THE NELSON MANDELA

AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY

(NM – AIST)

2021/2022 PROSPECTUS

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VISION

To become a world-class institution dedicated to the pursuit and promotion of excellence in Science, Engineering, Technology and Innovation (SETI), and their applications for economic growth and sustainable development.

MISSION

To deliver and promote high quality and internationally competitive teaching and learning, research and innovation, and public service in Science, Engineering and Technology leveraging on entrepreneurship for enhanced value addition to people and natural resources, with a view to stimulating, catalyzing and promoting economic growth and sustainable development in Tanzania and Sub-Saharan Africa.

Acronym

BioE	Biomedical Engineering
BuAM	Business Administration and Management
BuSH	Business Studies and Humanities
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CIDM	Civil Infrastructure Development and Management
CoCSE	Computation al and Communication Science and Engineering
CoSE	Communication Science and Engineering
EaSEn	Earth Sciences and Engineering
EE	External Examiner
EnSE	Environmental Science and Engineering
ETE	Electronics and Telecommunication and Engineering
FBNS	Food Biotechnology and Nutritional Sciences
GHBM	Global Health and Biomedical Sciences
GPA	Grade Point Average
HPRP	Health Physics and Radiation Protection
HuGL	Humanities, Governance and Leadership
HWRE	Hydrology and Water Resources Engineering
ICSE	Information and Communication Science and Engineering
IE	Internal Examiner
IEM	Innovation and Enterpreneurship Management
ISNS	Information System and Network Security
IPRS	Industrial Pharmacy and Regulatory Science
ISNS	Information System and Network Security
ITDM	Information Technology Development and Management
ITME	Innovation and Technology Management and Entrepreneurship
ITSDM	Information Technology Systems Development and Management
LiSBE/LSBE	Life Sciences and Bioengineering
MaSE	Materials Science and Engineering
MCSE	Mathematical and Computational Science and Engineering
MESE	Materials and Energy Science and Engineering
MEWES	Materials, Energy, Water and Environmental Sciences
NEPAD	New Partnership for Africa's Development
NM-AIST	Nelson Mandela African Institution of Science and Technology
PDF	Portable Document Format
PGSC	Petroleum and Gas Science and Engineering
PhD	Doctor of Philosophy
SABE	Sustainable Agriculture and Biodiversity Conservation
SESE	Sustainable Energy Science and Engineering
SETI	Science, Engineering, Technology and Innovation
SSA	Sub-Saharan Africa

STLC	Senate Teaching and Learning Committee
TCU	Tanzania Commission for Universities
WESE	Water and Environmental Science and Engineering
WiMC	Wireless and Mobile computing
WSSE	Water supply and sanitary engineering

Quick Facts

Principal Officers of the Institution

Location

The Tengeru campus of NM-AIST is situated at the former CAMARTEC premises, 16 KmEast of Arusha city centre. One can access the Tengeru Campus of NM-AIST from:

Kijenge Junction next to Impala Hotel, through the Nelson Mandela (Old Moshi-Arusha) road -12 Km;

Tengeru and then turning to the South through the Command and Staff College of Tanzania Peoples Defense - (4 Km);

Support for Students

Within the Campus, students will have access to the following services:

- A well-equipped and accessible library
- Well-furnished hostels
- Cafeterias offering the good catering services
- Agents for Posts, Banking (ATM), and other services
- Dispensary
- Counseling services
- Recreation facilities

How to apply Schools

All applications for admission must include:

- Application through online admission system
- Certified copies of degree certificates
- Transcripts of academic work
- Letters of recommendation
- Application fee

Schools

- School of Life Sciences and Bioengineering (LiSBE)
- School of Computational and Communication Science and Engineering (CoCSE)
- School of Materials, Energy, Water and Environmental Science (MEWES)
- School of Business Studies and Humanities (BuSH)

Chancellor

Hon. Dr. Mohamed Gharib Bilal
Former Vice President of United Republic of Tanzania
Former Chief Minister of Zanzibar

Chairperson of the Council

Prof. Joseph Rwegasira Buchweishaija

Vice Chancellor

Prof. Emmanuel J. Luoga,
P.O. Box 447, Arusha
TANZANIA.
Tel: +255 272 970 001
Mobile: +255 768 213333
Fax: +255 272 970 016
E-mail: vc@nm-aist.ac.tz, emmanuel.luoga@nm-aist.ac.tz

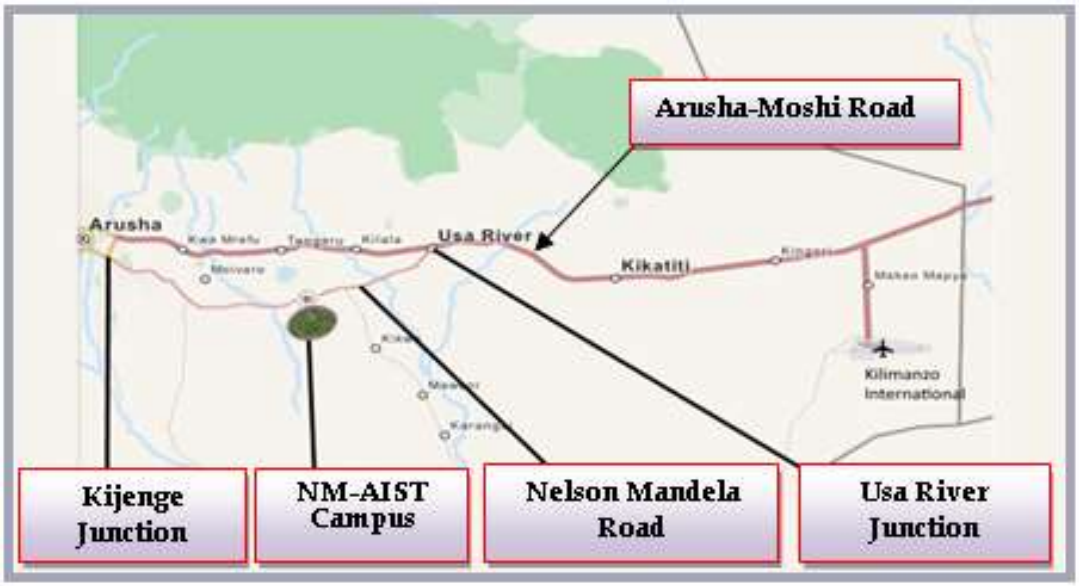
Deputy Vice Chancellor for Academic, Research and Innovation

Prof. Anthony M. Mshandete,
P.O. Box 447, Arusha
TANZANIA
Tel: +255 272 970 002
Mobile: +255 755 054 614
Fax: +255 272 970 016
E-mail: dvc-acad@nm-aist.ac.tz, anthony.mshandete@nm-aist.ac.tz

Deputy Vice Chancellor for Planning, Finance and Administration

Prof. Charles V. Lugomela,
P.O. Box 447, Arusha
TANZANIA
Tel: +255 272 970 003
Mobile: +255 784 230 023
Fax: +255 272 970 016
E-mail: dvc-admin@nm-aist.ac.tz, charles.lugomela@nm-aist.ac.tz

Location of the Nelson Mandela African Institution of Science and Technology



An Ariel view of the Tengeru Campus

1.0 Introduction

1.1 Overview

The Nelson Mandela African Institution of Science and Technology in Arusha (NM-AIST) is one in a network of Pan-African Institutions of Science and Technology located across the continent. These institutions, which are the proud brainchild of Nelson Mandela, envision training and developing the next generation of African scientists and engineers with a view to impacting profoundly on the continent's development through the application of Science, Engineering, Technology and Innovation (SETI).

The NM-AIST, which is accredited by the Tanzania Commission for Universities (TCU) is being developed into a world-class research-intensive institution for postgraduate and postdoctoral studies and research in SETI. The training in SETI, however, incorporates appreciable doses of relevant business studies and humanities ingredients. Thus, the training curricular also incorporates strong innovation and entrepreneurship features, and hence strong academia-industry society relations are part of the NM-AIST's development agenda. NM-AIST's curricular also seek to accommodate, enable, stimulate and catalyze innovation and entrepreneurship for the benefit of Sub-Saharan African's (SSA's) sustainable development.

1.2 Rationale of Establishing NM-AIST

Over the past two decades or so, one of the important lessons learned by the global community from the successes of the newly developed countries, particularly in East Asia, is that significant investment in SETI capacity building through educational excellence is a critical prerequisite for sustainable economic and technological development in any nation. It is increasingly being recognized that the weakness in the technological capability of African countries is one of the factors affecting their ability to harness their abundant natural resources for socio-economic development. In the 5th African Ministerial Conference on Science organized by New Partnership for Africa's Development (NEPAD) held from 12th – 16th December 2012, the Ministers recognized that "Science and Technology will play an important role in Africa's efforts to eradicate poverty, achieve food security, and fight diseases". There is a keen awareness that human resources are required to operate and maintain industries, build infrastructures, increase agricultural productivity and provide other valuable services. The contribution of SETI in general, and research and training institutions in particular, is now widely recognized as being of critical importance in efforts to attain SDGs and transform Africa's economies.

Neglect of SETI has created a critical gap between each country's needs and its ability to meet them since few public resources have been allocated for the same and, as a result, the research base has declined or failed to grow. Production of published papers is minimal in science and engineering. Within Africa, graduate education for sciences and engineering has not developed, and talented researchers have looked outside the country for work resulting in a considerable brain drain of talents. This self-reinforcing process drains researchers and technical personnel from firms and the public sector, further weakening the position of SETI in the continent.

It is a fact that currently, there exist deficiencies in highly qualified human resources in the SETI sectors in Africa. The launching of the Masters and PhD Degree Programmes at NM-AIST will contribute to addressing the deficiencies through advanced SETI components to provide solutions to the needs and problems of the society and industry.

1.3 Vision and Mission

The vision of NM-AIST is to become a world-class institution dedicated to the pursuit and promotion of excellence in Science, Engineering, Technology and Innovation (SETI), and their applications for economic growth and sustainable development.

The mission of NM-AIST is to deliver and promote high quality and internationally competitive teaching and learning, research and innovation, and public service in Science, Engineering and Technology leveraging on entrepreneurship for enhanced value addition to people and natural resources, with a view to stimulating, catalyzing and promoting economic growth and sustainable development in Tanzania and Sub-Saharan Africa

2.0 Admission and Registration Requirements

2.1 Admission

2.1.1 Masters Programmes

2.1.1.1 Masters by Coursework and Dissertation

To be admitted into a Master's programme by Coursework and Dissertation at the NM-AIST, the following requirements will be taken into consideration:

(i) Possession of at least a second-class Bachelor's degree with at least a GPA of 3.0/5.0 or its equivalent or a postgraduate diploma with at least a GPA of 4.0/5.0 or its equivalent in an appropriate area of study from an accredited university or similar institution of higher learning. For an applicant holding unclassified degrees (e.g. M.D, BVM & DDS) should have at least an overall of "C" grade and an average of "B" grade in the relevant subject or field of his/her specialization.

(ii) The applicant must satisfy the programme and specialty specific requirements as specified by the respective School/Department hosting the programme according to the list of degree programmes and areas of specialization (See Table 1).

(iii) The applicant may be expected to undergo an entry assessment by a panel appointed by the host School/Department, which may take one of the following methods: (1) personal interview, (2) written assessment, or (3) interview plus written assessment.

2.1.1.2 Master's Degree Programme by Research and Thesis

To be admitted into a Master's programme by Research and Thesis at the NM-AIST, the following requirements will be taken into consideration:

(i) Possession of a Bachelor's degree from an accredited university or similar institution of higher learning with a GPA of at least 3.5/5.0 or its equivalent or a postgraduate diploma with at least a GPA of 4.0/5.0 or its equivalent in an appropriate area of study from an accredited university or similar institution of higher learning. For an applicant holding unclassified degrees (e.g. M.D, BVM & DDS) should have at least an overall of "C" grade and an average of "B" grade in the relevant subject or field of his/her specialization and, either

   a) Possession of a prototype that requires incubation/scaling up in line with NM-AIST's research and innovation policy and guidelines, or

b) Evidence of at least ONE-year working experience in related fields and at least ONE publication in an accredited peer-reviewed journal as the FIRST author.

(ii) Submission along with application documents, a concise ONE-page concept notes or details of a prototype of what he/she wishes to work on as part of his/her study provided it be within the NM-AIST research agenda.

(iii) The applicant should be ready to pursue prescribed skills and capacity enhancing courses which are offered to all Master's students at NM-AIST as common core courses and as may be recommended by the supervisors, to enhance research performance. The courses may be taken flexibly during the duration of the programme but MUST be successfully completed before graduation.

2.1.1.3 Master's Degree Programme by Coursework and Project

This is a professional Master's programme and a student will spend the first three semester's doing coursework and one final semester in a pre-selected industry or NM-AIST laboratory to solve a pre-agreed problem of the industry or community. To be admitted into a Master's programme by Coursework and Project at the NM-AIST, the following requirements will be taken into consideration:

(i) Possession of at least a second-class Bachelor's degree with at least a GPA of 3.0/5.0 or its equivalent or a postgraduate diploma with at least a GPA of 4.0/5.0 or its equivalent in an appropriate area of study from an accredited university or similar institution of higher learning. For an applicant holding unclassified degrees (e.g. M.D, BVM & DDS) should have at least an overall of "C" grade and an average of "B" grade in the relevant subject or field of his/her specialization and working experience in related field (as guided by relevant School) will be added advantage.

(ii) The applicant must satisfy the programme and specialty specific requirements as specified by the respective School/Department hosting the programme according to the list of degree programmes and areas of specialization (See Table 1).

(iii) The applicant may be expected to undergo an entry assessment by a panel appointed by the host School/Department, which may take one of the following methods: (1) personal interview, (2) written assessment, or (3) interview plus written assessment.

2.1.2 PhD Programmes

2.1.2.1 PhD Degree Programme by Coursework and Dissertation

To be admitted into a PhD programme by Coursework and Dissertation at the NM-AIST, the following requirements will be taken into consideration:

(i) Possession of at least a second-class Bachelor's degree with at least a GPA of 3.0/5.0 or its equivalent or a postgraduate diploma with at least a GPA of 4.0/5.0 or its equivalent in an appropriate area of study from an accredited university or similar institution of higher learning. For an applicant holding unclassified degrees (e.g. M.D, BVM & DDS) should have at least an overall of "C" grade and an average of "B" grade in the relevant subject or field of his/her specialization.

(ii) Possession of a Master's degree from an accredited university or similar institution of higher learning with a minimum GPA of 3.5/5.0 or its equivalent and at least an average of "B" in the relevant subjects or field of specialization.

(iii) The applicant must satisfy the programme and specialty specific requirements as specified by the respective School/Department hosting the programme according to the list of degree programmes and areas of specialization (See Table 1).

(iv) The applicant may be expected to undergo an entry assessment by a panel appointed by the host School/Department, which may take one of the following methods: (1) personal interview, (2) written assessment, or (3) interview plus written assessment.

2.1.2.2 PhD Degree Programme by Research and Thesis

To be admitted into a PhD programme by Research and Thesis at the NM-AIST, the following requirements will be taken into consideration:

(i) Possession of at least a second-class Bachelor's degree with at least a GPA of 3.0/5.0 or its equivalent or a postgraduate diploma with at least a GPA of 4.0/5.0 or its equivalent in an appropriate area of study from an accredited university or similar institution of higher learning. For an applicant holding unclassified degrees (e.g. M.D, BVM & DDS) should have at least an overall of "C" grade and an average of "B" grade in the relevant subject or field of his/her specialization.

(ii) Possession of Master's degree from an accredited university or similar institution of higher learning with a minimum GPA of 3.5/5.0.

(iii) Demonstrate working and research experience by either producing evidence of:

a) At least TWO years working experience in related field and at least TWO publications in accredited peer-reviewed journals, being the FIRST author in ONE publication or

b) ONE publication and a patent/prototype emanating from his/her research/innovation work in line with NM-AIST's Research and Innovation Policy, or

c) A prototype that requires incubation/scaling up in line with NM-AIST's Research and Innovation Policy, or

d) A funded research project with a PhD training component in which the applicant is the project PI/ Co PI in a related field, or

e) Working experience (in related field) of at least FIVE years and a statement of purpose (education background, motivation for study programme, study plan and map, plan after study, and honors and awards).

(iv) Submission along with application documents, a concise TWO-page concept note or details of a prototype of what he/she wishes to work on as part of his/her study provided it is within the NM-AIST research agenda.

(v) The applicant may be expected to defend the concept note or prototype before a panel appointed by the host School/Department to demonstrate the candidate's research skills and work experience.

(vi) The applicant should be ready to pursue prescribed skills and capacity-enhancing courses that are offered to all PhD students at NM-AIST as common core courses and the supervisors may recommend as, enhancing research performance. The courses may be taken flexibly during the duration of the programme but MUST be successfully completed before graduation.

2.1.2.3 Programme and Specialty Specific Requirements

In addition to minimum entry requirements for Master's and PhD programmes stipulated above, there are additional requirements specific for each programme and/or specialty stipulated by the host Department/School that will also be considered for admission into the respective programme or specialty.

2.2 Registration

Having satisfied the admission and other requirements for joining NM-AIST to pursue Master's or PhD studies, students will be registered either for coursework and dissertation, coursework, and project or research and thesis programmes:

(i) Registration of students for the course(s) will take place during the first two weeks of the respective semester from the first day of the commencement of classes for the respective intakes.

(ii) Students must renew their studentship registration at the beginning of every subsequent year.

(iii) Students shall not be allowed to register or renew registration at the University without prior payment of fees or submission of commitment to pay fees from a sponsor.

(iv) Students shall be allowed to register/change subjects or courses within two weeks of commencement of classes in the respective semester after the recommendation of respective department.

(v) Students shall be allowed to register/change specialization/programme after two weeks of commencement of classes in the first semester of the first year after the recommendation of respective department/school.

(vi) Students shall be allowed to change the mode of study within two weeks of commencement of classes in the first semester of the first year after the recommendation of respective department/school.

(vii) Students shall not be allowed to register/change for subjects/courses after two weeks of commencement of classes in the respective semester.

(viii) Students shall not be allowed to register/change for specialization/programme after two weeks of commencement of classes in the first semester of the first year.

(ix) Students pursuing studies under coursework and dissertation, coursework and project as well as those under research and thesis will be registered twice per academic year.

2.3 Programmes Duration

2.3.1 Master and PhD Degree Programmes by Coursework and Dissertation/Project

The basic accounting period for teaching and learning at NM-AIST is the academic year. The academic year is divided into two semesters each comprising 18 weeks with 15 weeks of teaching, one week of study break and 2 weeks of examinations. There is a 3 weeks' vacation between semesters. The duration of Master's and PhD studies at NM-AIST is as follows:

2.3.1.1 Master's Degree Programmes

The duration of a Master's Degree Programme shall be 4 semesters. Students may be allowed to extend studies to a maximum of 6 semesters, provided that there are compelling reasons and proof of meeting the corresponding costs.

A Master's Programme shall consist of coursework in the first two semesters while the third and fourth semesters shall be wholly devoted to research and dissertation work.

2.3.1.2 PhD Degree Programmes

A PhD student can graduate after 6 semesters upon fulfilling all the requirements. Students may be allowed to extend studies to a maximum of 10 semesters provided that there are compelling reasons and proof of meeting the corresponding costs.

A PhD programme shall consist of coursework in the first two semesters while the third through sixth semesters shall be wholly devoted to dissertation work.

2.3.2 Master's and PhD Degree Programmes by Research and Theses

2.3.2.1 Master's Degree Programmes

The duration of the Master's Programme by research and thesis shall be 24 months including 6 months for development of a research proposal. Candidates that may not be able to complete the programme within the prescribed period may request for an extension from the Senate. Extensions will be granted for up to 12 months provided there are compelling reasons and proof of meeting the corresponding costs.

2.3.2.2 PhD Degree Programmes

The duration of the PhD programmes by research and thesis shall be three years including the six months of developing a research proposal. Candidates may be allowed to extend studies to a maximum of 5 years upon approval by the Senate of the request endorsed by the

School/Department provided that there are compelling reasons and proof of meeting the corresponding costs.

3.0 Introduction to the Programmes

3.1 Course

A course is construed as a compilation of course materials that enable acquisition of independent and self-contained competences within a particular duration. A course may constitute one or several modules.

3.2 Course Categories

All programmes comprise of core and elective courses. Core courses are those that a student must study in order to complete the degree programme while elective courses are those that students select from a list of recommended courses, which may include courses from other degree programmes.

Core courses fall under three sub-categories:

(i) Institution Common core courses are offered to all students across the institution

(ii) School common core courses are offered to all students in a particular School

(iii) Programme core courses offered to students registered in a particular programme, which equip the students with respective know-how and advanced knowledge;

(iv) Specialty core courses offered to students in the area of their specialization within the programme which provides deeper understanding and mastery of the specializations; and

(v) Elective courses provide students with broader, more extensive and in-depth knowledge of theory and respective know-how.

3.3 Credits

(i) The weight of a course is defined in terms of credits, which are based on the time required to complete a course. For the purpose of course weighting, a credit is defined as 10 lectures, practical, research, independent studies, seminar, tutorials or assignment hours.

(ii) The number of credits for the common core, programme core, specialty core, and elective courses shall range from 5 to 30 credits, of which the combination of lecture and practical sessions which require students to have direct contact with the instructor shall range from 1 to 8.

(iii) All students will be required to make presentations in graduate seminars organized by their respective academic departments/schools. Such presentations shall be assessed and credited.

