aortic Balloon Pump. • Intra-aortic balloon pump • Intravascular ultrasound and fractional flow reserve equipment • Right and left heart catheterisation on paediatrics: wires, catheters • Electrophysiology and ablation equipment and catheters	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in	• Bi-ventricular pacing: leads, wires and generators • Implantable cardiac defibrillators: leads, wires, defibrillator	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments

Cardiology IIb	• Echocardiography: transoesophageal echocardiography and • Dobutamine stress echocardiography; pericardiocentesis • Drug Administration and management of side effects.	[presentation and written] (40%)
	CRITICAL CARE	
Clinical Technology Practice in Critical Care IIa	• Intubation. • Assist with acute haemodialysis and continuous renal replacement therapy (CRRT). • Autologous blood recovery. • Cell saving. • Monitor Intra-Aortic Balloon Pump • Metabolic studies. • Left ventricle assist therapy. • Coagulation studies. • Endoscopy.	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Critical Care IIb	• Ultrasonography. • Drug Administration and management of side effects. • Advanced patient transport (inter-hospital and international transport). • General equipment management. • Physiological data management. • **Neonatal:** **Set up, apply and maintain the following equipment:** • Incubators; • Humidifiers; • Phototherapy; • Neonatal therapeutic gas administration; • Respiratory support devices. Invasive and non-invasive monitoring	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Techniques for Clinical Technology in Critical care IIa	• Intra-Aortic Balloon Pump. • haemodialysis machine • Continuous renal replacement therapy equipments (CRRT). • Autologous blood recovery. • Cell saving. • Ultrasonography. • Neonatal: Incubators; Humidifiers and Phototherapy; • Acute renal failure; • Chronic renal failure; • Hepatic failure; • Gullian-Barre syndrome, status epilepticus, meningitis, and myasthenia gravis;	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)

	• Brain herniation, intracranial pressure changes; • Drug Administration and management of side effects.	
Instrumentations and Techniques for Clinical Technology in Critical care IIb	• Intra-Aortic Balloon Pump. • haemodialysis machine • Continuous renal replacement therapy equipments (CRRT). • Autologous blood recovery. • Cell saving. • Ultrasonography. • Neonatal: Incubators; Humidifiers and Phototherapy; • Acute renal failure; • Chronic renal failure; • Hepatic failure; • Gullian-Barre syndrome, status epilepticus, meningitis, and myasthenia gravis; • Brain herniation, intracranial pressure changes; • Drug Administration and management of side effects.	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	NEUROPHYSIOLOGY	
Clinical Technology Practice in Neurophysiology Iia	• Paediatric electroencephalography (EEG) • The electroencephalogram in the unconscious patient in the intensive care • Sleep and long term electroencephalography • Multiple sleep latency testing	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Neurophysiology Iib	• Intra-operative monitoring • Trans-cranial Doppler's • Sub-dural monitoring • Drug administration and management of side-effects	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentation and Techniques for Clinical Technology in Neurophysiology IIa	• Calibration procedures on neurophysiological equipment • Design, operation and trouble-shooting skills on the equipment for the following procedures: • Paediatric electroencephalography (EEG) • The electroencephalogram in the unconscious patient in the intensive care	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)

	• Sleep and long term electroencephalography • Multiple sleep latency testing	
Instrumentation and Techniques for Clinical Technology in Neurophysiology IIb	• Intra-operative monitoring • Sub-dural monitoring • Selection of clinical instrumentation and stock control	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	NEPHROLOGY	
Clinical Technology Practice in Nephrology IIa	• Chronic Hemodialysis; • Acute peritoneal dialysis; • Management of transplant patients (pre and post); • Anticoagulation • Vascular Acesses- AVF/AVG • Vascular Acesses-Venous catheter • Heamodiafiltration • Phlebotomy& Laboratory Investigations ○	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Nephrology IIb	• Acute Hemodialysis (HD) • Chronic HD • Paediatric dialysis; • Therapeutic apheresis • Sorbent Dialysis &Hemoperfusion (HP) • CRRT therapies: ○ CVVH; ○ CAVVH; ○ SCUF, ○ CVVHD ○ CVVHDF • Cell saveing • Liver Dialysis • Blood transfusion	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentation and Techniques for Clinical Technology in Nephrology IIa	• Techniques & Procedures related to Vascular accesses • Arterio Venous Fistulas (AVF) & Arterio Venous Graft • Venous Catheters • Phlebotomy techniques & skill in HD & PD • Laboratory Investigations • Selection /Administration of different dialysates • Measurements of dialysis dose • Profiling – ultrafiltration, Sodium, temperature • peritoneal equilibration test • Equipments related to cardiac resuscitation • Defibrillators	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)