3.3.1 Master's and PhD Degree Programmes

3.3.1.1 Master's Degree Programmes by Coursework and Dissertation/Project

A student enrolled in a Master's Degree Programme by coursework and dissertation at NM-AIST will be required to earn at least 180 credits made up of core (common, programme and specialty core), and elective courses, graduate seminars as well as research work. With the approval of the respective department, candidates may take more courses to enhance their research performance. The minimum indicative credits in the various Master's degree programmes by coursework and dissertation are as specified in the respectivde curriculum.

3.3.1.2 Master's Degree Programmes by Research and Thesis

A student pursuing a Master's degree programme by research and thesis shall be required to earn at least 180 credits made up of common core courses, graduate seminars as well as research work. With the approval of the respective department, students may take additional courses to enhance their research performance. The minimum indicative credits in the various Master's degree programmes by research and thesis are as specified in the respective curriculum.

3.3.1.3 PhD Degree Programmes by Coursework and Dissertation

A student pursuing a PhD degree programme by coursework and dissertation shall be required to earn at least 540 credits before graduation. The student is required to flexibly take coursework to earn at least 160 credits during the first two semesters alongside developing the research proposal. The coursework comprises an appropriate combination of common, programme and specialty core as well as graduate seminars and elective courses depending on the interest of the student and supervisor's recommendations. The rest of the time shall be devoted to research work and graduate seminars. With the approval of the respective department, students may take additional courses on offer to enhance their research performance. The minimum indicative credits in the various PhD degree programmes by coursework and dissertation are as specified in the respective programme.

3.3.4 PhD Degree Programmes by Research and Thesis

A student pursuing a PhD programme by research and thesis shall be required to earn at least 540 credits made up of common core courses, graduate seminars as well as research work. With the approval of the respective department, students may take additional courses to enhance their research performance. The minimum indicative credits in the various PhD degree programmes by research and thesis are as specified in the respective currriculum.

3.4 Transfer of Credits

3.4.1 Overview

A student is permitted to transfer to the NM-AIST, credits equivalent to not more than 50% of all the credits for Master or PhD programme of the respective University Qualification Framework (UQF) level coursework taken at another recognized academic institution or NM-AIST.

The transfer must include a verifiable recommendation from Programme Coordinator of the originating university and an official transcript indicating completion of the coursework and must be endorsed by the Dean of the relevant School at NM-AIST for transmission to Senate approval.

The number of credits and grades earned for a transferred course will be included in calculating GPA and Cumulative Grade point Average (CGPA) of the student. Credits to be transferred shall have been earned within a period not exceeding five years from the time of application.

3.4.2 Guidelines for Transfer of Credits

The guidelines on credit transfer including the operational definitions and scenarios of credit transfer are detailed below:

3.4.2.1 Operational Definitions

The guidelines on credit transfer including the operational definitions and scenarios of credit transfer are detailed below:

(i) Credit is a measurement unit for 'notional' or 'average' learning time. The notional learning time includes all the activities which the learner is expected to undertake in order to achieve the learning outcomes. A credit in the UQF equates to learning outcomes achievable in 10 hours of learning time determined on the basis of a learner with an average learning speed. That is, a credit equals 10 notional hours.

(ii) Credit transfer refers to the process by which learners may transfer credit value(s) from one programme to another, both programmes belonging to the same institution or from one learning environment to another i.e. involving a programme of two different institutions having received recognition for knowledge, skill or competence acquired. This may occur within a programme of study, across programmes in an institution, between institutions within a single country or on an international basis.

(iii) Credit accumulation is the process of achieving credits over time in relation to a planned programme of study.**3.4.2.2 Scenarios of Credit Transfer**

There are two possible scenarios to be considered in the transfer of credits as outlined below:

(i) Transfer of course credits in a programme of the same UQF level within NM-AIST.

(ii) Transfer of course credits in a programme of the same UQF level from another Institution to NM-AIST.

3.4.2.3 Guidelines on Credit Transfer

The following guidelines which are organized under different themes shall provide guidance on credit transfer at NM-AIST:

(i) Role of NM-AIST as the Receiving Institution shall be:

(a) To ensure that the course content of the transferred course is at least 75% similar to that of the NM-AIST course.

(b) To scrutinize the course to assess whether the mode that was used to deliver it has significantly contributed to skills, knowledge and, competencies required to be achieved by NM-AIST graduate.

(c) To confirm that the Higher Education Institution (HEI) from which a student wants to transfer credit is a University with full accreditation by a recognized body in the country assigned to deal with such.

(d) Matters and the accreditation status of the Institution shall be independently verified by NM-AIST and the TCU. If in doubt, NM-AIST reserves the right to give any applicant a performance verification test or reject the application.

(e) To confirm that courses with credits for transfer have been accredited by the Commission and/or another national accreditation body.

(f) To ensure that all applications are scrutinized by the relevant school/department before transmitting to DVC-ARI for approval.

(g) To ensure that, once a course has been accepted as being equivalent to the NM-AIST course as per these guidelines, the course shall be given the same name and number of credits as that of the course on delivery at NM-AIST regardless of the credits in the other University's School/Faculty/Department.

(h) To ensure that the conversion of grades is done by anchoring the pass mark of the other University to that of NM-AIST and accordingly determining the range of marks in the other University for the NM-AIST grades. In cases where only grades and not scored marks are available, the lower equivalent grade shall be assumed.

(ii) Role of Releasing Institution shall be:

(a) To facilitate the transfer of credits of a student and providing necessary information on the student and the course/programme.

(b) To provide the amount of time that the student spent on supervised and unsupervised workload which aimed at achieving learning outcomes.

(c) To provide detailed transcripts recording the credits and grades awarded to the student.

(iii) Role of the Student shall be:

(a) To understand that a core subject, course or module in the releasing Institution/School/Faculty/Department may not necessarily be a core subject, course or module in the receiving Institution/School/Faculty/Department and vice versa. Credits for programme and specialty core courses are not transferable.

(b) To ensure that he/she possesses an active degree programme registration at his/her current Institution/School/Department.

(c) To ensure that credits for which transfer is requested have been obtained within a period of not more than five years.

(d) To undertake at least 50% of degree programme credits at NM-AIST. The maximum credit allowable for transfer, therefore, is 50% of the required credit of NM-AIST degree programme.

(e) To apply in writing, for credit transfer to the DVC-ARI through the Dean of respective school and attaching copies of all required supporting documents which include: official transcript, letter of introduction/recommendation from the previous university, course description, catalogue or syllabus to include number of hours of teaching, method of assessment and grading system, an official translation of the original documents (in case of non-English documents); photo-attached personal identification documents e.g. Birth certificate, passport or an Identification (ID),

certified copies of the original certificates used to gain admission into the previous university.

(f) To apply for credit transfer within two weeks of registration after getting approval from department/school that the course applying for transfer shall be offered in a respective academic year.

3.5 Course Codes

A course code has four letters and four digits to identify a particular course. The letters represent programme name while the digits depict a course status. The first digit denotes a type of programme, 6 being for Master's (UFQ 9) and 7 for PhD (UQF 10). The second digit denotes course category as follows: (0) for Common courses; (1) for Programme courses; (2) for Specialty courses; (3) for Elective courses and (4) for Graduate Seminars. The third and fourth digits denote the individual course serial number running from 01 to 99.

3.5.1 Course Outlines and Mapping

Table 1: Programmes and Areas of Specialization by Schools

Schools	Degree Programmes	Areas of Specialization
School of Life Science and Bioengineering (LiSBE)	Master of Science in Biodiversity and Ecosystem Management (BiEM) PhD in Biodiversity and Ecosystem Management (BiEM)	Molecular Biodiversity and Bio-Prospecting
		Sustainable Utilization of Natural Resources
	Master of Science in Sustainable Agriculture (SuAg) PhD in Sustainable Agriculture (SuAg)	Molecular Plant Pathology
		Plant Molecular Breeding
		Agricultural System Management
	Master of Science in Human Nutrition and Dietetic (HuND)	Clinical Nutrition and Dietetics
		Community Nutrition
	PhD in Human Nutrition and Dietetic (HuND)	Regulation of Nutrient Metabolism
		Molecular Mechanism of Human Disease-Nutrition
	Master of Science in Food Science and Biotechnology (FoSB) PhD in Food Science and Biotechnology (FoSB)	Postharvest Handling and Processing Technologies
		Food Safety and Quality
	Master of Science in Health	Health and Biomedical Sciences

Schools	Degree Programmes	Areas of Specialization
	and Biomedical Sciences (HBS) PhD in Health and Biomedical Sciences (HBS)	
	Master of Science in Public Health Research (PHR)	Determinants of Health and Diseases
		Interventions Research
		Implementations and Health Systems Research
	Master of Molecular Biomedical Engineering (BioE)	Molecular Biomedical Engineering
	Master of Science in Industrial Pharmacy and Regulatory Science (MSc.IPRS)	Industrial Pharmacy and Regulatory Science
School of Computational and Communication Science and Engineering (CoCSE)	Master's and PhD in Mathematical and Computer Science and Engineering (MCSE)	Applied Mathematics and Computational Science
		Computer Science and Engineering
	Master's and PhD in Information and Communication Science and Engineering (ICSE)	Information Technology Systems Development and Management
		Electronics and Telecommunications Engineering
	Master of Science in Embedded and Mobile Systems (EMoS)	Embedded Systems
		Mobile Systems
	Masters of Wireless and Mobile Computing (WiMC)	Wireless and Mobile Computing
	Master of Information Systems and Network Security (ISNS)	Information Systems and Network Security
School of Materials, Energy, Water and Environmental Sciences (MEWES)	Master's and PhD in Materials Science and Engineering (MaSE)	Materials Science and Engineering
	Master of Science in Sustainable Energy Science and Engineering (SESE	Sustainable Power Generation and Energy Utilization
		Renewable Energy Engineering
		Smart Grid Technology
	PhD in Sustainable Energy	Sustainable Power

Schools	Degree Programmes	Areas of Specialization
	Science and Engineering (SESE	Generation and Energy Utilization
		Renewable Energy Engineering
	Master's and PhD in Hydrology and Water Resources Engineering (HWRE)	Hydrology and Climate Studies
		Water Resources Engineering and Management
	Master of Science in Health Physics and Radiation Protection (HPRP)	Health Physics and Radiation Protection
	Water supply and sanitary engineering (WSSE)	Water Supply
		Sanitary Engineering
	PhD in Water supply and sanitary engineering (WSSE)	Water supply and sanitary engineering
	Master's and PhD in Environmental Science and Engineering (EnSE)	Environmental Science
		Environmental Engineering
School of Business Studies and Humanities	Master of Innovation and Enterpreneurship Management (IEM)	Innovation and Enterpreneurship Management
	PhD in Innovation and Enterpreneurship Management (IEM)	Innovation and Enterpreneurship Management

There are courses in the School of BuSH which are designed to enable students to develop attributes necessary for them to excel in academic and industry management and leadership that befits today's knowledge society, and which Africa needs to develop in order to leapfrog to prosperity. PhD students are required to explore the frontiers of knowledge that may lead to new discoveries and innovations. They will thus be required to take some courses that will expose them to these frontiers as well as prepare them for their research. It is also expected that some of the PhD students will be deployed as teaching assistants with a view to supporting senior academics and enabling them to develop their teaching skills and hence prepare for future careers in academia.

3.6 Graduate Seminars and Dissertation/Thesis/Project

3.6.1 Graduate Seminars

All students shall be required to attend and participate in a series of graduate seminars that will be organized by respective departments to provide them with an inter- and multi-disciplinary perspective in their areas of study. Seminar presentations may be given by visiting faculty, resident faculty, industrialists, and distinguished members of the international scientific community.

As part of the degree requirements, Master's and PhD students at NM-AIST must attain the number of credits from graduate seminars prescribed in the respective programme before graduation.

3.6.2 Dissertation/Thesis/Project

Upon approval of a research proposal, each student will proceed to conduct research and subsequently write and defend the dissertation/thesis to qualify for the degree award. The research and dissertation/thesis work is intended to enable students to deepen their understanding of the subject matter and come up with new knowledge and/or solutions to the problem(s) identified in the proposal.

3.6.3 Mapping of Courses for Master's and PhD Degree Programmes by Coursework and Dissertation

3.6.3.1 Master's Degree Programmes

Master's degree programmes by coursework and dissertation at NM-AIST are designed to take 4 semesters. The coursework is concentrated in the first two semesters and precedes the research for dissertation work, which commences in the third semester. In essence, the last two semesters are wholly reserved for research and dissertation writing. Graduate seminars are held throughout the 4 semesters and participation shall be compulsory.

3.6.3.2 PhD Degree Programmes

A PhD student is required to complete coursework with minimum credits as specified in the respective programmes and depending on one's background and intended area of research, as well as supervisor recommendation.

4.0 Schools under each School

4.1 School of Life Sciences and Bioengineering (LiSBE) Programmes

The School of Life Sciences and Bioengineering (LiSBE) offers 10 degree programmes at Master's and PhD level and three Programmes at Master's level.

(i) Master's and PhD in Biodiversity and Ecosystem Management (MSc. BiEM)

(ii) Master's and PhD in Sustainable Agriculture (MSc. SuAg)

(iii) Master's and PhD in Human Nutrition and Dietetics (MSc. HuND)

(iv) Master's and PhD in Food Science and Biotechnology (MSc. FoSB)

(v) Master's and PhD in Health and Biomedical Sciences (MSc. HBS)

(vi) Master of Science in Public Health Research (MSc. PHR)

(vii) Master of Molecular Biomedical Engineering (BioE)

(viii) Master of Science in Industrial Pharmacy and Regulatory Science (MSc.IPRS)

The programmes are designed to bring together engineering and biological sciences in as deep-seated a manner as possible. Stated broadly, the programmes will educate students to use principles in the analysis and manipulation of biological systems to solve problems across a spectrum of important biological applications. Accordingly, in the Master's programme, the curriculum emphasizes basic concepts as well as particular applications. By learning to advance both engineering and biological knowledge, coupled with relevant business and humanities ingredients, it is anticipated that both Master's and PhD graduates, though at different levels, will be well prepared to spearhead developments in academia and industry related to health, agriculture, food, biodiversity, bioengineering and other emerging fields based on biotechnological developments.

The School of Life Sciences and Bioengineering programmes offer a unique opportunity for graduates to become not only top-notch scientists or academicians, but also business managers and technopreneurs, due to well-structured curricula, combining both, biological and engineering knowledge on one side, and business and humanities concepts, on the other. It is anticipated that graduates of these programmes will be well prepared for leadership careers in academia and industry.

4.1.1 Master's and PhD in Biodiversity and Ecosystem Management

This programme will use a multidisciplinary approach to train students to generate the next generation of trainees equipped with knowledge and capacity to ensure sustainable management of natural resources is achieved while improving the livelihoods of the people in the respective areas. The programme will deliver innovative research, training and outreach packages to candidates from Tanzania and the region, taking advantage of the rich biodiversity in Tanzania and the strong existing pool of regional and international collaborations at NM-AIST. Candidates will use the opportunities and resources available at NM-AIST to achieve and promote career excellence in biodiversity and ecosystem management.

Students are required to choose one of the specializations offered within the Biodiversity and Ecosystem Management (BiEM) Programme. Specializations offered under BiEM programme are:

(i) Molecular Biodiversity and Bio-Prospecting

(ii) Sustainable Utilization of Natural Resources

4.1.1.1 Programme Outline for Biodiversity and Ecosystem Management

(I) Master of Science in Biodiversity and Ecosystem Management by Coursework and Dissertation

Students joining the MSc. BiEM by Coursework and Dissertation at NM-AIST shall be required to complete BuSH and school (LiSBE) core courses. With the approval of respective departments, students will take two BiEM programme courses on offer during the Semester based on their specialization, and other three electives courses of which can also be programme core courses offered within and/or outside the department/school

A list of courses for the Master of Science in Biodiversity and Ecosystem Managementprogramme is provided below in terms of course ante, name and credits:

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			**20**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	LiBE 6102	Outreach program	14
3.	BiEM 6401	Graduate Seminar	16
4.	BiEM 6901	Dissertation	60
Total Number of Credits			**104**

Specialty Courses

(i) Molecular Biodiversity and Bio-Prospecting

S/N	Course Ante	Course Name	Credits
1.	BiEM 6201	Microbial diversity and Bio-prospecting	14
2.	BiEM 6202	Natural Products in Biodiversity	14
Total Number of Credits			**28**

(ii) Sustainable Utilization of Natural Resources

S/N	Course Ante	Course Name	Credits
3.	BiEM 6221	Biodiversity Science and Conservation planning	14
4.	BiEM 6222	Conservation Governance	14
Total Number of Credits			**28**

Elective courses

Students doing Master's degree in BiEM under coursework and dissertation may elect additional course(s) from and/or from within or outside the department, after seeking advice and approval of their respective Head of Department. The following pool of elective courses will be offered within Biodiversity and Ecosystem Management.

S/N	Course Ante	Course Name	Credits
1.	BiEM 6301	Spatial Ecology and Conservation Planning	14
2.	BiEM 6302	Conservation Bio-geography	14
3.	BiEM 6303	Restoration Ecology and Eco-park	14
4.	BiEM 6304	Population Ecology	14
5.	BiEM 6305	Principles of Conservation Ecology	14
6.	BiEM 6306	Climate Change and Climate Modelling	14
7.	BiEM 6307	Conservation Genetics	14

(II) Master of Science in Biodiversity and Ecosystem Management by Research and Thesis

Students under Master's programme in BiEM by Research and Thesis at NM-AIST shall be required to complete two BuSH, one LSBE core course, and an outreach program as mandatory field attachment programme. A list of courses is provided below in terms of course ante, name and credits

Common Core Courses

S/N	Course Ante	Course Name	Credits
3.	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
4.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			**20**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	LiBE 6102	Outreach program	14
3.	BiEM 6402	Research Seminars and Conferences	16
4.	BiEM 6196	Thesis	116
Total Number of Credits			**160**

The topic of thesis may be taken to reflect any of specialty core courses taken from within BiEM programme or BiEM research themes or ongoing relevant research project within the field of specialty

(III) PhD in Biodiversity and Ecosystem Management by Coursework and Dissertation

The list of courses for the PhD degree programme in BiEM is provided below in terms of course ante, name and credits. With approval of respective departments, students may choose other courses on offer during the semester, within and/or outside BiEM.

Common Core Course

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Philosophy, Law and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organizational Development and Leadership	10
4.	*BuSH 6010	Economic of Innovation and Entrepreneurship	10

Total Number of Credits	20

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AIST*

Programme Core Courses

S/N	**Course Ante**	**Course Name**	**Credits**
1.	LiBE 7101	Applied Research Methods	14
2.	LiBE 7102	Outreach and Internship	14
3.	LiBE 7401	Graduate Seminars	20
4.	BiEM 7901	Dissertation	376
Total Number of Credits			**424**

Specialty Courses

S/N	**Course Ante**	**Course Name**	**Credits**
1	BiEM 7221	Biostatistics II	24
2	BiEM 7222	Population Ecology and Modeling	24
3	BiEM 7223	Advanced Microbial diversity and Bio-prospecting	24
4	BiEM 7224	Human Dimension of Conservation	24
5	BiEM 7225	Issues in Molecular Biodiversity	24
6	BiEM 7226	Restoration Ecology	24
7	BiEM 7227	Principles of Conservation Ecology	24
8	BiEM 7228	Natural Products and Bio-prospecting	24
Total Number of Credits			**48**

**Students must choose at least any two BiEM programme courses on offer during the Semester.*

(IV) PhD in Biodiversity and Ecosystem Management by Research and Thesis

A candidate pursuing PhD by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop research proposal and undertake research work before preparation of a thesis.

With the approval of respective departments, students may choose other courses on offer during the semester, within and/or outside the department/school as recommended by supervisor as indicated below:

Common Course

S/N	**Course Ante**	**Course Name**	**Credits**
1	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3	*BuSH 6009	Organization Development Leadership	10
4	*BuSH 6010	Economics of Innovation Entrepreneurship	10

Total Number of Credits	20

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AIST*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
3	LiBE 7101	Applied Research Methods	14
4	LiBE 7102	Outreach and Internship	14
5	BiEM7402	Research Seminars and Conferences	24
6	BiEM 7196	Thesis	468
Total Credits			**520**

4.1.1.2 Mapping of Courses for Biodiversity and Ecosystem Management

(I) Master of Science in Biodiversity and Ecosystem Management by Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		LiBE 6101	Research Methods and Statistics	14
Specialty Core	Molecular Biodiversity and Bio-Prospecting	BiEM 6201	Microbial diversity and Bio-prospecting	14
	Sustainable Utilization of Natural Resources	BiEM 6221	Biodiversity Science and Conservation Planning	14
Seminar		BiEM 6401	Graduate Seminar I	4
Elective		Choose one elective from a pool of prescribed courses		14
Subtotal credits for semester I (Per Specialty)				56

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		LiBE 6102	Outreach and Internship	14
Specialty Core	Molecular Biodiversity and Bio-Prospecting	BiEM 6202	Natural Products in Biodiversity	14
	Sustainable Utilization of Natural Resources	BiEM 6222	Conservation Governance	14
Seminar		BiEM 6401	Graduate Seminar II	4
Elective		Choose one elective from a pool of prescribed courses		14
Subtotal credits for semester II (Per Specialty)				56
Subtotal credits for semester I & II (Per Specialty)				112

Semester III & IV

Course Category	Course Ante	Course Name	Credits
Seminars	BiEM 6401	Graduate seminar III	4
		Graduate seminar IV	4
Dissertation	BiEM 6196	Dissertation	60
Total credits for semester III-IV			**68**

Credits Mapping for Semester I –IV

SN	Course Category	Semester I	Semester II	Semester III-IV	TotalCredits
1.	Common core	10	10	-	20
2.	Programme Core	14	14	-	28
3.	Specialty core	14	14	-	28
4.	Elective	14	14		28
5.	Graduate seminars	4	4	8	16
6.	Dissertation			60	60
	Total Credits	**56**	**56**	**68**	**180**

(II) Master of Science in Biodiversity and Ecosystem Management by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	LiBE 6102	Outreach and Internship	14
	LiBE 6101	Research Methods and Statistics	14
Seminars	BiEM6402	Research Seminars and Conferences I	4
		Research Seminars and Conferences II	4
		Research Seminars and Conferences III	4
		Research Seminars and Conferences IV	4
Thesis	BiEM 6196	Thesis	116
Total Number of Credits			**180**

The topic of thesis may be taken to reflect any of specialty core courses taken from within BiEM programme or BiEM research themes or ongoing relevant research project within the field of specialty

(III) PhD in Biodiversity and Ecosystem Management by Coursework and Dissertation

A PhD student is required to complete coursework within the first two semesters. The table below shows the indicative mapping of PhD courses and their respective weights in credits. Actual mapping will vary for the various students depending on one's intended area of research, as well as the supervisor's recommendation

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
		*BuSH 6009	Organization Development Leadership	10
Programme core		LiBE 7101	Applied Research Methods	14
Specialty Core	*Students must choose at least any two BiEM programme courses on offer during the Semester*	BiEM 7221	Biostatistics II	24
		BiEM 7222	Population Ecology and Modeling	
		BiEM 7223	Advanced Microbial Biodiversity and Bio-prospecting	
		BiEM 7224	Human Dimension of Conservation	
		BiEM 7225	Issues in Molecular Biodiversity	24
		BiEM 7226	Restoration Ecology	
		BiEM 7227	Principles of Conservation Ecology	
		BiEM 7228	Natural Products and Bio-prospecting	
Subtotal credits for semester I (Per Specialty)				**72**

Semester II

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6010	Economics of innovation Entrepreneurship	10
Programme Core	LiBE 7102	Outreach and Internship	14
Students must choose at least any two BiEM programme courses on offer during the Semester	BiEM 7221	Biostatistics II	24
	BiEM 7222	Population Ecology and Modeling	
	BiEM 7223	Advanced Microbial Biodiversity and Bio-prospecting	
	BiEM 7224	Human Dimension of Conservation	
	BiEM 7225	Issues in Molecular Biodiversity	24
	BiEM 7226	Restoration Ecology	
	BiEM 7227	Principles of Conservation Ecology	
	BiEM 7228	Natural Products and Bio-prospecting	
	BiEM7401	Graduate Seminar I	4
Total credits for semester II (Per Specialty)			76
Total credits for semester I & II (Per Specialty)			148

Semester III-VI

Course Category	Course Ante	Course Name	Credits
Seminars	BiEM 7401	Graduate seminar III	4
		Graduate seminar IV	4
		Graduate seminar V	4
		Graduate seminar VI	4
Dissertation	BiEM 6901	Dissertation	376
Total credits for semester III-IV			**392**

Credits Mapping for Semester I - VI

SN	Course Category	Semester I	Semester II	Semester III-VI	TotalCredits
1	Common core	10	10	-	20
2	Programme Core	14	14	-	28
3	Specialty core	48	48	-	96
5	Graduate seminars	-	4	16	20
6	Dissertation	-	-	376	376
	Total Credits	**48**	**52**	**392**	**540**

(IV) Mapping of Core Courses for PhD by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6009	Organization Development Leadership	10
	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Programme Core	LiBE 7101	Applied Research Methods	14
	LiBE 7102	Outreach and Internship	14
Seminars	BiEM 7102	Research Seminars and Conferences I	4
		Research Seminars and Conferences II	4
		Research Seminars and Conferences III	4
		Research Seminars and Conferences IV	4
		Research Seminars and Conferences V	4
		Research Seminars and Conferences VI	4
Thesis	BiEM 7196	Thesis	468
Total Credits			**540**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AIST*

4.1.2 Master's and PhD in Sustainable Agriculture

The programme will develop students with the necessary scientific, technological, managerial and mental skills and competences in the agricultural industry that will contribute effectively and ethically to strategic decision making for the sustainable development of agriculture. Upon completion of the program, graduates will have obtained knowledge that will support the process of sustainable development in agriculture such as: maintenance and development of agricultural production and services (productivity), managing agricultural production risks through technological advancements (security), protecting the agricultural production potential and capacity of natural resources and preventing the degradation of soil, water quality and biological diversity (protection), economic viability (profitability) and social acceptability (social equity).

After the mandatory common core courses, students who will be admitted into SuAg programme may specialize in one of the following areas:

(i) Molecular Plant Pathology

(ii) Plant Molecular Breeding

(iii) Agricultural System Management

With the approval of respective departments, students may choose elective courses from a prescribed pool of courses and /or some core courses from within and /or outside SuAg

4.1.2.1 Programme Outline for Sustainable Agriculture

(I) Master of Sciences in Sustainable Agriculture by Coursework and Dissertation

A list of courses for MSc SuAg programme is provided bellow in terms of ante, name and credit

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			20

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	SuAg 6101	Issues in Sustainable Agriculture	14
2.	LiBE 6101	Research Methods and Statistics	14
3.	LiBE 6102	Outreach and Internship	14
4.	SuAg 6401	Graduate Seminar	16
5.	SuAg 6901	Dissertation	60
Total Number of Credits			**114**

Specialty Courses

(i) Molecular Plant Pathology

S/N	Course Ante	Course Name	Credits
1.	SuAg 6201	Molecular Plant Pathology	14
Total Number of Credits			**14**

(ii) Plant Molecular Breeding

S/N	Course Ante	Course Name	Credits
1.	SuAg 6202	Plant Molecular Breeding	14
Total Number of Credits			**14**

(iii)Agricultural System Management

S/N	Course Ante	Course Name	Credits
1.	SuAg 6203	Managing Agro-ecosystems	**14**
Total Number of Credits			**14**

Elective Courses

Masters' students may elect courses which strengthen their scientific knowledge and technical competences, from a prescribed pool of courses and/or some courses from within or outside the school after seeking approval of the respective departments.

The following pool of elective courses will be offered under the SuAg programme.

S/N	Course Ante	Course Name	Credits
1.	SuAg 6301	Sustainable Crop Protection and Soil Health Management	14
2.	SuAg 6302	Plant Tissue Culture	14
3.	SuAg 6303	Application of Engineering in Life Sciences	14
4.	SuAg 6304	Economic Aspects of Biotechnology	14
5.	SuAg 6305	Molecular Biotechnology	14
6.	SuAg 6306	Plant Virology	14
7.	SuAg 6307	Sustainable Crop Production	14
8.	SuAg 6308	Seed Science and Seed Systems	14
9.	SuAg 6309	Applied Plant Pathology	14
10.	SuAg 6310	Metabolic Engineering and Molecular Farming	14

S/N	Course Ante	Course Name	Credits
11.	SuAg 6311	Abiotic and Biotic Stress Biology	14
12.	SuAg 6312	Molecular Techniques in Life Sciences	14
13.	SuAg 6313	Agriculture Entomology	14
14.	SuAg 6314	Agriculture Enterprise Management	14
15.	SuAg 6315	Livestock Production and Management	14
Total Number of Credit			**210**

(II) Master of Sciences in Sustainable Agriculture by Research and Thesis

Candidates pursuing master degree by research and thesis at NM-AIST shall be required to take all common courses, present graduate seminars, develop research proposals and undertake research work before preparation of thesis. With approval respective department, students may choose other courses on offer during semester, within and /or outside SuAg as detailed below

Common core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			**20**

Programme core courses

S/N	Course Ante	Course Name	Credits
1.	SuAg 6102	Master's Outreach and Internship	14
2.	SuAg6402	Master's Research Seminar and Conferences	16
3.	SuAg 6196	Master's Thesis	116
Total Number of Credit			**160**

(III) PhD in Sustainable Agriculture by Coursework and Dissertation

The program is developed from the fact that agricultural productivity in sub–Saharan Africa has been declining in the past few decades and food needs are increasing due to population growth rates. Currently, the agricultural productivity (crop, animal, aquaculture) production in the agro-ecosystems is adversely affected by input prices (fertilizer, seeds, agro-pesticides, feeds), proper management practices, use of poor farming practices and climate change related issues, declining water resources, poor infrastructure, and governmental policy that distort agricultural markets.

The list of courses for the PhD degree programme in SuAg is provided below in terms of course ante, name and credits. With approval of respective departments, students may choose other courses on offer during the semester, within and/or outside SuAg.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development Leadership	10
4.	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Total Number of Credits			**20**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AST.*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	SuAg 7101	Sustainability in Agriculture	24
2.	LiBE 7101	Applied Research Methods	14
3.	LiBE 7102	Outreach and Internship	14
4.	SuAg 7401	Graduate seminars	20
5.	SuAg 7902	Dissertation	376
Total Number of Credits			**448**

Specialty Core Courses

(i) Plant Molecular Breeding

S/N	Course Ante	Course Name	Credits
1.	SuAg 7201	Advanced Plant Biotechnology	24
Total Number of Credits			**24**

(ii) Molecular Plant Pathology

S/N	Course Ante	Course Name	Credits
1.	SuAg 7202	Molecular Biology of Plant Microbe Interaction.	24
Total Number of Credits			**24**

(iii) Agricultural Systems Management

S/N	Course Ante	Course Name	Credits
1.	SuAg 7203	Agriculture and Farming System Management	24
Total Number of Credits			**24**

Elective Courses

PhD students may elect courses which strengthens their scientific knowledge and technical competences, from a prescribed pool of courses and/or some of courses from within or outside the school after seeking approval of the respective departments.

Elective courses

S/N	Course Ante	Course Name	Credits
1.	SuAg 7301	Molecular Markers in Plant Breeding	24
2.	SuAg 7302	Advanced Genomics and Bioinformatics	24
3.	SuAg 7303	Soil Health Management and Sustainable Farming Systems	24
4.	SuAg 7304	Postharvest Physiology	24
5.	SuAg 7305	Issues in Climate Change Adaptation and Resilience in Agro-Ecosystems	24
6.	SuAg 7306	Advanced Agricultural Entomology	24
7.	SuAg 7307	Advanced Agriculture Enterprise Management	24
8.	SuAg 7308	Advances in Livestock Production Technologies	24

(IV) PhD in Sustainable Agriculture by Research and Thesis

A candidate pursuing PhD by Research and Thesis at NM-AIST shall be required to take all common core courses present graduate seminars, develop research proposal and undertake research work before preparation of thesis.

With the approval of respective departments students may choose other courses on offer during semester within and /or outside SuAg as detailed below.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development Leadership	10
4.	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Total Number of Credits			20

*Core course shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their PhD at NM-AST.

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 7101	Applied Research Methods	14
2.	LiBE 7102	PhD Outreach and Internship	14
3.	SuAg 7402	Research Seminars and conferences	24
4.	SuAg 7196	Thesis	468
Total Number of Credits			**520**

*The topic of thesis may be taken to reflect any of specialty core courses taken from within **SuaAg** programme or **SuAg** research themes or ongoing relevant research project within the field of specialty*

4.1.2.2 Mapping of Courses for Sustainable Agriculture

(I) Master of Science in Sustainable Agriculture by Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		LiBE 6101	Research Methods and Statistics	14
		SuAg 6101	Issues in Sustainable Agriculture	14
Specialty Core	Molecular Plant Pathology	SuAg 6201	Molecular Plant Pathology	14
	Plant Molecular Breeding	SuAg 6202	Plant Molecular Breeding	14
	Agricultural Systems Management	SuAg 6203	Managing Agro-ecosystems	14
Subtotal credits for semester I (Per Specialty)				52

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		LiBE 6102	Outreach and Internship	14
Specialty Core	Molecular Plant Pathology	SuAg	Choose 2 electives from a pool of prescribed electives	28
	Plant Molecular Breeding	SuAg	Choose 2 electives from a pool of prescribed electives	28
	Agricultural Systems Management	SuAg	Choose 2 electives from a pool of prescribed electives	28
Seminar		SuAg 6401	Graduate seminar I	4
Total credits for semester II (Per Specialty)				56
Total credit for semester I & II (Per Specialty)				108

Semester III & IV

Course Category	Course Ante	Course Name	Credits
Seminars	SuAg 6401	Graduate seminar II	4
		Graduate seminar III	4
		Graduate seminar IV	4
Dissertation	SuAg 6196	Dissertation	**60**
Total credits for semester III-IV			**72**

Credits Mapping for Semester I - IV

SN	Course Category	Semester I	Semester II	Semester III-IV	Total Credits
1.	Common core	10	10	-	20
2.	Programme Core	28	14	-	42
3.	Specialty core	14	-	-	14
4.	Electives	-	28	-	28
5.	Graduate seminars	-	4	12	16
6.	Dissertation	-	-	60	60
Total Credits		**52**	**56**	72	180

(II) Master of Science in Sustainable Agriculture by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	LiBE 6101	Research Methods and Statistics	14
	LiBE 6102	Outreach and Internship	14
Seminars	SuAg 6402	Research Seminar and Conferences I	4
		Research Seminar and Conferences II	4
		Research Seminar and Conferences III	4
		Research Seminar and Conferences IV	4
Thesis	SuAg 6196	Thesis	116
Total Number of Credit			**180**

(III) PhD in Sustainable Agriculture by Coursework and Dissertation

A student must accumulate at total of 540 credits from course work, seminars, outreach and dissertation/thesis for graduation. Students are required to choose one of the specializations offered within the PhD Sustainable Agriculture such as Molecular Plant Pathology, Plant Molecular Breeding and Agricultural System Management for their specialty preference. The list of all courses for PhD students under this programme is shown below:

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
		*BuSH 6009	Organization Development Leadership	10
Programme core		LiBE 7101	Applied Research Methods	14
		SuAg 7101	Sustainability in Agriculture	24
Specialty Core	Plant Molecular Breeding	SuAg 7201	Advanced Plant Biotechnology	24
	Molecular Plant Pathology	SuAg 7202	Molecular Biology of Plant Microbe Interaction	24
	Agricultural System Management	SuAg 7203	Agriculture and Farming Systems Management	24
Subtotal credits for semester I (Per Specialty)				72

Semester II

Course Category		CourseAnte	Course Name	Credits
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
		BuSH 6010	Economics of innovation Entrepreneurship	10
Programme Core		LiBE 7102	Outreach and Internship	14
Specialty Core	Molecular Plant Pathology	SuAg	Choose 2 electives from a pool of prescribed electives	48
	Plant Molecular Breeding	SuAg	Choose 2 electives from a pool of prescribed electives	48
	Agricultural Systems Management	SuAg	Choose 2 electives from a pool of prescribed electives	48
Seminars		SuAg 7401	Graduate seminar I	4
Total credits for semester II (Per Specialty)				76
Total credits for semester I & II (Per Specialty)				148

Semester III-VI

Course Category	Course Ante	Course Name	Credits
Seminars	SuAg 7401	Graduate seminar II	4
		Graduate seminar III	4
		Graduate seminar IV	4
		Graduate seminar V	4
Dissertation	SuAg 6901	Dissertation	376
Total credits for semester III-IV			**392**

Credits Mapping for Semester I - VI

SN	Course Category	Semester I	Semester II	Semester III-VI	Total Credits
1.	Common core	10	10	-	20
2.	Programme Core	38	14	-	52
3.	Specialty core	24	-	-	24
4.	Electives	-	48	-	48
5.	Graduate seminars	-	4	16	20
6.	Dissertation	-	-	376	376
Total Credits		**72**	**76**	**392**	**540**

(IV) PhD in Sustainable Agriculture by Research and Thesis

Common Core Courses

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6009	Organization Development Leadership	10
	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Programme Core	LiBE 7101	Applied Research Methods	14
	LiBE 7102	Outreach and Internship	14
Seminars	SuAg 7402	Research Seminars and conferences I	4
		Research Seminars and conferences II	4
		Research Seminars and conferences III	4
		Research Seminars and conferences IV	4
		Research Seminars and conferences V	4
		Research Seminars and conferences VI	4
Thesis	SuAg 6196	Thesis	468
Total Number of Credits			**540**

**Core course shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's at NM-AST.*

4.1.3 Master's and PhD in Science Human Nutrition and Dietetics

The human nutrition and dietetics programme at Master's level at NM-AIST has been designed with multiple specializations specifically, to address the different challenges in relation to human health. Thus, the human nutrition and dietetics programme focuses on three interdisciplinary specializations: Clinical Nutrition, Dietetics and Community Nutrition. Graduates of this programme will possess knowledge on how to use food and nutrition to solve health and other community problems in relation to diets. The human nutrition and dietetics programme offers a unique opportunity for graduates to become not only top-notch scientists or academicians, but also business managers and techno-preneurs. It is anticipated that graduates of this programme will be well prepared for leadership careers in the area of human nutrition for academia, society and industry.

After the mandatory common core courses, students who will be admitted into HuND programme may specialize in one of the following areas:

(i) Clinical Nutrition

(ii) Community Nutrition

With the approval of respective departments students may choose elective courses from a prescribed pool of courses and /or some core courses from within and /or outside HuND

4.1.3.1 Program outline for Human Nutrition and Dietetic

(I) Master of Sciences in Human Nutrition and Dietetic by Coursework and Dissertation

A list of courses for MSc in HuND programme is provided bellow in terms of ante, name and credit.

Common Core Courses

S/N	Course Code	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			20

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	HuND 6102	Advanced Nutrition Assessments and Surveillance	12
3.	LiBE 6102	Outreach and Internship	14
4.	HuND 6401	Graduate Seminar	12
5.	HuND 6901	Dissertation	50
Total Number of Credits			**102**

Specialty Core Courses

(i) Clinical Nutrition and Dietetics

S/N	Course Ante	Course Name	Credits
1	HuND 6204	Advanced Nutritional Epidemiology	12
2	HuND 6203	Clinical Nutrition and Dietetics	12
3	HuND 6201	Therapeutic Nutrition	12
4	HuND 6202	Advanced Nutritional Biochemistry	12
5	HuND 6206	Advanced Maternal and Child Nutrition	12
Total Number of Credits			**24**

(ii) Community Nutrition

S/N	Course Ante	Course Name	Credits
1.	HuND 6223	Nutrition in Emergencies	12
2.	HuND 6222	Food and Nutrition Security	12
3.	HuND 6221	Programme Design, Implementation, Monitoring and Evaluation	12
4.	HuND 6224	Ergogenic Aids and Sports Performance	12
5.	HuND 6225	Nutrition in Exercise and Sports	12
Total Number of Credits			**24**

(II) Master of Science in Human Nutrition and Dietetics by Research and Thesis

Candidates pursuing master degree by research and thesis at NM-AIST shall be required to take all common courses, present graduate seminars, develop research proposals and undertake research work before preparation of thesis. With approval respective department, students may choose other courses on offer during semester, within and /or outside HuND as detailed below

Common core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credit			**20**

Programme Core courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	LiBE 6102	Outreach and Internship	14
3.	LiBE 6402	Research Seminar and Conferences	16
4.	HuND 6196	Thesis	116
Total Number of Credit			**160**

(III) Programme Outline for PhD in Human Nutrition and Dietetics

The human nutrition and dietetics programme at PhD level at NM-AIST has been designed with multiple specializations specifically, to address the different challenges in relation to human health. Thus, the human nutrition and dietetics programme puts a focus in three interdisciplinary specializations: Regulation of Nutrient Metabolism, Nutrition bioinformatics and Molecular Mechanism of Human Disease-Nutrition. Graduates of this programme will possess knowledge on how to use food and nutrition knowledge to solve health and community problems in relation to diets. The human nutrition and dietetics programme offers a unique opportunity for graduates to become not only top-notch scientists or academicians, but also business managers and techno-preneurs. It is anticipated that graduates of this programme will be well prepared for leadership careers in the area of human nutrition for academia, society and industry.