	• Blood gas equipments • Administration of oxygen • Suctioning • Hemodifiltration (HDF) • Membranes for HDF • Water Quality related equipments • Techniques in Anticoagulation and equipment used • • Equipments for CRRT therapies: o Plasma exchange; o CVVHD; o Hemoperfusion	
Instrumentation and Techniques for Clinical Technology in Nephrology IIb	• Equipments for Acute Hemodialysis; • Acute peritoneal dialysis; • Paediatric dialysis; • Supportive equipment required for acute HD & PD • Management of transplant patients (pre and post); • Equipments for & related to CRRT therapies: o CVVH; o CAVVH; o SCUF, CVVHD, CVVHDF • Cell Saving &Transfusion • Sorbent Technology & Hemoperfusion • ; Home Dialysis • Liver Dialysis	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	PERFUSION	
Clinical Technology Practice in Perfusion IIa	Assessing the Physiological Health of Patient; Use Various Cardioulmonary Components; Electrocardiography (ECG) Measurement; Perform Advanced Cardiac Life Support; Spirometry Measurement, Anthropometric Measurement; Anticoagulation Testing (ACT), Blood Pressure Measurement, Temperature Monitoring, Pulse Measurement; Perform Bloodgas Analysis; Oximetry Measurement; Blenders, Vaporizers, Perform Capnography; Use of Non-provocative Nebulizers; Administer Oxygen Therapy, Calibrate the Transducers; Use of Ventilators; Use of Infusion Devices; Perform Phlebotomy; Utilize Intra-Aortic Balloon Pumps; Perform Autologous Blood Salvage; Monitor Haemodynamic Parameters; Operate Flowmeters; Perform Cardiopulmonary Resuscitation (CPR); Utilize the Left Ventricular Assist Devices (LVAD); Administer Drugs	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology	Perform Basic Echocardiography (ECHO); Perform Vascular Sonography; Interpretation	Continuous assessment The final mark:

Practice in Perfusion IIb	and Analysis of Diagnostic Data; Perform External Counterpulsation (ECP), 3-Dimensional Cardiography (3DVG) Measurement, Perform Stress Test, Monitor the Basic Electroencephalography (EEG); Application of Defibrillator and Cardioversion; Integrate Hemodialyzer; Interpret Magnetic Resonance Imaging (MRI); Perform Extracorporeal Membrane Oxygenation (ECMO)	Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Techniques for Clinical Technology in Perfusion II	12 Lead Electrocardiography (ECG); Advanced Cardiac Life Support; Lung Dynamics and Measurement, Ventilation/Perfusion Monitoring, Haemodynamic Monitoring, Blood Gas Analysis; Blenders; Vaporizers; Capnography; Provocative Nebulizers; Ventilators; Infusion Devices, Phlebotomy, Intra-Aortic Balloon Pumps; Autologous Blood Salvage; Cardiovascular Monitoring; Cardiopulmonary Resuscitation (CPR); Left Ventricular Assist Devices (LVAD); Drug Administration,	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in Perfusion II	Echocardiography (ECHO); Vascular Sonography; Interpretation and Analysis of Diagnostic Data. External Counterpulsation (ECP), 3-Dimensional Cardiography (3DVG), Stress Test, Basic Electroencephalography (EEG); Defibrillators, Cardioverters, Transducers, Cell Savers; Flowmeters;	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	PULMONOLOGY	
Clinical Technology Practice in Pulmonology IIa	• Assessing the Physiological Health of Patient; Use Various Cardioulmonary Components; Electrocardiography (ECG) Measurement; Perform Advanced Cardiac Life Support; Anthropometric Measurement; Anticoagulation Testing (ACT), Blood Pressure Measurement, Oximetry Measurement; Blenders, Vaporizers, Perform Capnography; • Use of Non-provocative Nebulizers; Administer Oxygen Therapy, Calibrate the Transducers;	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Pulmonology IIb	• CEPT (cardio pulmonary exercise testing) • Skin allergy investigations using skin prick tests • Provocation tests • Sleep studies • Nitric oxide testing)	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Procedures	• Exercise study equipment • Sleep study equipment	Continuous assessment The final mark:

for Clinical Technology in Pulmonology IIa		2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Procedures for Clinical Technology in Pulmonology IIb	• Provocation testing equipment • Nitric oxide machine (NiOx)	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
	REPRODUCTIVE BIOLOGY	
Clinical Technology Practice in Reproductive Biology Iia	• Embryo scoring for transfer/cryopreservation • IVF and Embryo Culture • Micromanipulation • Cryobiology and Cryopreservation	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Clinical Technology Practice in Reproductive Biology Iib	• Quality Assurance, Risk management and Laboratory organisation • Pre-implantation genetic disease • Fluorescence in-situ hybridization • Ethics and Law for Embryologists	Continuous assessment The final mark: Continuous Proficiency Assessment based on the application and performance of the procedures or techniques as outlined in module content (80%) Compilation of a logbook of procedures (20%)
Instrumentations and Techniques for Clinical Technology in Reproductive Biology Iia	• Equipment/APPARATUS for the following procedures: • Aspiration, Identification, Evaluation and Manipulation of Ova. • Fertilization and transfer of ova • Embryo transfer and artificial insemination •	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)
Instrumentations and Techniques for Clinical Technology in Reproductive Biology Iib	• Cryopreservation of semen, ova, and embryos • Testicular biopsy • Genetic screening and analysis • Quality control procedures	Continuous assessment The final mark: 2 written theory tests (60%) 2 x assignments [presentation and written] (40%)