The list of courses for the PhD degree programme in HuND is provided below in terms of course ante, name and credits. With approval of respective departments, students may choose other courses on offer during the semester, within and/or outside HuND.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development Leadership	10
4.	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Total Number of Credits			**20**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AST.*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE BE 7101	Applied Research Methods	14
2.	LiBE 7102	Outreach and Internship	14
3.	HuND 7401	Graduate seminars	20
4.	HuND 7902	Dissertation	376
5.	**Total Number of Credits**		**424**

Specialty Core Courses

(i) Regulation of Nutrient Metabolism

S/N	Course Ante	Course Name	Credits
1.	HuND 7201	Intermediary Metabolism of Macronutrients	24
	HuND 7202	Intermediary Metabolism of Micronutrients	24
Total Number of Credits			48

Molecular Mechanism of Human Disease-Nutrition

S/N	Course Ante	Course Name	Credits
1.	HuND 7241	Pathophysiology of Inborn Metabolic Disorders	24
2.	HuND 7242	Immunology, Endocrinology and Lifestyle conditions	24
3.	HuND 7243	Pharmacology and Therapeutics of nutrition-related disease	24
4.	HuND 7244	Microbial Physiology	24
5.	HuND 7245	Cell and Molecular Toxicology Technique	24
6.	HuND 7246	Human physiology, Nutrition care process, health and anatomy of the organ systems	24
Total Number of Credits			**48**

Select a minimum of 2 courses

Elective Courses

PhD students may elect courses which strengthen their scientific knowledge and technical competences, from a prescribed pool of courses and/or some courses from within or outside the school after seeking approval of the respective department

Elective Courses

S/N	Course Ante	Course Name	Credits
1.	HuND 7243	Pharmacology and Therapeutics of nutrition-related disease	24
2.	HuND 7244	Microbial Physiology	24
3.	HuND 7245	Cell and Molecular Toxicology Technique	24
4.	HuND 7246	Human physiology, Nutrition care process, health and anatomy of the organ systems	24

(IV) PhD in Human Nutrition and Dietetics by Research and Thesis

A candidate pursuing PhD by Research and Thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop research proposals and undertake research work before preparation of thesis. With the approval of respective departments students may choose other courses on offer during semester within and /or outside HuND as detailed below:

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development Leadership	10
4.	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Total Number of Credits			**20**

**Core course shall be take n by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's at NM-AST.*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 7101	Applied Research Methods	**14**
2.	LiBE 7102	Outreach and Internship	14
3.	HuND 7402	Research Seminar and conference	24
4.	HuND 7196	Thesis	468
Total Number of Credits			**520**

The topic of thesis may be taken to reflect any of specialty core courses taken from within HuND programme or HuND research themes or ongoing relevant research project within the field of specialty

4.1.3.2 Mapping of Courses for Human Nutrition and Dietetics

(I) Master of Science in Human Nutrition and Dietetics by Coursework and Dissertation

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		LiBE 6101	Research Methods and Statistics	14
		HuND 6102	Advanced Nutrition Assessments and Surveillance	12
Specialty Core	Clinical nutrition & dietetics	HuND 6204	Advanced Nutritional Epidemiology	12
		HuND 6203	Clinical Nutrition and Dietetics	12
	Community nutrition	HuND 6223	Nutrition in Emergencies	12
		HuND 6222	Food and Nutrition Security	12
Seminar		HuND 6401	Graduate Seminar I	4
Total credits for semester I (Per Specialty)				**64**

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		HuND 6102	Advanced Nutrition Assessments and Surveillance	12
Specialty core	*Clinical Nutrition & Dietetics	HuND 6201	Therapeutic Nutrition	12
		HuND 6202	Advanced Nutritional Biochemistry	12
		HuND 6206	Advanced Maternal and Child Nutrition	12
	*Community Nutrition	HuND 6221	Programme Design, Implementation, Monitoring and Evaluation	12
		HuND 6224	Ergogenic Aids and Sports Performance	12
		HuND 6225	Nutrition in Exercise and Sports	12
	Seminar	HuND 6401	Graduate seminar II	4
Total credits for semester II (Per Specialty)				50
Total credit for semester I & II (Per Specialty)				114

**Choose any 2 specialty core courses*

Semester III &IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Outreach	LiBE 6102	Outreach Programme	20
Seminars	HuND 6401	Graduate Seminar III	2
		Graduate Seminar IV	2
Dissertation	HuND 6196	Dissertation	50
Total credits for semester III-IV			**74**

Credits Mapping for Semester I – IV

SN	Course Category	Semester I	Semester II	Semester III-IV	Total
1.	Common core	10	10	-	20
2.	Programme Core	14	-	20	34
3.	Specialty core	12	12	-	24
4.	Electives	24	24	-	48
5.	Graduate seminars	4	4	4	12
6.	Dissertation	-	-	50	50
Total Credits		**64**	**50**	**74**	**188**

(II) Master of Science in Human Nutrition and Dietetics by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Common Core	LiBE 6101	Research Methods and Statistics	14
	LiBE 6102	Outreach and Internship	14
Seminars	HuND 6402	Research Seminar and Conference I	4
		Research Seminar and Conference II	4
		Research Seminar and Conference III	4
		Research Seminar and Conference IV	4
Thesis	HuND 6196	Thesis	116
Total Number of Credit			**180**

(III) PhD in Human Nutrition and Dietetics by Coursework and Dissertation

A student must accumulate at total of 540 credits from course work, seminars, outreach and dissertation/thesis for graduation. Students are required to choose one of the specializations offered within the PhD in Human Nutrition and Dietetics degree programmes. The list of all courses for PhD students under this programme is shown below:

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
		*BuSH 6009	Organization Development Leadership	10
Programme core		LiBE 7101	Applied Research Methods	14
Specialty Core	Regulation of Nutrient Metabolism	HuND7201	Intermediary Metabolism of Macronutrients	24
	Molecular Mechanism of Human Disease	HuND 7241	Pathophysiology of Inborn Metabolic Disorders	24
		HuND7242	Immunology, Endocrinology and Lifestyle conditions	24
		HuND7243	Pharmacology and Therapeutics of nutrition-related disease	24
Elective		Choose from a pool of prescribed courses		24
Subtotal credits for semester I (Per Specialty)				72

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
		*BuSH 6010	Economics of Innovation Entrepreneurship	10
Programme core		LiBE 7102	Outreach and Internship	20
Specialty Core	Regulation of Nutrient Metabolism	HuND7202	Intermediary Metabolism of Micronutrients	24
	Molecular Mechanism of Human Disease	HuND7244	Microbial Physiology	24
		HuND7245	Cell and Molecular Toxicology Technique	24
		HuND7246	Human physiology, Nutrition care process, Health and Anatomy of the Organ Systems	24
Elective		Choose from a pool of prescribed courses		24
Subtotal credits for semester I (Per Specialty)				72

Semester III & IV

Course Category	Course Ante	Course Name	Total Credits
Seminar	HuND 7401	Graduate Seminar I	8
		Graduate Seminar II	8
Dissertation	HuND 7901	Dissertation	376
Total Credits			**392**

Credits Mapping for Semester I - VI

SN	Course Category	Semester I	Semester II	Semester III-VI	TotalCredits
1.	Common core	10	10		20
2.	Programme Core	14	20		34
3.	Specialty core	24	24		48
4.	Electives	24	24		48
5.	Graduate seminars			16	16
6.	Dissertation			376	376
Total Credits		**72**	**78**	**392**	**542**

(IV) PhD in Human Nutrition and Dietetics by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6009	Organization Development Leadership	10
	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Programme Core	LiBE 7101	Applied Research Methods	14
	LiBE 7102	Outreach and Internship	14
Seminars	HuND 7402	Research Seminar and conference I	4
		Research Seminar and conference II	4
		Research Seminar and conference III	4
		Research Seminar and conference IV	4
		Research Seminar and conference V	4
		Research Seminar and conference VI	4
Thesis	HuND 7196	Thesis	468
Total Number of Credits			**540**

The topic of thesis may be taken to reflect any of specialty core courses taken from within HuND programme or HuND research themes or ongoing relevant research project within the field of specialty.

4.1.4 Master's and PhD in Food Science and Biotechnology

Graduates and technologies emanating from this program are anticipated to innovatively contribute to improve the traditional ways of handling agro-produce for value addition through agro-processing for shelf-life extension, product diversification, and finally to ensure safety and quality in small/medium scale food processing. Therefore, graduates of this programme will possess; Knowledge on how to use food technology principles to solve problems of food safety and quality, food and nutrition security across Sub-Saharan Africa. The programme will offer a unique opportunity for graduates to become not only top-notch scientists or academicians, but also business managers and techno-preneurs, due to a stylishly structured curriculum, combining both scientific and innovation knowledge on one side, and business and humanities concepts, on the other. This program will produce experts who will: develop new and innovative postharvest handling technologies, participate in different platforms with similar views of enhancing food and nutrition security, and develop models and technologies to reduce the losses. This program will produce experts who will: Design and implement food quality and safety management systems, and enforcement of food safety regulations and legislation.

After the mandatory common core courses, students who will be admitted into FoSB programme may specialize in one of the following areas:

(i) Postharvest Handling and Processing Technologies

(ii) Food Safety and Quality

With the approval of respective departments students may choose elective courses from a prescribed pool of courses and /or some core courses from within and /or outside FoSB.

4.1.4.1 Programme Outlines for Food Science and Biotechnology

(I) Master of Science in Food Science and Biotechnology by Course work and Dissertation

A list of courses for MSc FoSB programme is provided bellow in terms of ante, name and credit.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			20

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	LiBE 6102	Outreach and Internship	14
3.	FoBS 6401	Graduate Seminar	**16**
4.	FoSB 6901	Dissertation	60
Total Number of Credits			**114**

Specialty core

(i) Postharvest Handling and Processing Technologies

S/N	Course Ante	Course Name	Credits
1.	FoSB 6201	Postharvest Handling and Processing Technologies I	14
2	FoSB 6202	Postharvest Handling and Processing Technologies II	14
Total Number of Credits			**28**

(ii) Food Safety and Quality

S/N	Course Ante	Course Name	Credits
1.	FoSB 6221	Food Safety Issues	14
2.	FoSB 6222	Food Quality Assurance and Control	14
Total Number of Credits			28

Elective Courses

Masters' students may elect courses which strengthen their scientific knowledge and technical competences, from a prescribed pool of courses and/or some courses from within or outside the school after seeking approval of the respective departments.

Electives Courses

S/N	CourseAnte	Course Name	Credits
1.	FoSB 6301	Total Quality Management in Food Industry	14
2.	FoSB 6302	Food Product Development	14
3.	FoSB 6303	Food Law and Regulations	14
4.	FoSB 6304	Functional Foods	14
5.	FoSB 6305	Food Mycotoxicology	14
6.	FoSB 6306	Trends in Food Technology	14
7.	FoSB6307	Advanced Food Chemistry	14
8.	FoSB 6308	Food Microbiology	14
9.	FoSB 6309	Food Analysis and Instrumentation	14
10.	FoSB 6310	Industrial Food Biotechnology	14

(II) Master of Science in Food Science and Biotechnology by Research and Thesis

Candidates pursuing master degree by research and thesis at NM-AIST shall be required to take all common courses, present graduate seminars, develop research proposals and undertake research work before preparation of thesis. With approval respective department, students may choose other courses on offer during semester, within and /or outside FoSB as detailed below:

Common core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credit			**20**

Programme core courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	LiBE 6102	Outreach and Internship	14
3.	FoBS 6402	Research Seminar and Conferences	16
4.	FoBS 6196	Thesis	116
Total Number of Credit			160

(III) PhD in Food Science and Biotechnology

The goal of the programmes in Food Science and Biotechnology is to produce world class professionals, with competence for academia, research and industries. A three-year program mainly focuses on research concerning primary food production, handling/processing and quality assurance. Emphasis shall be on linkage to society and to the local industry, and scientific and technological response to local needs. The programme will offer a unique opportunity for graduates to become not only top-notch scientists or academicians, but also business managers and techno-preneurs, due to stylishly structured curriculum, combining both, scientific and biotechnology on one side, and business and humanities concepts, on the other. It is anticipated that graduates of these programme will be well prepared for leadership careers in academia and industry.

The list of courses for the PhD degree programme in FoSB is provided below in terms of course ante, name and credits. With approval of respective departments, students may choose other courses on offer during the semester, within and/or outside FoSB

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development Leadership	10
4.	*BuSH 6010	Economics of Innovation Entrepreneurship	10

Total Number of Credits	**20**

**Core course shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AST*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 7101	Applied Research Methods	14
2.	LiBE 7102	Outreach and Internship	14
3.	FoBS 7401	Graduate Seminars	20
4.	FoBS 7902	Dissertation	376
5.	**Total Number of Credits**		**424**

Specialty Core Courses

S/N	Course Ante	Course Name	Credits
1.	FoSB7221	Functional Microorganism in Foods	24
2.	FoSB 7222	Advanced Food Analysis	24
3.	FoSB 7223	Advanced Functional Foods	24
4.	FoSB 7224	Food Safety Issues	24

**Students must choose at least any two FoSB programme courses on offer during the Semester*

Elective Courses

PhD students may elect courses which strengthen their scientific knowledge and technical competences, from a prescribed pool of courses and/or some courses from within or outside the school after seeking approval of the respective departments.

Elective Courses

S/N	Course Ante	Course Name	Credits
1.	FoSB 7301	Meat Science and Technology	24
2.	FoSB7302	Food Bio-ingredients	24
3.	FoSB 7303	Fruit and Vegetable Technology	24
4.	FoSB7304	Cereals Technology	24
5.	FoSB 7305	Milk and Diary Technology	24
6.	FoSB 7306	Advanced Postharvest Physiology	24
7.	FoSB 7307	Novel Technologies in Food Science	24

(IV) PhD in Sciences in Food Science and Biotechnology by Research and Thesis

A candidate pursuing PhD by Research and Thesis at NM-AIST shall be required to take all common core courses present graduate seminars, develop research proposal and undertake research work before preparation of thesis. With the approval of respective departments students may choose other courses on offer during semester within and /or outside FoSB as detailed below:

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10

2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development Leadership	10
4.	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Total Number of Credits			**40**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's at NM-AIST.*

Programme Core Courses

S/N	CourseAnte	Course Name	Credits
1.	LiBE 7101	Applied Research Methods	14
2.	LiBE 7102	Outreach and Internship	14
3.	FoSB 7402	Research Seminars and conferences	24
4.	FoSB 7196	Thesis	468
Total Number of Credits			**520**

The topic of thesis may be taken to reflect any of specialty core course taken from within FoSB programme or FoSB research themes or ongoing relevant research project within the field of specialty

4.1.4.2 Mapping of Courses for Food Science and Biotechnology

(I) Master of Science in Food Science and Biotechnology by Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		LiBE 6101	Research Methods and Statistics	14
Specialty Core	Postharvest Handling and Processing Technologies	FoSB 6201	Postharvest Handling and Processing Tecnologies – I	14
		Choose 1 course from a pool of prescribed specialities		14
	Food Safety and Quality	FoSB 6221	Food Safety Issues	14
		Choose 1 course from a pool of prescribed specialities		14
Seminars		FoSB 6401	Graduate Seminar I	4
Subtotal credits for semester I (Per Specialty)				**56**

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		LiBE 6102	Master's Outreach and Internship	14
Specialty Core	Postharvest Handling and Processing Technologies	FoSB 6202	Postharvest Handling and Processing Technologies-I	14
		Choose 1 course from a pool of prescribed specialties		14
	FoodSafety and Quality	FoSB 6222	Food quality assurance and control	14
		Choose 1 course from a pool of prescribed specialties		14
Seminar		FoSB 6401	Graduate Seminar II	4

Total credits for semester II (Per Specialty)	**56**
Total credit for semester I & II (Per Specialty)	**112**

Semester III - IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	FoSB6401	Graduate seminar III	4
	FoSB 6401	Graduate seminar IV	4
Dissertation	FoSB 6901	Dissertation	**60**
Total credits for semester III-IV			**68**

Credits Mapping for Semester I - IV

SN	**Course Category**	**Semester I**	**Semester II**	**Semester III-IV**	**Total**
1.	Common core	10	10	-	20
2.	Programme Core	14	14	-	28
3.	Specialty core	28	28	-	56
4.	Graduate seminars	-	4	12	16
5.	Dissertation	-	-	60	60
Total Credits		**52**	**56**	**72**	**180**

(II) Master of Science in Food Science and Biotechnology by Research and Thesis

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	LiBE 6101	Research Methods and Statistics	14
	LiBE 6102	Outreach and Internship	14
Seminars	FoSB 6402	Research Seminar and Conferences I	4
		Research Seminar and Conferences II	4
		Research Seminar and Conferences III	4
		Research Seminar and Conferences IV	4
Thesis	FoSB 6196	Thesis	116
Total Number of Credit			**180**

(III) PhD in Food Science and Biotechnology by Coursework and Dissertation

A student must accumulate at total of 540 credits from course work, seminars, outreach and dissertation/thesis for graduation. Students are required to choose one of the specializations offered within the PhD in Food Science and Biotechnology. The list of all courses for PhD students under this programme is shown below;

Semester I

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	*BuSH 6009	Organization Development Leadership	10
Programme core	LiBE 7101	Applied Research Methods	14
Specialty Core	**FoSB 7221	Functional Microorganism in Foods	24
	**FoSB 7222	Advanced Functional Foods	24
Elective	FoSB	Choose 1 course from a pool of prescribed elective	24
Subtotal credits for semester I (Per Specialty)			**72**

***Students must choose one FoSB programme courses on offer during the Semester*

Semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6010	Economics of innovation Entrepreneurship	10
Programme Core	LiBE 7102	Outreach and Internship	14
Specialty Core	**FoSB 7223	Advanced Food Analysis	24
	**FoSB 7224	Food Safety Issues	24
Electives	FoSB	Choose 1 course from a pool of prescribed elective	24
Seminars	FoBS 7401	Graduate seminar I	4
Total credits for semester II (Per Specialty)			**76**
Total credits for semester I&II (Per Specialty)			**148**

***Students must choose one FoSB programme courses on offer during the Semester*

Semester III-VI

Course Category	Course Ante	Course Name	Credits
Seminars	FoBS 7401	Graduate seminar II	4
		Graduate seminar III	4
		Graduate seminar IV	4
		Graduate seminar V	4
Dissertation	FoBS 7901	Dissertation	376
Total credits for semester III-IV			**392**

Credits Mapping for Semester I - VI

SN	Course Category	Semester I	Semester II	Semester III-VI	Credits
1	Common core	10	10	-	20
2	Programme Core	14	14	-	52
3	Specialty core	48	48	-	24
5	Graduate seminars		4	16	20
6	Dissertation			376	376
	Total Credits	**72**	**76**	**392**	**540**

(IV) PhD in Food Science and Biotechnology by Research and Thesis

Common Core Courses

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6009	Organization Development Leadership	10
	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Programme Core	LiBE 7101	Applied Research Methods	**14**
	LiBE 7102	Outreach and Internship	14
Seminars	FoBS 7402	Research Seminars and conferences I	4
		Research Seminars and conferences II	4
		Research Seminars and conferences III	4
		Research Seminars and conferences IV	4
		Research Seminars and conferences V	4
		Research Seminars and conferences VI	4
Thesis	FoBS 7196	Thesis	**468**
Total Number of Credits			**520**

4.1.5 Master's and PhD in Health and Biomedical Sciences

The goal of the Health and Biomedical Sciences program is to produce world class professionals, with competence for academia, research and industries. Emphasis shall be on linkage to society and to the local industry, and scientific and technological response to local needs.

The ultimate goal of this programme is the education and training of biomedical and health scientists, with a focus on understanding the basic and applied aspects of global health and biomedical sciences. The programme will identify and absorb the best brains from the region and envisage using these brains to produce a pool of world-class creative experts who are able to generate novel solutions to today's societal problems and open new avenues for technological innovations in the region. It is the expectation of this programme that graduates will take up high-level careers in innovation, research for development, industry and health. Furthermore, the programme is tuned to respond to and make impact on societal needs.

With the approval of respective departments students may choose elective courses from a prescribed pool of courses and /or some core courses from within and /or outside HBS.

4.1.5.1 Programme outlines for Health and Biomedical Sciences

(I) Master of Science in Health and Biomedical Science by Coursework and Dissertation

A list of courses for MSc HBS programme is provided bellow in terms of ante, name and credit.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			20

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6101	Research Methods and Statistics	14
2.	LiBE 6102	Outreach and internship	14
3.	BIOS 6401	Graduate Seminars	14
4.	BIOS 6901	Dissertation	60
Total Number of Credits			**102**

Programme Core Course

S/N	Course Ante	Course Name	Credits
1.	BIOS 6101	Molecular and Cell Biology	14
Total Number of Credits			**14**

Specialty Core Courses

S/N	Course Ante	Course Name	Credits
1.	BIOS 6201	Immunology	14
2.	BIOS 6202	Molecular Techniques in Life Sciences	14
3.	BIOS 6203	Applied Microbiology	14
4.	BIOS 6221	One Health	14
5.	BIOS 6222	Emerging and re-emerging infectious diseases	14
6.	BIOS 6223	Applied Epidemiology	14
7.	BIOS 6224	Applied Biostatistics	14

Elective Courses

Masters' students may elect courses which strengthen their scientific knowledge and technical competences, from a prescribed pool of courses and/or some courses from within or outside the school after seeking approval of the respective departments.

Electives

S/N	Course Ante	Course Name	Credits
1.	BIOS 6301	Biosafety and Bioethics	14
2.	BIOS 6302	Application of Engineering in Life Sciences	14
3.	BIOS 6303	Neurobiology	14
4.	BIOS 6304	Infectious Disease Modeling and Geographical Information	14
5.	BIOS 6305	Tropical Parasitology	14
6.	BIOS 6306	Drug Design and Discovery	14
7.	BIOS 6307	Virology	14
8.	BIOS 6308	Economic Aspects of Biotechnology	14
9.	BIOS 6309	Genomics and bioinformatics	14
10.	BIOS 6310	Emerging Trends in Biotechnology, Industrial Pharmacy and Regularity Science	14
11.	BIOS 6311	Non-communicable diseases	14

(II) Master of Science in Health and Biomedical Sciences by Research Thesis

Candidates pursuing Master degree by Research and Thesis at NM-AIST shall be required to take all common courses, present graduate seminars, develop research proposals and undertake research work before preparation of thesis. With approval respective department, students may choose other courses on offer during semester, within and /or outside HBS as detailed below:

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credit			**20**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 6102	Outreach and Internship	14
2.	BIOS 6402	Research Seminar and Conferences	16
3.	BIOS 6196	Thesis	116
Total Number of Credit			160

(III) PhD in Health and Biomedical Sciences by Coursework and Dissertation

The list of courses for the PhD degree programme in HBS is provided below in terms of course ante, name and credits. With approval of respective departments, students may choose other courses on offer during the semester, within and/or outside HBS

Common Core Course

S/N	Course Ante	Course Name	Credits
5.	BuSH 6007	Foundation of Philosophy, Law and Ethics	10
6.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
7.	*BuSH 6009	Organizational Development and Leadership	10
8.	*BuSH 6010	Economic of Innovation and Entrepreneurship	10
Total Number of Credits			**20**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AIST*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	LiBE 7101	Applied Research Methods	14
2.	LiBE 7102	Outreach and internship	14
3.	BIOS 7401	Graduate Seminars	24
4.	BIOS 7901	Dissertation	376
Total Number of Credits			**428**

Specialty Courses

S/N	Course Ante	Course Name	Credits
1.	BIOS 7201	Advanced Immunology	24
2.	BIOS 7202	Applied Genomics and Bioinformatics	24
3.	BIOS 7221	Emerging Infectious Diseases and Zoonoses	24
4.	BIOS 7222	Special Topics in Global Health	24

Electives Courses

S/N	Course Ante	Course Name	Credits
15.	BIOS 7301	Genetics and Diseases	24
16.	BIOS 7302	Environmental Biotechnology	24
17.	BIOS 7303	Bioethics and Intellectual Property	24
18.	BIOS 7304	Emerging Trends in Biotechnology	24

(IV) PhD in Health and Biomedical Sciences by Research and Thesis

A candidate pursuing PhD by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop research proposals and undertake research work before preparation of a thesis.

Common Core Course

SN	Course Ante	Course Name	Credits
1	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3	*BuSH 6009	Organization Development Leadership	10
4	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Total Number of Credits			20

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AIST*

Common Core Course

SN	Course Ante	Course Name	Credits
	LiBE 7101	Applied Research Methods	14
	LiBE 7102	Outreach and internship	14
	BIOS 7402	Research seminars and conferences	24
	BIOS 7196	Thesis	468
Total Number of Credits			520

4.1.5.2 Mapping of Courses for Health and Biomedical Sciences Degree programmes

(I) Master of Science in Health and Biomedical Sciences by Coursework and Dissertation

SemesterI

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core	LiBE 6101	Research Methods and Statistics	14
Common specialty programme core course	BIOS 6101	Molecular and Cell Biology	14
Specialty Core	*BIOS 6201	Immunology	14
	*BIOS 6202	Molecular Techniques in Life Sciences	14
	*BIOS 6203	Applied Microbiology	14
	*BIOS 6221	One Health	14
	*BIOS 6222	Emerging and re-emerging infectious diseases	14
	*BIOS 6223	Applied Epidemiology	14
	*BIOS 6224	Applied Biostatistics	14
Subtotal Credits for Semester I			52

** Students can choose only one of the listed courses*

SemesterII

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	LiBE 6102	Master's Outreach and Internship	14
Specialty Core	**BIOS 6201	Immunology	14
	**BIOS 6202	Molecular Techniques in Life Sciences	14
	**BIOS 6203	Applied Microbiology	14
	**BIOS 6221	One Health	14
	**BIOS 6222	Emerging and re-emerging infectious diseases	14
	**BIOS 6223	Applied Epidemiology	14
	**BIOS 6224	Applied Biostatistics	14
BIOS Electives	Choose 1 elective from a pool of prescribed courses		14
Seminar	BIOS 6401	Graduate Seminars I	4
Total credits for semester II (Per Specialty)			70
Total credit for semester I & II (Per Specialty)			122

*** Students can choose only two*

Semester III - IV

Course Category	Course Ante	Course Name	Credits
Seminars	BIOS 6401	Graduate Seminar II	4
		Graduate Seminar III	4
Dissertation	LSBE 6901	Dissertation	60
Total credits for semester III-IV			**68**

Credits Mapping for Semester I - IV

SN	Course Category	Semester I	Semester II	Semester III -IV	Total
1.	Common core	10	10	-	20
2.	Programme Core	14	14	-	28
3.	Common specialty programme core	14	-	-	14
4.	Specialty core	14	28	-	42
5.	Elective		14	-	14
6.	Graduate seminars	-	4	8	12
7.	Dissertation	-		60	60
8.	**Total Credits**	**52**	**70**	**68**	**190**

(II) Master of Science in Health and Biomedical Sciences by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	LiBE 6101	Research Methods and Statistics	14
	LiBE 6102	Outreach and Internship	14
Seminars	BIOS 6402	Research Seminar and Conferences I	4
		Research Seminar and Conferences II	4
		Research Seminar and Conferences III	4
		Research Seminar and Conferences IV	4
Thesis	BIOS 6196	Thesis	116
Total Number of Credits			**180**

(III) PhD in Health and Biomedical Sciences by Coursework and Dissertation

A PhD student is required to complete coursework within the first two semesters. The Table below shows the indicative mapping of PhD courses and their respective weights in credits. Actual mapping will vary for the various students depending on one's intended area of research, as well as the supervisor's recommendation.

Semester I

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	*BuSH 6009	Organization Development Leadership	10
Programme core	LiBE 7101	Applied Research Methods	14
Specialty Core	**BIOS 7201	Advanced Immunology	24
	**BIOS 7202	Applied Genomics and Bioinformatics	
	**BIOS 7221	Emerging Infectious Diseases and Zoonoses	24
	**BIOS 7222	Special Topics in Global Health	
Subtotal credits for semester I (Per Specialty)			**72**

Semester II

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6010	Economics of innovation Entrepreneurship	10
Programme Core	LiBE 7102	Outreach and Internship	14
Electives	**BIOS 7301	Genetics and Diseases	24
	**BIOS 7302	Environmental Biotechnology	24
	**BIOS 7303	Bioethics and Intellectual Property	24
	**BIOS 7304	Emerging Trends in Biotechnology	24
	LiBE 7401	Graduate Seminar I	4
Total credits for semester II (Per Specialty)			76
Total credits for semester I & II (Per Specialty)			148

*** Students should choose only two of these specialty core courses*

Semester III-VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	BIOS 7401	Graduate seminar III	4
		Graduate seminar IV	4
		Graduate seminar V	4
		Graduate seminar VI	4
Dissertation	BIOS 7901	Dissertation	376

Total credits for semester III-IV	392

Credits Mapping for Semester I - VI

SN	Course Category	Semester I	Semester II	Semester III-VI	Total
1.	Common core	10	10	-	20
2.	Programme Core	14	14	-	28
3.	Specialty core	-	48	-	48
4.	Electicoreve	-	48	-	48
5.	Graduate seminars	-	4	16	20
6.	Dissertation	-	-	376	376
Total Credits		**24**	**124**	**392**	**540**

(IV) Mapping of Core Courses for PhD in Health and Biomedical Sciences by Research and Thesis

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6009	Organization Development Leadership	10
	*BuSH 6010	Economics of Innovation Entrepreneurship	10
Programme Core	LiBE 7101	Applied Research Methods	14
	LiBE 7102	Outreach and internship	14
Seminars	BIOS 7401	Research Seminars and Conferences I	4
		Research Seminars and Conferences II	4
		Research Seminars and Conferences III	4
		Research Seminars and Conferences IV	4
		Research Seminars and Conferences V	4
		Research Seminars and Conferences VI	4
Thesis	BIOS 7196	Thesis	468
Total Credits			**560**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008 if they did their Master's degree at NM-AIST.*

4.1.6 Master of Science in Public Health Research

The MSc PHR Programme is intended to fill the gap of public health researchers who are scarce in Tanzania and the region at large. It is well documented that most of the University curricula in Africa have relatively poor coverage of practical research training even at the postgraduate level. Furthermore, traditional curricula in most universities in Africa do not foster innovation, entrepreneurship and soft skills. There is also a limited link to industry. As a result, scientists in the field are left to cope with challenges of implementing their research with neither sufficient preparation nor a framework to address practical hurdles by themselves. Moreover, there is a general lack of opportunities for training to refresh or sharpen skills after graduate qualification.

The unprecedented investment into research on diseases of poverty in the recent years has led to a sharp increase in collaborative research and in the number of clinical and field trials targeted at understanding the epidemiology and development of interventions against major diseases. Inevitably, there is a rise in research studies being implemented in Africa, against a background of relatively few well-trained scientists at study sites. In line with the NM-AIST philosophy and the outcome of the Research Training Market Analysis, the programme aims to address critical gaps that exist within the conventional training programmes in sub-Saharan Africa.

After the mandatory common and programme core courses, students who will be admitted into the MSc PHR programme may specialize in one of the following areas:

(i) Determinants of Health and Diseases,

(ii) Interventions Research, and

(iii) Implementations and Health Systems Research.

With the approval of the respective department, students may choose elective courses from a prescribed pool of courses and/or some core courses from within and/or outside MSc PHR.

4.1.6.1 Programme Outline for in Public Health Research (MSc PHR)

(I) Master of Science in Public Health Research (MSc PHR) by Coursework and Dissertation

Master of Science in Public Health Research (MSc PHR) by Coursework and Dissertation.

A list of courses for the Master of Science in Public Health Research programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Programme Core Courses

S/N	Course Ante	Course Name	Credits

1.	RePH 6101	Research Managementand Professional Skills	7
2.	RePH 6102	Population Health and Health Determinants	8
3.	RePH 6103	Health Systems, Policy and Ethics	7
4.	RePH 6104	Conceptualization of Research	7
5.	RePH 6105	Study Design and tools	8
6.	RePH 6106	Basics in Analysis	6
7.	RePH 6402	Proposal Writing	6
8.	RePH 6403	Graduate Seminar I	6
9.	RePH 6404	Graduate Seminar II	6
10.	RePH6901	Dissertation	54
Total Number of Credits			**115**

Specialty Courses

(i) Determinants of Health and Diseases

S/N	Course Ante	Course Name	Credits
1.	RePH 6201	Advanced Epidemiology	13
2.	RePH 6202	Advanced Quantitative Analysis Methods	10
3.	RePH 6203	Infectious and non-infectious Diseases	10
Total Number of Credits			**33**

(ii) Interventions Research

S/N	Course Ante	Course Name	Credits
1.	RePH 6221	Intervention Trials Design and Management	10
2.	RePH 6201	Advanced Epidemiology	13
3.	RePH 6202	Advanced Quantitative Analysis Methods	10
Total Number of Credits			**33**

(iii) Implementations and Health Systems Research

S/N	Course Ante	Course Name	Credits
1.	RePH 6241	PolicyAnalysis and Health systems	13
2.	RePH 6242	Economic Evaluation of Health Programs	10
3.	RePH 6243	Advanced Qualitative Analysis Methods	10
Total Number of Credits			**33**

Elective Courses

Master's students may elect courses, which strengthen their scientific knowledge and technical competence, from a prescribed pool of courses and/or some courses from within or outside the school, after seeking approval of the respective Department.

S/N	Course Ante	Course Name	Credits

1.	RePH 6301	Geographical Information Systems (GIS) and spatial analysis	9
2.	RePH 6302	Scientific Reading and writing	9

4.1.6.2 Mapping of Courses for Master of Science in Public Health Research

Semester I

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6001	Research Methods and Communication	9
	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
Programme Core	RePH 6101	Research Management and Professional Skills	7
	RePH 6102	Population Health and Health Determinants	8
	RePH 6103	Health systems, Policy and Ethics	7
	RePH 6104	Conceptualization of Research	7
	RePH 6105	Study Design and Tools	8
	RePH 6106	Basics in Analysis	6
	RePH 6402	Proposal Writing	6
Electives	Chosen from a pool of prescribed courses and/or some core courses on offer from within and/or outside Master of Science in Public Health Research		10
Total Credits for Semester I (Per specialty)			73

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
		BuSH 6004	Innovation Management and Competitiveness	5
		BuSH 6005	Entrepreneurship and Management	5
Specialty Core	Determinants of Health and Diseases	RePH 6201	Advanced Epidemiology	13
		RePH 6202	Advanced Quantitative Analysis Methods	10
		RePH 6203	Infectious and Non-infectious Diseases	10
	Interventions Research	RePH 6221	Intervention Trials Design and Management	13
		RePH 6201	Advanced Epidemiology	10
		RePH 6202	Advanced Quantitative Analysis Methods	10
	Implementations and Health Systems Research	RePH 6241	Policy Analysis and Health systems	13
		RePH 6242	Economic Evaluation of Health Programs	10
		RePH 6243	Advanced Qualitative Analysis Methods	10
Electives		Chosen from a pool of prescribed courses and/or some core courses on offer from within and/or		10

Course Category	Course Ante	Course Name	Credits
	outside Master of Science in Public Health Research		
Total Credits for Semester II (Per Specialty)			**43**
Total Credits for Semester I & II (Per Specialty)			**116**

Semester III and IV

Course Category	Course Ante	Course Name	Credits
Seminars	RePH 6403	Graduate Seminars	6
	RePH 6404	Graduate Seminars	6
Dissertation	RePH6199	Dissertation	54
Total Number of Credits			**66**

Credits Mapping for Semester I-IV

SN	Course Category	Semester I	Semester II	Semester III-IV	Total
1	Common core	14	15	-	29
2	Programme core	34	-	-	34
3	Specialty core	-	33	-	33
4	Electives	10	10	-	20
5	Graduate Seminars	-	-	12	12
6	Dissertation	-	-	54	54
Total Number of Credits		**58**	**58**	**66**	**182**

4.1.7 Master of Molecular Biomedical Engineering

The Molecular Biomedical engineering programme at NM-AIST will offer unique opportunity for graduates to become not only top-notch scientists or academicians/researchers, but also business managers and techno-preneurs, due to stylishly structured curricula, combining both, biological and engineering knowledge on one side, and business and humanities concepts, on the other. It is anticipated that graduates of this programme will be well prepared for leadership careers in academia and industry. Graduates from this programme can also be employed in Biomedical research Institutions like NIMR and specialized referral hospitals.

The programme will be jointly offered for three years, in which the first year will involve course work that will be conducted at NM-AIST, and the remaining two years will be entirely for research, which will be carried out in China as agreed under the signed agreement between NM-AIT and HUT.

4.1.7.1 Programme Outline for Master of Molecular Biomedical Engineering (MSc. BioE) by Coursework and Dissertation

Students joining the joint Master's degree of Molecular Biomedical Engineering at NM-AIST shall be required to complete institutional common core courses and programme specialty core courses depending on their professional interest and academic qualification. The course structure comprises core and elective courses. Core courses are those that a student must study and pass in order to complete the degree programme, while elective courses are those that students select from amongst a list of recommended courses, which may include courses from other dee programmes.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			**20**

Common core Courses at School Levels

S/N	Course Ante	Course Name	Credits
1	LSBE 6101	Research Methods and Statistics	14
2	LSBE 6102	Outreach and internship	14
3	LSBE 6401	Graduate Seminars	120
4	LSBE 6901	Dissertation (Bio engineering research)	120
Total Number of Credits			**268**

Common programme core Course

S/N	Course Ante	Course Name	Credits
1.	BIOS 6101	Molecular and cell biology	14
Total Number of Credits			14

Sciciality Core Courses

S/N	Course Ante	Course Name	Credits
2.	BioE 6201	Mathematics for Biosciences	12
3.	BioE 6202	Biosensors	12
4.	BioE 6203	Functional Genomics	12
5.	BioE 6204	Design and Development of Molecular Diagnostics and devices	12
6.	BioE 6205	Nanoscience	12
Total Number of Credits			**36**

Elective Courses

Master's students may elect courses, which strengthen their scientific knowledge and technical competence, from a prescribed pool of courses and/or some courses from within or outside the school, after seeking approval of the respective School.

S/N	Course Ante	Course Name	Credits
7.	BioE 6301	Protein Design and Engineering	12
8.	BioE 6302	Advanced Biological Thermodynamics	12
9.	BioE 6303	Bioreactor Design and Operations	12
10.	BioE 6304	Microbial Engineering	12
11.	BioE 6305	Practical Course in Genetic Engineering	12
12.	BioE 6306	Protein Chemistry and Catalysis	12
13.	BioE 6307	Material analysis	12
14.	BioE 6308	Novel drug technology and dosage	12
15.	BioE 6309	Vaccinology	12
16.	BioE 6310	Synthestic biology	12
17.	BioE 6311	Bioprocess engineering	12
18.	BioE 6312	Bioengineering Innovation and Entrepreneurship	12
19.	BioE 6313	Microbial physiology	12

4.1.7.2 Mapping of Courses for Master of Molecular Biomedical Engineering (BioE)

Semester I

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
Common core Courses at School Levels	*LSBE 6101	Research Methods and Statistics	14
	*BIOS 6101	Molecular and cell biology	14
Speciality Core Courses	**BioE 6201	Mathematics for Biosciences	12
	**BioE 6202	Biosensors	
	**BioE 6203	Functional Genomics	
	**BioE 6204	Design and Development of Molecular Diagnostics and devices	
	**BioE 6205	Nanoscience	
Total Credits for Semester I			**50**

***All students must study these courses*

***Students can choose only ONE of the listed courses.*

Semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Specialty core	***BioE 6201	Mathematics for Biosciences	24

courses	***BioE 6202	Biosensors	
	***BioE 6203	Functional Genomics	
	***BioE 6204	Design and Development of Molecular Diagnostics and devices	
	***BioE 6205	Nanoscience	
Seminars	LSBE	Graduate Seminars	10
Electives	Chosen from a pool of prescribed elective courses and/or some core courses on offer from within and/or outside Master of Molecular Biomedical Engineering		24
Total Credits for Semester II			**68**
Total Credits for Semester I & II			**118**

****Students can choose only TWO of the listed courses*

**LSBE 6401-This is core graduate seminar course in which students present their concept notes, research proposal and research progress. This is a mandatory course to all students.*

Semester III

Course Category	**Course Ante**	**Course Name**	**Credits**
Common core Courses at School Levels	LSBE 6102	Outreach and internship	14
Seminars	LSBE 6401	Graduate Seminars	30
Total Number of Credits			**44**

Semester IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	LSBE 6401	Graduate Seminars	50
Total Number of Credits			**50**

Semester V and VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	LSBE 6401	Graduate Seminars	30
Dissertation	LSBE 6901	Dissertation (Bio engineering research)	120
Total Number of Credits			**150**

Credits Mapping for Semester I-VI

SN	**Course Category**	**Semester I**	**Semester II**	**Semester III**	**Semester IV**	**Semester V-VI**	**Total**
1	Institutional Common core	10	10	-	-	-	20
2	Common core	14	-	14	-	-	28

SN	Course Category	Semester I	Semester II	Semester III	Semester IV	Semester V-VI	Total
	courses at school level						
3	Programme core course	14	-	-	-	-	14
4	Specialty core	12	24	-	-	-	36
5	Electives	-	24	-	-	-	24
6	Graduate Seminars	-	10	30	50	30	120
7	Dissertation	-	-	-	-	120	120
Total Number of Credits		**50**	**68**	**44**	**50**	**150**	**362**

4.1.8 Master of Indusrial Pharmacy and Regulatory Science

Industrial pharmacists and biotechnologists are responsible for designing, planning and overseeing of manufacturing and quality control of drugs, using the latest technologies to research drug compounds, conduct trials to test medications for safety, and develop new drugs formulations that save lives. The Master of Industrial Pharmacy and Regulatory Science program will prepare students for careers in the pharmaceutical manufacturing industry and for entry into Ph.D. programs in pharmaceutical sciences, and other related fields. This Master of Science program bridges the gap between drug discoveries and their applications to patient's care, hence, graduates under this programme will be integral partners in advancing biotechnology innovation and regulatory science at the university, industrial, and community level.

4.1.8.1 Programme Outline for Master of Indusrial Pharmacy and Regulatory Science (IPRS) by Coursework and Dissertation

Students joining the Master of Industrial Pharmacy and Regulatory Science (IPRS) at NM-AIST shall be required to complete institutional common core courses and programme core courses depending on their professional interest and academic qualification. Core courses are those that a student must study and pass in order to complete the degree programme, while elective courses are those that students select from amongst a list of recommended courses, which may include courses from other degree programmes. Students shall be required to earn

at least 104 credits from the course work, 12 credits from graduate seminar, 60 credits from research, and 14 credits from outreach for graduation.

Common Core Courses for Institution

S/N	Course Ante	Course Name	Credits
1	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Number of Credits			**20**

Common core Courses at School Levels

S/N	Course Ante	Course Name	Credits
3	LSBE 6101	Research Methods and Statistics	14
4	LSBE 6102	Outreach and internship	14
5	LSBE 6401	Graduate Seminars	12
6	LSBE 6901	Dissertation	60
Total Number of Credits			**100**

Common programme core Course

S/N	Course Ante	Course Name	Credits
7	IPRS 6101	Modern approaches to drug manufacturing	14
Total Number of Credits			14

Sciciality Core Courses

S/N	Course Ante	Course Name	Credits
8	IPRS 6201	Drug Discovery and Development (including Herbal medicine driven science)	14
9	IPRS 6202	Quality management in pharmaceutical industry	14
10	IPRS 6203	Pharmaceutical product documentation	14
11	IPRS 6204	Introduction to Chemistry Principles in Cosmetic Science	14
12	IPRS 6205	Introduction to Cosmetic Science	14
13	IPRS 6206	Quality management in Cosmetics and Cosmetic Industry	14
14	IPRS 6207	Global supply chain management	14
15	IPRS 6208	Regulatory science 1	14
16	IPRS 6209	Regulatory science 2	14
Total Number of Credits			

Elective Courses for the programme

Master's students may elect courses, which strengthen their scientific knowledge and technical competence, from a prescribed pool of courses and/or some courses from within or outside the school, after seeking approval of the respective School.

S/N	Course Ante	Course Name	Credits
17	IPRS 6301	Project Management in Industry and Technology	14
18	IPRS 6302	Technology from a Global Perspective	14
19	IPRS 6303	Introduction to nanoscience and nanotechnology	14
20	IPRS 6304	Application of nanotechnology in medicine (nanomedicine)	14
21	IPRS 6305	Nano diagnostics and imaging (point of care)	14
22	IPRS 6306	Nano drug delivery	14
23	IPRS 6307	Formulation and manufacture of creams, ointments and topical products	14
Total Elective Courses for the programme			14

4.1.8.2 Mapping of Courses for Master of Indusrial Pharmacy and Regulatory Science (IPRS)

Semester I

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundations of Law, Philosophy and Ethics	10
Common core Courses at School Levels	*LSBE 6101	Research Methods and Statistics	14
	*IPRS 6101	Modern approaches to drug manufacturing	14
Speciality Core Courses	Chosen from a pool of prescribed Speciality core courses for Master of Indusrial Pharmacy and Regulatory Science (IPRS)		14
Total Credits for Semester I			**52**

All students must study these courses

Semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	**10**
Speciality Core	Chosen from a pool of prescribed Speciality core courses for Master of Indusrial Pharmacy and Regulatory Science (IPRS)		24
Electives	Chosen from a pool of prescribed Elective courses for Master of Indusrial Pharmacy and Regulatory Science (IPRS)		14
Total Credits for Semester II			**52**
Total Credits for Semester I & II			**104**

****LSBE 6401-This is core graduate seminar course in which students present their concept notes, research proposal and research progress. This is a mandatory course to all students.***

Semester III

Course Category	Course Ante	Course Name	Credits
Common core Courses at School Levels	LSBE 6102	Outreach and internship	14
Seminars	*LSBE 6401	Graduate Seminars	12
Total Number of Credits			**26**

Semester IV

Course Category	Course Ante	Course Name	Credits
Dissertation	LSBE 6901	Graduate Seminars	60
Total Number of Credits			**60**

Credits Mapping for Semester I-IV

SN	Course Category	Semester I	Semester II	Semester III	Semester IV	Total
1	Institutional Common core	10	10	-	-	20
2	Common core courses at school level	14	-	14	-	28
3	Programme core course	14	-	-	-	14
4	Specialty core	14	28	-	-	42
5	Electives	-	14	-	-	14
6	Graduate Seminars	-	-	12	-	12
7	Dissertation	-	-	-	60	60
Total Number of Credits		**52**	**52**	**26**	**60**	**190**

4.2 School of Computational and Communication Science and Engineering (CoCSE) Programme Clusters

The School of Computational and Communication Science and Engineering (CoCSE) offers the following programmes:

(i) Master's and PhD in Mathematical and Computer Science and Engineering (MCSE)

(ii) Master's and PhD in Information and Communication Science and Engineering (ICSE)

(iii) Master of Science in Embedded and Mobile Systems (EMoS)

(iv) Master of Information Systems and Network Security (ISNS)

(v) Master of Wireless and Mobile Computing (WiMC)

Applicants into the MCSE, ICSE, WiMC and ISNS programmes must have a good background in respective fields to fit into the area of specialization of their choice. Admission requirements are in accordance with NM-AIST General Admission requirements for Masters and PhD programmes.

4.2.1 Master's and PhD in Mathematical and Computer Sciences and Engineering

In today's world of virtual research, mathematical modeling is the keyword. The MCSE cluster leverages a deep background in mathematical modeling with exceptional breadth in traditional science and engineering fields. The MCSE plays a pivotal role in the development of these disciplines, hence the rationale for developing a coherent package of mathematics and computer science courses that will lay the groundwork for cutting edge research in an application of mathematical skills and knowledge, to apply the same in modeling and simulation of the components of real-life challenges for real-life solutions.

MCSE is an interdisciplinary programme created to foster computationally intensive competencies for research and graduate education in the sciences and engineering. The aim of this programme is to produce experts in scientific computing who will be able to work as part of interdisciplinary research and/or industry teams which may be charged to thrash out some complex societal or industrial problems. Students in these programmes will be trained in state-of-the-art numerical methods, use of software development tools, and in the application of these techniques to at least one scientific or engineering area.

After the mandatory common and programme core courses, students who will be admitted into these programmes will specialize in one of the following areas:

(i) Applied Mathematics and Computational Science (AMCS)

(ii) Computer Science and Engineering (CSE)

With the approval of respective departments, students may choose elective courses from a pool of prescribed courses and/or some core courses from within and/or outside MCSE.

4.2.1.1 Programme Outline for Mathematical and Computer Science and Engineering

(I) Master's in MCSE by Coursework and Dissertation

A list of courses for the Master's degree in MCSE Programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MCSE 6101	Computer Programming with MATLAB	10
2.	MCSE 6102	Computer Programming in Java for Scientists and Engineers	10
3.	MCSE 6103	Numerical Linear Algebra and Computational Methods	10
4.	MCSE 6401	Graduate Seminar I	8
5.	MCSE 6402	Graduate Seminar II	8
6.	MCSE 6403	Graduate Seminar III	2
7.	MCSE 6404	Graduate Seminar IV	2
8.	MCSE 6199	Dissertation	56
Total Number of Credits			**106**

Specialty Courses

(i) Applied Mathematics and Computational Science

S/N	Course Ante	Course Name	Credits
1.	MCSE6201	Probability, Statistics, and Stochastic Processes	8
2.	MCSE 6202	Ordinary Differential Equations and Applied Partial Differential Equations	8
3.	MCSE 6203	Finite Elements and Finite Difference Methods	7
4.	MCSE 6204	Numerical Optimization	8
Total Number of Credits			**31**

(ii) Computer Science and Engineering

S/N	Course Ante	Course Name	Credits
1.	MCSE 6221	Design and Analysis of Algorithm	8
2.	MCSE 6222	Computer Operating Systems	8
3.	MCSE 6223	Computer Architecture	8
4.	MCSE 6224	Computational Intelligence	7
Total Number of Credits			**31**

(II) Master's in MCSE by Research and Thesis

A candidate pursuing a Master's degree by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop a research proposal and undertake research work before preparation of a thesis. With the approval of respective department, students may choose other courses on offer during the semester, within and/or outside MCSE as detailed below:

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Graduate Seminar for Master's by Research and Thesis

S/N	Course Ante	Course Name	Credits
1.	MCSE 6401	Graduate Seminar I	4
2.	MCSE 6402	Graduate Seminar II	4
3.	MCSE 6403	Graduate Seminar III	4
4.	MCSE 6404	Graduate Seminar IV	4
5.	MCSE 6405	Graduate Seminar V	4
6.	MCSE 6406	Graduate Seminar VI	4
7.	MCSE 6198	Thesis	127
Total Number of Credits			**151**

Elective Courses

Students must choose at least twenty-two credits from a prescribed pool of courses and/or some core courses from within and/or outside MCSE.

S/N	Course Ante	Course Name	Credits
1.	MCSE 6301	Optimal Control	7
2.	MCSE 6302	Convex Optimization	7
3.	MCSE 6303	Dynamical Systems	7
4.	MCSE 6304	Financial Mathematics	7
5.	MCSE 6305	Design and Analysis of Algorithms	7
6.	MCSE 6306	Parallel and Distributed System	7
7.	MCSE 6307	Data Mining	7
8.	MCSE 6308	Software Engineering	7
9.	MCSE 6309	Machine Learning	7
10.	MCSE 6310	Combinatorial Optimization	7
11.	MCSE 6311	Computer Networks	7

(III) PhD in MCSE by Coursework and Dissertation

The list of courses for the PhD degree in MCSE is provided below in terms of course ante, name and credits. With the approval of the respective department, students may choose other courses on offer during the semester, within and/or outside MCSE.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MCSE 7101	Advanced Topics in Numerical Linear Algebra	23
2.	MCSE 7401	Graduate Seminar I	8
3.	MCSE 7402	Graduate Seminar II	8
4.	MCSE 7403	Graduate Seminar II	2
5.	MCSE 7404	Graduate Seminar IV	2
6.	MCSE 7405	Graduate Seminar V	2
7.	MCSE 7406	Graduate Seminar VI	2
8.	MCSE 7199	Dissertation	364

Total Number of Credits	**411**

Specialty Courses

The list of courses below shows the indicative mapping of PhD courses and their respective weights in credits. Actual specialty courses will vary for the various PhD students depending on one's background and intended area of research as well as the supervisor's recommendation.

(i) Applied Mathematics and Computational Science

S/N	**Course Ante**	**Course Name**	**Credits**
1.	MCSE 7201	Advanced Finite Element Methods	20
2.	MCSE 7202	Computational Mechanics	20
3.	MCSE 7203	Applied Mathematics in the Chemical and Biological Sciences	20
Total Number of Credits			**60**

(ii) Computer Science and Engineering

S/N	**Course Ante**	**Course Name**	**Credits**
1.	MCSE 7221	Advanced Operating Systems	20
2.	MCSE 7222	Combinatorial Algorithms and Data Structures	20
3.	MCSE 7223	Data Mining and Data Warehousing	20
Total Number of Credits			**60**

Elective Courses

Students must choose two courses from the below prescribed pool of courses and/or some core courses from within and/or outside MCSE.

S/N	**Course Ante**	**Course Name**	**Credits**
1.	MCSE 7301	Advanced Methods in Numerical Optimization	20
2.	MCSE 7302	Compressed Sensing	20
3.	MCSE 7303	Numerical Analysis of Differential Equations	20

(IV) Programme Outline for PhD in MCSE by Research and Thesis

A candidate pursuing PhD degree in MCSE Programme by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop a research proposal and undertake research work before preparation of a thesis. The list of courses for the PhD degree in MCSE by research and thesis is provided below in terms of course ante, name and credits. With the approval of the respective department, students may choose other courses on offer during the semester, within and/or outside MCSE.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Graduate Seminar and Thesis

S/N	Course Ante	Course Name	Credits
1.	MCSE 7401	Graduate Seminar I	4
2.	MCSE 7402	Graduate Seminar II	4
3.	MCSE 7403	Graduate Seminar III	4
4.	MCSE 7404	Graduate Seminar IV	4
5.	MCSE 7405	Graduate Seminar V	4
6.	MCSE 7406	Graduate Seminar VI	4
7.	MCSE 7407	Graduate Seminar VII	4
8.	MCSE 7408	Graduate Seminar VIII	4
9.	MCSE 7409	Graduate Seminar IX	4
10.	MCSE 7410	Graduate Seminar X	4
11.	MCSE 7198	Thesis	**471**

4.2.1.2 Mapping of Courses for Mathematical and Computer Science and Engineering

(I) Master's In MCSE by Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6001	Research Methods and Communication	9
		BuSH 6002	Philosophy, Ethics and Social Imperatives	5
		BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
Programme Core		MCSE 6101	Computer Programming with MATLAB	10
		MCSE 6102	Computer Programming in Java for Scientists and Engineers	10
Specialty Core	Applied Mathematics and Computational Science	MCSE 6201	Probability, Statistics and Stochastic Processes	8
		MCSE 6202	Ordinary Differential Equations and Applied Partial Differential Equations	8
		MCSE 6204	Numerical Optimization	8
	Computer Science and Engineering	MCSE 6221	Design and Analysis of Algorithms	8
		MCSE 6222	Computer Operating Systems	8
		MCSE 6224	Computational Intelligence	7
Seminars		MCSE 6401	Graduate Seminars I	8
Elective	Elected from a pool of prescribed courses and/ or some core courses on offer within and/or outside COCSE			7
Total Credits for Semester I (Per Specialty)				***77(78)**

***Total number of credits for Applied Mathematics and Computational Science and Computer Science and Engineering are 78 and 77, respectively.*

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6004	Innovation Management and Competitiveness	5
		BuSH 6005	Entrepreneurship and Management	5
Programme Core		MCSE 6103	Numerical Linear Algebra and Computational Methods	10
Specialty Core	Applied Mathematics and Computational Science	MCSE 6203	Finite Elements and Finite Difference Methods	7
	Computer Science and Engineering	MCSE 6223	Computer Architecture	8
Seminars		MCSE 6402	Graduate Seminar II	8
Electives	Selected from a pool of prescribed courses or some core courses on			7

	offer within and outside CoCSE	
Total Credits for Semester I (Per Specialty)		***43(42)**
Total credits Semester I & II (Per Specialty)		**120**

***Total number of credits for Applied Mathematics and Computational Science and Computer Science and Engineering are 42 and 43, respectively.*

Semester III &IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminar	MCSE 6403	Graduate Seminar II	**2**
	MCSE 6404	Graduate Seminar IV	**2**
Dissertation	MCSE 6199	Dissertation	**56**
Total Credits			**60**

Credits Mapping for Semester I-IV

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III – VI**	**Total**
	Common core	19	10	-	29
	Programme core	20	10	-	30
	Specialty core	24(23)	8(7)	-	31
	Elective	7	7	-	14
	Graduate Seminar	8	8	4	20
	Dissertation	-	-	56	56
Total Credits		**78(77)**	**42(43)**	**60**	**180**

(II) PhD in MCSE by Coursework and Dissertation

A PhD student is required to complete coursework within the first two semesters and students pursuing PhD may choose courses, with the help of their supervisors, from the 7000 series**.**

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6001	Research Methods and Communication	9
		BuSH 6002	Philosophy, Ethics and Social Imperatives	5
		BuSH 6003	Foundations of law in Science, Engineering and Technology	5
Programme Core		MCSE 7101	Advanced Topics in Numerical Linear Algebra	23
Specialty Core	Applied Mathematics and	MCSE 7201	Advanced Finite Element Methods	20
		MCSE 7202	Computational Mechanics	20

	Computational Science			
	Computer Science and Engineering	MCSE 7221	Advanced Operating Systems	20
		MCSE 7222	Combinatorial Algorithms and Data Structure	20
Seminars		MCSE 7401	Graduate Seminar I	8
Elective	Elected from a pool of prescribed courses or some core courses on offer within and outside CoCSE			20
Total Credits for Semester I				110

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6004	Innovation Management and Competitiveness	5
		BuSH 6005	Entrepreneurship and Management	5
Specialty Core	Applied Mathematics and Computational Science	MCSE 7203	Applied Mathematics in the Chemical and Biological Science	20
	Computer Science and Engineering	MCSE 7223	Data Mining and Data Warehousing	20
Seminars		MCSE 7402	Graduate Seminar II	8
Electives	Elected from the pool of prescribed courses and/ or some core courses on offer within and/or outside CoCSE			20
Sub-total Credits for Semester II				**58**
Sub-total Credits for Semester I & II				**168**

Semesters III - VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	MCSE 7403	Graduate Seminar II	**2**
	MCSE 7404	Graduate Seminar IV	**2**
	MCSE 7405	Graduate Seminar V	**2**
	MCSE 7406	Graduate Seminar VI	**2**
Dissertation	MCSE 7199	Dissertation	**364**
Total Credits for Semester III – VI			**372**

Credits Mapping for Semester I-VI

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III – VI**	**Total**
(i)	Common core	19	10	-	29
(ii)	Programme core	23	-	-	23

(iii)	Specialty core	40	20	-	60
(iv)	Elective	20	20	-	40
(v)	Graduate Seminar	8	8	8	24
(vi)	Dissertation	-	-	364	364
Total Credits		**110**	**58**	**372**	**540**

4.2.2 Master's and PhD in Information and Communication Science and Engineering

The ICSE Programmes are designed to produce graduates competent in modern information and communication technology development and management. Students following this programme will study a variety of courses that will enable them to develop capability in a wide scope of information, communication and telecommunications science and engineering which is interdisciplinary in nature. The need for faster and more efficient transmission, reception, storage, and retrieval of information in our fast-growing society has caused digital communications to be one of the fastest growing fields in technology.

The Masters and PhD programmes in ICSE are open to candidates who possess minimum qualifications in relevant science and engineering fields as stipulated in the NM-AIST admission and registration requirements. After the mandatory common and programme core courses, students who will be admitted into these programmes will specialize in one of the following areas:

(i) Information Technology Systems Development and Management (ITSDM)

(ii) Electronics and Telecommunications Engineering (ETE)

With the approval of the respective departments, students may choose elective courses from a pool of prescribed courses and/or some core courses from within and/or outside ICSE.

4.2.2.1 Programme Outlines for Information and Communication Science and Engineering (ICSE) Programme

(I) Master's in Information and Communication Science and Engineering by Coursework and Dissertation

A list of courses for the Master's degree in ICSE Programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	ICSE 6101	Engineering Mathematics	10
2.	ICSE 6102	Data and Communication Systems	9
3.	ICSE 6103	Operating Systems	9
4.	ICSE 6104	Information System Security	9
5.	ICSE 6401	Graduate Seminar I	8
6.	ICSE 6402	Graduate Seminar II	8
7.	ICSE 6403	Graduate Seminar III	2
8.	ICSE 6404	Graduate Seminar IV	2
9.	ICSE 6199	Dissertation	56
Total Number of Credits			**113**

Specialty Courses

(i) Information Technology Systems Development and Management

S/N	Course Ante	Course Name	Credits
1.	ICSE 6201	Information Technology Project Management	8
2.	ICSE 6202	Database Management Systems and Application	8
3.	ICSE 6203	Information Systems Modeling, Design and Analysis	8
Total Number of Credits			**24**

(ii) Electronics and Telecommunications Engineering

S/N	Course Ante	Course Name	Credits
1.	ICSE 6221	Advanced Electronics	8
2.	ICSE 6222	Fiber Optics and Optical Communication System	8

3.	ICSE 6223	Wireless and Mobile Communication	8
Total Number of Credits			**24**

Elective Courses

S/N	Course Ante	Course Name	Credits
1.	ICSE 6301	Copyright, Cyber Ethics and Information Ethics	7
2.	ICSE 6302	Web Technologies and Client-Server Systems	7
3.	ICSE 6303	Mobile Software Development	7
4.	ICSE 6312	Electromagnetic Compatibility and Antennas	7

(II) Master's in Information and Communication Science and Engineering by Research and Thesis

A candidate pursuing a Master's degree in ICSE programme by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop a research proposal and undertake research work before preparation of a thesis. With the approval of respective department, students may choose other courses on offer during the semester, within and/or outside ICSE as detailed below:

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Graduate Seminar and Thesis

S/N	Course Ante	Course Name	Credits
1.	ICSE 6401	Graduate Seminar I	4
2.	ICSE 6402	Graduate Seminar II	4
3.	ICSE 6403	Graduate Seminar III	4
4.	ICSE 6404	Graduate Seminar IV	4
5.	ICSE 6405	Graduate Seminar V	4
6.	ICSE 6406	Graduate Seminar VI	4
7.	ICSE 6198	Thesis	127
Total Number of Credits			**151**

(III) PhD in Information and Communication Science and Engineering by Coursework and Dissertation

A list of courses for the PhD degree programme in ICSE is provided below in terms of course ante, name and credits. With the approval of the respective department, students may choose other courses on offer during the semester, within and/or outside ICSE.

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	ICSE 7101	Cyber Security	23
2.	ICSE 6401	Graduate Seminar I	8
3.	ICSE 6402	Graduate Seminar II	8
4.	ICSE 6403	Graduate Seminar III	2
5.	ICSE 6404	Graduate Seminar IV	2
6.	ICSE 6405	Graduate Seminar V	2
7.	ICSE 6406	Graduate Seminar VI	2
8.	ICSE 7199	Dissertation	364
Total Number of Credits			**411**

Specialty Courses

(i) Information Technology Systems Development and Management

S/N	Course Ante	Course Name	Credits
1.	ICSE 7201	Document Engineering and Information Architecture	20
2.	ICSE 7202	Information and Communication Technologies and Development	20
3.	ICSE 7203	Advanced Database Management Systems	20
Total Number of Credits			**60**

(ii) Electronics and Telecommunications Engineering

S/N	Course Ante	Course Name	Credits
1.	ICSE 7221	Communication Theory and System	20
2.	ICSE 7222	Communications System Design and Analysis	20
3.	ICSE 7223	Digital Systems Design	20
Total Number of Credits			**60**

(IV) PhD in Information and Communication Science and Engineering by Research and Thesis

A candidate pursuing PhD degree in ICSE Programme by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop a research proposal and undertake research work before preparation of a thesis. A list of courses for the PhD degree in ICSE is provided below in terms of course ante, name and credits. With the approval of the respective Department, students may choose other courses on offer during the semester, within and/or outside ICSE.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6001	Research Methods and Communication	9
2.	BuSH 6002	Philosophy, Ethics and Social Imperatives	5
3.	BuSH 6003	Foundations of Law in Science, Engineering and Technology	5
4.	BuSH 6004	Innovation Management and Competitiveness	5
5.	BuSH 6005	Entrepreneurship and Management	5
Total Number of Credits			**29**

Graduate Seminar and Thesis

S/N	Course Ante	Course Name	Credits
1.	ICSE 7401	Graduate Seminar I	4
2.	ICSE 7402	Graduate Seminar II	4
3.	ICSE 7403	Graduate Seminar III	4
4.	ICSE 7404	Graduate Seminar IV	4
5.	ICSE 7405	Graduate Seminar V	4
6.	ICSE 7406	Graduate Seminar VI	4
7.	ICSE 7407	Graduate Seminar VII	4
8.	ICSE 7408	Graduate Seminar VIII	4
9.	ICSE 7409	Graduate Seminar IX	4
10.	ICSE 7410	Graduate Seminar X	4
11.	ICSE 7198	Thesis	**471**

4.2.2.2 Mapping of Courses for Information and Communication Science and Engineering Programme

(I) Master's In ICSE by Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6001	Research Methods and Communication	9
		BuSH 6002	Philosophy, Ethics and Social Imperatives	5
		BuSH 6003	Foundations of law in Science, Engineering and Technology	5
Programme Core		ICSE 6101	Engineering Mathematics	10
		ICSE 6102	Data and Communication Systems	9
		ICSE 6103	Operating Systems	9
Specialty Core	Information Technology System Development and Management (ITSDM)	ICSE 6201	Information Technology Project Management	8
		ICSE 6202	Database Management Systems and Applications	8
	Electronics and Telecommunication Engineering (ETE)	ICSE 6221	Advanced Electronics	8
		ICSE 6222	Fiber Optics and Optical Communication Systems	8
Seminars		MCSE 6401	Graduate Seminar I	8
Elective	Elected from the pool of prescribed courses and/ or some core courses on offer within and/or outside CoCSE			7
Total Credits for Semester I (Per Specialty)				**78**

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6004	Innovation Management and Competitiveness	5
		BuSH 6005	Entrepreneurship and Management	5
Programme Core		ICSE 6104	Information Systems Security	9
Specialty Core	Information Technology Systems Development and Management (ITSDM)	ICSE 6203	Information Systems Modeling, Design and Analysis	8
	Electronics and Telecommunication (ETE)	ICSE 6223	Wireless and Mobile Communication	8
Seminars		ICSE 6402	Graduate Seminar II	8
Elective	Elected from the pool of prescribed courses or some core courses on offer within and outside COCSE			7
Total Credits for Semester I (Per Specialty)				**42**

Total Credits Semester I & II (Per Specialty)	**120**

Semester III & IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	ICSE 6403	Graduate Seminar III	2
	ICSE 6404	Graduate Seminar IV	2
Dissertation	ICSE 6199	Dissertation	56
Total			**60**

Credits Mapping for Semester I-IV

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III – VI**	**Total**
1.	Common core	19	10	-	29
2.	Programme core	28	9	-	37
3.	Specialty core	16	8	-	24
4.	Elective	7	7	-	14
5.	Graduate Seminar	8	8	4	20
6.	Dissertation	-	-	56	56
Total Credits		**78**	**42**	**60**	**180**

(II) PhD in Information and Communication Science and Engineering by Coursework and Dissertation

A PhD student is required to complete coursework within the first two semesters. The table below shows the indicative mapping of PhD courses and their respective weights in credits. Actual specialty courses will vary for the various PhD students depending on one's background and intended area of research as well as the supervisor's recommendation.

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6001	Research Methods and Communication	9
		BuSH 6002	Philosophy, Ethics and Social Imperatives	5
		BuSH 6003	Foundations of law in Science, Engineering and Technology	5
Programme Core		ICSE 7101	Cyber Security	23
Specialty Core	Information Technology Systems Development and Management (ITSDM)	ICSE 7201	Document Engineering and Information Architecture	20
		ICSE 7202	Information and Communication Technologies and Development a	20
	Electronics and Telecommunication Engineering (ETE)	ICSE 7221	Communication Theory and System	20
		ICSE 7222	Communications System Design and Analysis	20

Seminars		ICSE 7401	Graduate Seminar I	8
Elective	Elected from a pool of prescribed courses or some core courses on offer within and outside CoCSE			20
Total Credits for Semester I				**110**

Semester II

Course Category		**Course Ante**	**Course Name**	**Credit***
Common Core		BuSH 6004	Innovation Management and Competitiveness	5
		BuSH 6005	Entrepreneurship and Management	5
Specialty Core	Information Technology Systems Development and Management	ICSE 7203	Advanced Database Management Systems	20
	Electronics and Telecommunication Engineering	ICSE 7223	Digital Systems Design	20
Seminars		ICSE 7402	Graduate Seminar II	8
Elective	Elected from a pool of prescribed courses and/ or some core courses on offer within and/or outside CoCSE			20
Sub-total Credits for Semester II				**58**
Sub-total Credits for Semester I & II				**168**

Credits Mapping for Semester III - VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminars	ICSE 7403	Graduate Seminar III	2
	ICSE 7404	Graduate Seminar IV	2
	ICSE 7405	Graduate Seminar V	2
	ICSE 7406	Graduate Seminar VI	2
Dissertation	ICSE 7199	Dissertation	364
Sub-total Credits for Semester III – VI			**372**

Credits Mapping for Semester I-VI

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III – VI**	**Total**
1.	Common core	19	10	-	29
2.	Programme core	23	-	-	23
3.	Specialty core	40	20	-	60
4.	Elective	20	20	-	40
5.	Graduate Seminar	8	8	8	24
6.	Dissertation	-	-	364	364
Total Credits		**110**	**58**	**372**	**540**

4.2.3 Master of Science in Embedded and Mobile Systems

The cornerstone of this programme is to be a state-of-the-art graduate master's programme in "Embedded and Mobile Systems (EMoS)", incorporating applied-oriented training modules,

linkage to industry and thus ensuring a strong focus on technology transfer, innovation and entrepreneurship. The EMoS Programme is designed to produce graduates competent in Embedded and Mobile Systems. Students following this programme will study a variety of courses that will enable them to develop capability in a wide scope of information, Embedded and Mobile communication and telecommunications which is interdisciplinary in nature.

The Masters programme in EMoS is open to candidates who possess minimum qualifications in relevant fields as stipulated in the NM-AIST admission and registration requirements.

After the mandatory common and programme core courses, students who will be admitted into this programme will specialize in one of the following areas:

(i) Embedded Systems (ES)

(ii) Mobile Systems (MS)

With the approval of the respective departments, students may choose elective courses from a pool of prescribed courses and/or some core courses from within and/or outside EMoS.

Nature of Practical training/Fieldwork attached to the programme:

For the field attachment (Outreach/Internship program); each student must complete at least four (4) weeks of field attachment in companies, innovation/incubation centres or any other organisation in the field relevant to student's specializations in embedded system and mobile system specialization.

4.2.3.1 Programme Outline for Master of Science in Embedded and Mobile Systems by coursework and Project

A list of courses for the degree of Master of Science in Embedded and Mobile Systems (EMoS) is provided below in terms of course ante, name and credits.

Common Core Course

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundations of Law, Philosophy, and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Credits			**20**

Programme Core Course

S/N	Course Ante	Course Name	Credits
1.	CCSE 6001	Research Methods and Communication	14
2.	EMoS 6403	Outreach and Internship	14
3.	EMoS 6101	Soft Skills	7
4.	EMoS 6102	Group Project	9
5.	EMoS 6103	Electronic Business	9
6.	EMoS 6104	Internet of Things and Embedded Systems	9
7.	EMoS 6401	Graduate Seminar	8
8.	EMoS 6199	Project	50
Total Credits			**120**

Specialty core

(i) Embedded Systems

S/N	Course Ante	Course Name	Credits
1.	EMoS 6201	Sensors and Actuators	9
2.	EMoS 6202	Embedded Networking	9
3.	EMoS 6203	Embedded Systems Engineering	9
4.	EMoS 6204	Advanced Applied Electronics	9
Total Credits			**36**

Student must take four specialty core course

(ii) Mobile Systems

Course Ante	Course Name	Credits
EMoS 6221	Applied Information Systems	9
EMoS 6222	Mobile Telecommunication Technology	9
EMoS 6223	Mobile Commerce	9
EMoS 6224	Mobile Application Development	9
Total Credits		**36**

Elective Courses

Course Ante	Course Name	Credits
EMoS 6301	Testing of Embedded Systems	7
EMoS 6302	RFID Systems	7
EMoS 6303	Safety-Critical Systems	7
EMoS 6304	Embedded Systems in Traffic Applications	7
EMoS 6305	IT Project Management	7
EMoS 6306	Machine Learning	7
EMoS 6307	Computational Data Analytics and Tools	7
EMoS 6308	System Development Methodology	7
Total Credits		**14**

**Students must take at least two (2) elective courses.*

4.2.3.2 Mapping of Courses for Master of Embedded and Mobile Systems by Coursework and Project

Semester I-Year I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundations of Law, Philosophy, and Ethics	10
		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		EMoS 6101	Soft Skills	7
		CCSE 6001	Research Methods and Communication	14
		EMoS 6103	Electronic Business	9
Specialty Core:	Embedded Systems	EMoS 6201	Sensors and Actuators	9
		EMoS 6202	Embedded Networking	9
	Mobile System	EMoS 6221	Applied Information Systems	9
		EMoS 6223	Mobile Commerce	9
Total Credits for Semester I				**68**

Semester II- Year I

Course Category		Course Ante	Course Name	Credits
Programme Core		EMoS 6104	Internet of Things and Embedded Systems	9
Specialty Core	Embedded Systems	EMoS 6203	Embedded Systems Engineering	9
		EMoS 6204	Advanced Applied Electronics	9
	Mobile System	EMoS 6222	Mobile Telecommunication Technology	9
Elective		EMoS 6306	Machine Learning	7
		EMoS 6301	Testing of Embedded Systems	7
Total Credits for Semester II			**Embedded systems/Mobile systems**	**34/25**

Semester III- Year II

Course Category		Course Ante	Course Name	Credits
Program Core		EMoS 6102	Group Project	9
		EMoS 6403	Outreach and Internship	14
Specialty	Mobile System	EMoS 6224	Mobile Application Development	9
Elective		EMoS 6302	RFID Systems	7
		EMoS 6308	System Development Methodology	7
		EMoS 6304	Embedded Systems in Traffic Applications	7
		EMoS 6303	Safety-Critical Systems	7
Sub-total Credits for Semester III			**Embedded systems/Mobile systems**	**30/39**

Mapping for Semester IV year II

Course Category	Course Ante	Course Name	Credits
Seminars	EMoS 6401	Graduate Seminar	8

Project	EMoS 6199	Project	50
Sub-total Credits for Semester IV		Embedded systems/Mobile systems	**58**
Total Credits for Semester I - IV		Embedded systems/Mobile systems	**116**

Credit Mapping for Semester I – IV

S/N	Course Category	Semester I	Semester II	Semester III	Semester IV	Total
1.	Common core	20				20
2.	Programme core	30	9	23		62
3.	Specialty core	18	18/9	0/9		36
4.	Elective	0	7	7		14
5.	Graduate Seminars	0	0	0	8	8
6.	Project	0	0	0	50	50
Total Credits: Embedded/Mobile		**68**	**34/25**	**30/39**	**58**	**190**

4.2.4 Master of Information Systems and Network Security

Information Systems and Network Security (ISNS) is a multi-disciplinary program that focuses on the analysis, design, development, and integration of systems that enable effective and efficient use of information in today's highly dynamic environment. Building on the disciplines of computer engineering, information and communication systems, including telecommunication, ISNS programme employs techniques and methodologies that allow practitioners to create and manage complex information systems to solve real-world problems. A significant portion of technology advancement originates from cutting edge research done in Information Technology.

The Masters in Information Systems and Network Security (ISNS) to be offered by NM-AIST aims to produce graduates competent in modern systems and network security. Students following the masters ISNS programme will study a variety of courses that will enable them develop capability in a wide scope of information, communication science and engineering. The main objective of the program is to develop capacity and competence of graduates for high-end jobs in information systems and network security in the industry and academia.

4.2.4.1 Programme Outline for Master of Information Systems and Network Security by Coursework and Dissertation

A list of courses for the degree of Master of Science in Information Systems and Network Security is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Credits			**20**

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	CCSE 6001	Research Methods and Communication	14
2.	CCSE 6011	Outreach and Internship	14
3.	ISNS 6104	Graduate Seminar	12
4.	ISNS 6199	Dissertation	50
Total Credits			**90**

Specialty Core

SN	Course Code	Course Name	Credits
1.	ISNS 6201	Advanced Operating System and Management	14
2.	*ISNS 6202	Information System & Network Security	14
3.	ISNS 6203	Network Programming	14
4.	ISNS 6204	Application Security	14
5.	ISNS 6205	Cyber Forensics	14
6.	ISNS 6206	PKI and Biometrics	14
7.	ISNS 6207	Network Defense and Countermeasures	14
8.	*ISNS 6208	Ethical Hacking	14
9.	ISNS 6209	IT Service Management	14
10.	*ISNS 6210	Cloud Computing	14
11.	ISNS 6211	Distributed Computing	14
12.	ISNS 6212	Parallel Programming	14
13.	ISNS 6213	Storage Area Network	14
14.	ISNS 6214	Security Standards and Audit	14
15.	ISNS 6215	Software Engineering	14
16.	ISNS 6216	Data Centre Management	14
17.	ISNS 6217	Infrastructure Management & Virtualization	14
18.	ISNS 6218	Cloud Security Services	14
Total Credits			70

With the help of a supervisor, head of department, or head of a research group a student will be advised to select 70 credits from a number of courses in his/her specialty, and from other pool of courses in CoCSE or other Schools.

**Can be opted in Semester 1*

4.2.4.2 Mapping of Courses for Master of Information Systems and Network Security by Coursework and Dissertation

Semester I & II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	CCSE 6001	Research Methods and Communication	14
Specialty courses	*Five (5) courses, selected from the list of specialty courses*		70
Seminar	ISNS 6104	Graduate Seminar	4
Total Credits for Semester I & II			**108**

Semester III & IV

Course Category	Course Ante	Course Name	Credits
Programme Core	CCSE 6011	Outreach and Internship	14
Seminar	ISNS 6104	Graduate Seminar	8
Dissertation	ISNS 6199	Dissertation	50
Total Credits for Semester III & IV			72

Credits Mapping for Semester I-IV

SN	Course Category	Semester I -II	Semester III-IV	Total
1	Common core	20	-	20
2	Programme core	14	14	28
3	Specialty core	70	-	70
5	Graduate Seminars	4	8	12
6	Dissertation	-	50	50
Total Number of Credits		**108**	**72**	**180**

4.2.5 Master of Wireless and Mobile Computing

In the` WIMC programme, students will be given the necessary theoretical and practical foundation and, thereafter, be expected to proceed with research into problems that are experienced by society in our region and can be addressed by wireless and mobile technologies. This focus on problems in our regional context will offer unique solutions to key problems hindering development. The delivery of the proposed programme will include exchange of experts between India and Tanzania for Master's program, ICT application testing and facility management.

4.2.5.1 Programme Outline for Masters of Wireless and Mobile Computing by Coursework and Dissertation

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Total Credits			**20**

Programme Core

S/N	Course Ante	Course Name	Credits
1.	CCSE 6001	Research Methods and Communication	14
2.	CCSE 6011	Outreach and Internship	14
3.	WIMC 6104	Graduate Seminar	12
4.	WIMC 6199	Dissertation	50

Specialty Courses

S/N	Course Ante	Course Name	Credits
1.	*WIMC 6201	Operating Systems Programming	14
2.	*WIMC 6202	Advanced Object Oriented Programming	14
3.	WIMC 6203	System Development Methodology	14
4.	WIMC 6204	Advanced Programming on Mobile Devices - I	14
5.	WIMC 6205	Advanced Programming on Mobile Devices - II	14
6.	**WIMC 6206	Wireless Sensor Networks	14
7.	*WIMC 6207	Wireless Communications	14
8.	**WIMC 6208	Network Security and Cryptography for Wireless Devices	14
9.	WIMC 6209	Internet of Things and Embedded Systems	14
10.	WIMC 6210	Compact Framework for Microsoft Windows Mobile	14
11.	WIMC 6211	Database Technologies	14
12.	WIMC 6212	Parallel Programming	14
13.	WIMC 6213	Mobile Adhoc Networks	14
14.	WIMC 6214	Wireless Programming and Applications Development	14
15.	WIMC 6215	Digital Signal Processing	14
16.	WIMC 6216	Security in Wireless and Mobile Systems	14
17.	WIMC 6217	Mobile Satellite Communication Network	14
18.	WIMC 6218	Design of Communication Circuits	14
Total Credits			**70**

With the help of a supervisor, head of department, or head of a research group a student will be advised to select 70 credits from a number of courses in his/her specialty, and from other pool of courses in CoCSE or other Schools.

**Can be opted in Semester 1*

***Can be opted in Semester 2*

4.2.5.2 Mapping of Courses for Master of Wireless and Mobile Computing (WIMC) by Coursework and Dissertation

Semester I - II

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	CCSE 6001	Research Methods and Communication	14
Specialty courses	*Five (5) courses, selected from the list of specialty courses*		70
Seminar	WIMC 6104	Graduate Seminar	4
Total Credits for Semester I & II			108

Semester III - IV

Course Category	**Course Code**	**Course Name**	**Credits**
Programme Core	CCSE 6011	Outreach and Internship	14
Seminars	WIMC 6104	Graduate seminar	8
Dissertation	WIMC 6199	Dissertation	50
Total Credits for Semester III & IV			72

Credits Mapping for Semester I-IV

SN	**Course Category**	**Semester I -II**	**Semester III-IV**	**Total**
1	Common core	20	-	20
2	Programme core	14	14	28
3	Specialty core	70	-	70
5	Graduate Seminars	4	8	12
6	Dissertation	-	50	50
Total Number of Credits		**108**	**72**	**180**

4.3 School of Materials, Energy, Water and Environmental Sciences (MEWES)

4.3.1 Master of Science Health Physics and Radiation Protection

The program of Health Physics and Radiation Protection (HPRP) offered by the School of MEWES is designed for Master's level. The HPRP programme aims to deliver and promote high quality and internationally competitive teaching and learning, research and innovation in science, engineering and technology with impact in economic growth and sustainable development in Africa. In this context, methodologies and approaches are geared towards producing graduates that are internationally competitive in their areas of expertise such that: Cancer Management and Treatment, improvement of agricultural practices to improve yields, pest management and the development of new varieties of crops that will be resilient to climate change, utilization of nuclear techniques such as Radiotracer/Radioisotope Techniques will enhance the operation of units and the optimization of extractive, petroleum refineries, petrochemical, chemical and process industries, construction and fabrication industries using the Non-Destructive Testing (NDT) techniques, and regulation of practices to ensure safety from ionizing radiation from radiation emitting devices and sources and security of neutron and gamma sources. The MSc programme in HPRP has no specializations and is only delivered in coursework and project.

A Masters student under the programme of MSc. Health Physics and Radiation Protection shall be required to complete; two (2) institutional common core courses, two (2) departmental common core courses, seven (7) programmes core courses, at least two (2) electives from the pool of courses. The courses should be completed within the first three semesters. Students shall also be required to complete the credits for the Graduate Seminar and doing project in the third and fourth semester.

4.3.1.1 Programme Outlines for Health Physics and Radiation Protection (HPRP)

(I) Master of Science in Health Physics and Radiation Protection (HPRP) programes by Coursework and Dissertation

A list of courses for the Master of Science in **HPRP** programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1	NuST 6101	Research Methods and Communication	10
2	NuST 6102	Outreach and Internship	10
3	HPRP 6401	Graduate Seminars	8
4	HPRP 6199	Project	50

Specialty core Courses

S/N	Course Ante	Course Name	Credits
1	HPRP 6101	Nuclear Physics	10
2	HPRP 6102	Biological Effects of Ionizing Radiations	10
3	HPRP 6103	Radiation Quantities and Measurement	10
4	HPRP 6104	Radiation Dosimetry	10
5	HPRP 6105	Radiation Protection and health physics	10
6	HPRP 6106	Radiation Safety, security, safeguards and International Framework	10
7	HPRP 6107	Nuclear Law and Regulatory Framework	10
8	HPRP 6301	Diagnostic Radiology Physics	10
9	HPRP 6302	Quality assurance for Radiotherapy and Nuclear Medicine	10

Elective Courses

S/N	Course Ante	Course Name	Credits
1	HPRP 6303	Radioactive Waste Management	10
2	HPRP 6304	Radiation protection in Industry, Mining and Mineral Processing	10
3	HPRP 6305	Nuclear Techniques and application	10
4	HPRP 6306	Computational Methods in Physics	10

*With the help of a supervisor, a head of department, or a head of research group, a student will be advised to select **at least two elective courses** from the Health Physics and Radiation*

Protection (HPRP) pool of elective courses and/or other pool of courses in the host school or other Schools

4.3.1.2 Mapping of Courses for Master of Science in Health Physics and Radiation Protection by Coursework and Project

(I) MSc HPRP by Coursework and Project

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		NuST 6101	Research Methods and Communication	10
Specialty Core	HPRP 6101	Nuclear Physics		10
	HPRP 6103	Radiation Quantities and Measurement		10
Elective		One elective course		10
Total Credits for Semester I				**50**

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Specialty Core	HPRP 6105	Radiation Protection and Health physics		10
	HPRP 6106	Radiation Safety, security, safeguards and International Framework		10
Total Credits Semester II				30
Total Credits Semester I & II				80

Semester III

Course Category		**Course Ante**	**Course Name**	**Credits**
Programme Core		NuST 6102	Outreach and Internship	10
Specialty Core	HPRP 6102	Biological Effects of Ionizing Radiations		10
	HPRP 6104	Radiation Dosimetry		10
	HPRP 6107	Nuclear Law and Regulatory Framework		10
Elective		One elective course		10
Total Credits for Semester III				**50**

Semester IV

Course Category		Course Ante	Course Name	Credits
Seminar	HPRP 6401	Graduate Seminar		8
Project	HPRP 6199	Project		50
Total Credits for Semester IV				**58**

Credits Mapping for Semester I-IV

S/N	Course Category	Semester I	Semester II	Semester III - IV	Total
1	Common core	10	-	10	20
2	Programme core	10	-	10	20
3	Specialty core	20	20	30	70
4	Electives	10		10	20
5	Graduate Seminars	-	-	8	8
6	Project	0	0	50	50
TotalCredits		**50**	**20**	**118**	**188**

4.3.2 Master's and PhD in Water supply and sanitary engineering

The programes in Water supply and sanitary engineering (WSSE) offered by the School of MEWES are designed for both Master's and PhD levels. Both programmes aim to develop and strengthen human resources and institutional capacity in impact-oriented training and research in water resources management as an entry point towards sustainable management of water resources and the natural resources at large. The training programmes will lead to provision of technical know-how that will address problems related to agriculture and water resources so as to alleviate food insecurity and improve livelihoods of the society.

The MSc programme in WSSE has two specializations in which Students are required to choose one of the specializations. Specializations offered under MSc. WSSE programme are:

Water Supply

Sanitary Engineering

However, the PhD program has no specializations. The PhD program is offered in Research and Thesis mode

Students joining the Master's degree in Water Supply and Sanitary Engineering (WSSE) at NM-AIST shall be required to complete two (2) institutional common core courses, two (2) program core courses, at least four (4) courses from the pool of specialty courses, depending on the student's specialization (research area); supervisor must guide a student to take relevant

courses. The remaining course(s) can be from any school within the institution to fulfill the 70-credits requirement, depending on the student's area of research. The courses can be taken any timewithin the timeframe of Master's program whenever a course is offered. Students shall also be required to complete the credits for the Graduate Seminar and doing research throughout the entire period of study. The list of courses for the Master's of Water Supply and Sanitary Engineering (WSSE) program is provided below in terms of course ante, name and credits and their distribution in the semesters

A minimum total of 540 credits are required for the award of a PhD degree. The 540 credits will comprise an appropriate combination of lectures, practical, research, independent studies, seminars, tutorials or assignments. A student may be required to take certain courses to bridge possible knowledge gaps in neither the respective PhD work as may be recommended by the supervisors but such courses will not be considered for the final degree evaluation nor GPA. BuSH 6009 and BuSH 6010 are to be taken as common core course at institutional level for those students who already covered BuSH 6007 and BuSH 6008 during Masters Studies at NM AIST.

A student may be required to take certain courses on offer within the school of MEWES or any other school to bridge possible knowledge gaps in the respective PhD research as may be recommended by the supervisors or the head of department but such courses will neither count for the final degree evaluation nor the GPA calculation**.**Programme Outlines for Water supply and sanitary engineering (WSSE)

4.3.2.1 Programme Outline for Water Supply and Sanitation Engineering (WSSE)

(I) Master of Science in Water supply and sanitary engineering (WSSE) programes by Coursework and Dissertation

A list of courses for the Master of Science in WSSE programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1	MEWE 6101	Research Methods and Communication	14

2	MEWE 6102	Outreach and Internship	14
3	MEWE 6401	Graduate Seminars	12
4	HWRE 6901	Dissertation	50

Specialty Courses

Water supply Speciality core courses

S/N	Course Ante	Course Name	Credits
1	WSSE 6201	Water Transport And Distribution	14
2	HWRE 6270	Integrated Water Resources Management	14
3	EnSE 6251	Climate change impacts, adaptation and mitigation	14
4	HWRE 6276	Water Quality Assessment And Modelling	14
5	WSSE 6205	Pumps Selection for Water Supply	14
6	HWRE 6283	Water Harvesting and Conservation	14
7	HWRE 6273	Water Governance and Water Conflict Management	14

Sanitary engineering Speciality core courses

S/N	Course Ante	Course Name	Credits
1	HWRE 6270	Integrated Water Resources Management	14
2	EnSE 6250	Climate change impacts, adaptation and mitigation	14
3	WSSE 6202	Health, Hygiene and Environmental Sanitation	14
4	EnSE 6257	Wastewater Treatment and Engineering	14
5	WSSE 6206	Introduction to Fecal Sludge Management	14
6	EnSE 6263	Solid Waste Management	14
8	EnSE 6265	Environmental Microbiology and Biotechnology	14
9	WSSE 6204	Urban drainage and water supply	14
10	WSSE 6205	Engineering economics and cost analysis	14

Elective Courses

S/N	Course Ante	Course Name	Credits
1	HWRE 6373	Environmental Isotopes Hydrology	14
2	HWRE 6375	Remote Sensing and GIS	14
3	HWRE 6376	Water Quality Assessment and Modelling	14
4	HWRE 6377	Open Channel Hydraulic and Engineering	14
5	HWRE 6379	Reservoir and Hydropower Development	14
6	HWRE 6380	Erosion and Sediment Transport Processes	14
7	HWRE 6381	Hydro-informatics for Decision Support	14
8	HWRE 6384	Irrigation and Drainage Systems Engineering	14
9	HWRE 6385	Irrigation Agronomy	14

(II) Programme Outline for PhD in WSSE by Research and Thesis

A list of courses for the PhD degree in WSSE programme is provided below in terms of course ante, name and credits. With the approval of the respective departments and the supervisors, students may choose other courses on offer during the semester, within and/or outside WSSE.

Common Courses

S/N	Course Ante	Course Name	Credits

1	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3	*BuSH 6009	Organization Development and Leadership	10
4	*BuSH 6010	Economics of Innovation and Entrepreneurship	10

**BuSH 6009 and BuSH 6010 are to be taken as common core course at institutional level for those students who already covered BuSH 6007 and BuSH 6008 during Masters Studies at NM-AIST*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1	MEWE 6101	Research Methods and Communication	14
2	MEWE 7101	Outreach and Internship	14
3	MEWE 7401	Graduate Seminar	24
4	HWRE 7901	Thesis	468

4.3.2.2 Mapping of Courses for Water supply and sanitary engineering (WSSE) Degree Programme

(I) MSc WSSE by Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		MEWE 6101	Research Methods and Communication	14
Specialty Core	Water Supply	Choose 3 course from a pool of prescribed specialty courses		42
	Sanitary Engineering	Choose at least 2 course from a pool of prescribed specialty courses		42
Seminars		HWRE 6401	Graduate Seminar I	3
Total Credits for Semester I				**69**

Semester II

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		MEWE 6102	Outreach and Internship	14
Specialty Core	Hydrology and Climate studies	Choose 2 course from a pool of prescribed specialty courses		28
	Water Resources Engineering and Management	Choose 2 courses from a pool of prescribed specialty courses		28
Seminars		HWRE 6402	Graduate Seminar II	3
Total Credits Semester II				55

Total Credits Semester I & II	124

Semester III & IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Seminar	HWRE 6403	Graduate Seminar III	3
	HWRE 6403	Graduate Seminar IV	3
Dissertation	HWRE 6199	Dissertation	60
Total Credits			**66**

Credits Mapping for Semester I-IV

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III - IV**	**Total**
1	Common core	10	10	-	20
2	Programme core	14	14	-	28
3	Specialty core	42	28	-	70
4	Graduate Seminars	3	3	6	12
	Dissertation	0	0	60	60
TotalCredits		**69**	**55**	**66**	**190**

(II) PhD Water supply and sanitary engineering (WSSE) by Thesis

Mapping for Semester I, II, III-VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Common Core	*BuSH 6007	Foundation of Law, Philosophy and Ethics	10
	*BuSH 6008	Technological Innovation and Entrepreneurship Management	10
	BuSH 6009	Organizational Development and Leadership	10
	BuSH 6010	Economics of Innovation and Entrepreneurship	10
	MEWE 6101	Research Methods and Communication	14
Programme Core	MEWE 7102	Outreach and Internship	14
Electives		Electives (chosen from a pool of prescribed courses and/or some core courses on offer from within and/or outside MEWES)	0
Dissertation	WSSE 7199	Thesis	468
Seminar	MEWE 7401	Graduate seminar	24
Total Credits for Semester I,II, III & IV			540

**If not taken at Master's level. Students who graduated master's level at NM-AIST shall not take these courses, but instead will be required to opt for other relevant courses from school of BuSH such as BuSH 6009 and 6010 Courses, and use the available time for research and analytical learning, to fulfil NM-AIST required credits.*

Credits mapping for all semesters (I-VI) -PhD by Research and Thesis

S/N	Course Category	Semester I	Semester II	Semester III - VI	Total
1	common core	10	10	-	20
2	Program Common core	14	14	-	28
3	Graduate Seminars	6	6	12	24
4	Research/Thesis				468
Total Credits for the whole program					**540**

4.3.3 Master's and PhD in Hydrology and Water Resources Engineering

The programes in Hydrology and Water Resources Engineering (HWRE) offered by the School of MEWES are designed for both Master's and PhD levels. Both programmes aim to develop and strengthen human resources and institutional capacity in impact-oriented training and research in water resources management as an entry point towards sustainable management of water resources and the natural resources at large. The training programmes will lead to provision of technical know-how that will address problems related to agriculture and water resources so as to alleviate food insecurity and improve livelihoods of the society.

The MSc programme in HWRE has two specializations in which Students are required to choose one of the specializations. Specializations offered under MSc. HWRE programme are:

(i) Hydrology and Climate studies

(ii) Water Resources Engineering and Management.

However, the PhD program has no specializations. The PhD program is offered in two modes:

(i) Course work and Dissertation mode,

(ii) Research and Thesis mode

Students joining the MSc programme in HWRE at the NM-AIST shall be required to complete Common core (institutional common core courses), program core courses (School common core courses), , graduate seminars, specialty core courses (program specialty courses) and the dissertation in a period of two years comprising of 4 semesters. Courses for students taking Master's degree in Hydrology and Water Resources Engineering (HWRE) will comprise of two (2) institutional common core courses, two (2) School common core courses, at least two (2) program specialty courses and at least three (3) electives from the pool of programme courses within the school or any other school within NM-AIST. The credits for

dissertation shall be accrued through research activities throughout the entire study period and the final dissertation document

Students joining PhD programmes in HWRE by Coursework and Dissertation at NM AIST will be required to flexibly take courses amounting to a minimum of 188 credits and 352 credits for research dissertation. However, students joining the PhD programme in HWRE at the NM-AIST shall be required to complete two (2) Common core courses (institutional common core courses), two (2) program core courses (School common core courses), five (5) program specialty elective courses, graduate seminars and the thesis/dissertation in a period of three (3) years. With the approval of respective departments based on research theme, students may choose any courses as electives to gain skills in particular area of one's research interests offered within and/or outside the department/school. For PhD by Research and Thesis mode, students will be required to take at least 68 credits from two (2) institutional common core courses, two program core courses and graduate seminars. The 68 credits plus the 472 credits from the thesis gives the minimum total credits of 540 required by TCU for one to graduate with a PhD Degree.

4.3.3.1 Programme Outlines for Hydrology and Water Resource Engineering

(I) Master of Science in Hydrology and Water Resource Engineering by Coursework and Dissertation

A list of courses for the Master of Science in HWRE programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 6102	Outreach and Internship	14
3.	MEWE 6401	Graduate Seminars	12
4.	HWRE 6901	Dissertation	50

Specialty Courses

(i) Hydrology and Climate studies

S/N	Course Ante	Course Name	Credits
1.	EnSE 6251	Climate change impacts, adaptation and mitigation	14
2.	HWRE 6271	Ground water Hydrology	14
3.	HWRE 6272	Surface water Hydrology	14
4.	HWRE 6274	Applied Surface and Ground water Modelling	14

(ii) Water Resources Engineering and Management

S/N	Course Ante	Course Name	Credits
1.	HWRE 6270	Integrated Water Resources Management	14
2.	HWRE 6274	Applied Surface and Ground water Modelling	14
3.	HWRE 6271	Ground water Hydrology	14
4.	HWRE 6272	Surface water Hydrology	14

Elective Courses

S/N	Course Ante	Course Name	Credits
5.	HWRE 6373	Environmental Isotopes Hydrology	14
6.	HWRE 6375	Remote Sensing and GIS	14
7.	HWRE 6376	Water Quality Assessment and Modelling	14
8.	HWRE 6377	Open Channel Hydraulic and Engineering	14
9.	HWRE 6379	Reservoir and Hydropower Development	14
10.	HWRE 6380	Erosion and Sediment Transport Processes	14
11.	HWRE 6381	Hydro-informatics for Decision Support	14
12.	HWRE 6384	Irrigation and Drainage Systems Engineering	14
13.	HWRE 6385	Irrigation Agronomy	14

(II) PhD in Hydrology and Water Resources (HWRE) by Coursework and Dissertation

A list of courses for the PhD degree in HWRE programme is provided below in terms of course ante, name and credits. With the approval of respective departments based on research theme, students may choose any courses as electives to gain skills in particular area of one's research interests offered within and/or outside the department/school

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development and Leadership	10
4.	*BuSH 6010	Economics of Innovation and Entrepreneurship	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 7101	Outreach and Internship	14
3.	MEWE 7401	Graduate seminars	20
4.	HWRE 7901	Dissertation	352

Program Specialty Electives (Specialty courses)

S/N	Course Ante	Course Name	Credits
1.	HWRE 7270	Surface and Ground water Hydrology	24
2.	HWRE 7271	Advanced Open Channel Hydraulic and Engineering	24
3.	HWRE 7272	Water Governance and Water Conflict Management	24
4.	HWRE 7273	Soil and Water Engineering	24
5.	HWRE 7274	Water Harvesting and Conservation	24
6.	HWRE 7275	Watershed and River Basin Management	24

(III) Programme Outline for PhD in HWRE by Research and Thesis

A list of courses for the PhD degree in HWRE programme is provided below in terms of course ante, name and credits. With the approval of the respective departments and the supervisors, students may choose other courses on offer during the semester, within and/or outside HWRE.

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development and Leadership	10
4.	*BuSH 6010	Economics of Innovation and Entrepreneurship	10

**BuSH 6009 and BuSH 6010 are to be taken as common core course at institutional level for those students who already covered BuSH 6007 and BuSH 6008 during Masters Studies at NM-AIST*

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 7101	Outreach and Internship	14
3.	MEWE 7401	Graduate Seminar	20
4.	HWRE 7901	Thesis	472

4.3.3.2 Mapping of Courses for Hydrology and Water Resources Engineering Degree Programme

(I) MSc HWRE by Coursework and Dissertation

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		MEWE 6101	Research Methods and Communication	14
Specialty Core	Hydrology and Climate studies	Choose at least 1 course from a pool of prescribed specialty courses		14
	Water Resources Engineering and Management	Choose atleast 1 course from a pool of prescribed specialty courses		14
Seminars		HWRE 6401	Graduate Seminar I	2
Electives	Choose atleast 2 electives from a pool of prescribed electives within and outside HWRE			28
Total Credits for Semester I				**68**

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		MEWE 6102	Outreach and Internship	14
Specialty Core	Hydrology and Climate studies	Choose atleast 1 course from a pool of prescribed specialty courses		14
	Water Resources Engineering and Management	Choose atleast 1 courses from a pool of prescribed specialty courses		14
Seminars		HWRE 6402	Graduate Seminar II	2
Electives	Choose atleast 1 electives from a pool of prescribed electives within and outside HWRE			14
Total Credits Semester II				54
Total Credits Semester I & II				122

Semester III & IV

Course Category	Course Ante	Course Name	Credits
Seminar	HWRE 6403	Graduate Seminar III	4
	HWRE 6403	Graduate Seminar IV	4
Dissertation	HWRE 6199	Dissertation	50
Total Credits			**58**

Credits Mapping for Semester I-IV

S/N	Course Category	Semester I	Semester II	Semester III - IV	Total
1.	Common core	10	10	-	20
2.	Programme core	14	14	-	28
3.	Specialty core	14	14	-	28
4.	Elective	28	14	-	42
5.	Graduate Seminars	2	2	8	12
6.	Dissertation	0	0	50	50
TotalCredits		**68**	**54**	**58**	**180**

(II) PhD Programme in HWRE by Coursework and Dissertation

A PhD student is required to complete coursework within the first two semesters as shown in Table bellow. Actual mapping will vary for the various students depending on one's background and intended area of research, as well as the supervisor's recommendation.

Semester I

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core	MEWE 6101	Research Methods and Communication	14
**Program specialty electives	Student will be required to take specialty courses from a pool of Program specialty electives amounting to a minimum of 60 credits		72
Seminars	MEWE 7401	Graduate seminar I	4
Total Credits for Semester I			88

Semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core	MEWE 7101	Outreach and Internship	14
**Program specialty electives	Student will be required to take specialty courses from a pool of Program specialty electives amounting to a		48

	minimum of 60 credits		
Seminars	MEWE 7402	Graduate seminars II	4
Total Credits for Semester II			88

***upon guidance by supervisor/HoD/Dean and depending on the student's area of research, a student shall select relevant courses from the pool of programme courses within the school or any other school within NM-AIST to fulfil the required credits.*

*****BuSH 6009 and BuSH 6010 are to be taken as common core course at institutional level for those students who already covered BuSH 6007 and BuSH 6008 during Masters degree studies at NM-AIST***.

Semester III-VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Graduate Seminars	MEWE 7401	Graduate Seminar	12
Dissertation	HWRE 7901	Dissertation	352
Sub-total Credits for Semester III – VI			**364**

Credits Mapping for Semester I-VI

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III - VI**	**Total**
1.	Common core	10	10	-	20
2.	Programme core	14	14	-	28
3.	Specialty core			-	120
4.	Elective		-	-	0
5.	Graduate Seminar				20
6.	Dissertation	-	-	352	352
Total Credits					**540**

(III) PhD Programme in HWRE by Research and Thesis

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III - VI**	**Total**
7.	Common core	10	10	-	20
8.	Programme core	14	14	-	28
9.	Graduate Seminar	4	4	12	20
10.	Thesis	-	-	-	472
Total Credits					**540**

4.3.4 Master's and PhD in Environmental Science and Engineering

The programes in Environmental Science and Engineering (EnSE) offered by the school of MEWES are designed for both Master's and PhD levels so as to fill the gap of highly trained and qualified researchers and techno-preneurs capable to use innovate and scientific approaches in addressing the persistent problem of the environment. Both programmes aim to equip the graduates with knowledge, understanding, skills and competencies on environmental

related discipline for societal, economical, and industrial benefits in line with the motto of the institution, “Academia for society and industry”. Under this program, research and thesis mode is only offered at PhD level. The MSc and PhD Programs in EnSE share two specializations. After the mandatory common and programme core courses, students who will be admitted into this programme will specialize in either of the following areas:

(i) Environmental Science

(ii) Environmental Engineering

The Environmental Science specialization provides the fundamentals and applied training in the applications of chemistry and biology to environmental problems and systems, including lakes, rivers, groundwater, and engineered processes, and development of alternative environmental-friendly technologies. This specialization is intended primarily for students with undergraduate degrees in biological and physical sciences. The Environmental Engineering specialization provides an advanced study on the fundamentals, design, and operation of biological, physical, and chemical treatment processes. Applications include treatment of wastewater and hazardous wastes, development of strategies to improve the quality and safety of drinking water, and management and minimization of solid wastes.

Students joining the MSc programme in EnSE at the NM- will be required to take at least 130 credits comprising of course work, outreach, and graduate seminar. The 130 credits and 50 credits for Dissertation gives the minimum total credits (180 credits) required for to graduate with a Master Degree at NM-AIST. Courses for students taking (Master of Science in Environmental Science and Engineering by Coursework and Dissertation will comprise of two (2) institutional common core courses, two (2) School common core courses, five (5) program specialty courses from the pool of programme elective specialty courses within the school or any other school within NM-AIST. The credits for dissertation shall be accrued through research activities throughout the entire study period and the final dissertation document

Students joining PhD programmes in in EnSE by Coursework and Dissertation at NM AIST will be required to flexibly take courses amounting to a minimum of 164 credits and 376 credits for research dissertation. However, students joining the PhD programme in in EnSE at the NM-AIST shall be required to complete two (2) Common core courses (institutional common core courses), two (2) program core courses (School common core courses), five (4) program specialty elective courses, graduate seminars and the thesis/dissertation in a period of three (3) years. With the approval of respective departments based on research theme, students

may choose any courses as electives to gain skills in particular area of one's research interests offered within and/or outside the department/school. for PhD by Research and Thesis mode, students will be required to take at least 72 credits from two (2) institutional common core courses, two program core courses and graduate/conference seminars. The 72 credits plus the 468 credits from the thesis gives the minimum total credits of 540 required by TCU for one to graduate with a PhD Degree.

4.3.4.1 Programme Outline for Environmental Science and Engineering (EnSE)

(I) Master of Science in Environmental Science and Engineering by Coursework and Dissertation

A list of courses for the Master's degree in EnSE programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 6102	Outreach and Internship	14
3.	MEWE 6401	Graduate seminar	12
4.	EnSE 6400	Dissertation	50

Specialty Courses

(i) Environmental Science

S/N	Course Ante	Course Name	Credits
1.	EnSE 6250	Environmental Chemistry	14
2.	EnSE 6254	Atmospheric Sciences	14
3.	EnSE 6265	Environmental Microbiology and Biotechnology	14
4.	EnSE 6266	Environmental Pollution	14
5.	EnSE 6267	Environmental Governance	14
6.	HWRE 6275	Remote Sensing and GIS	14
7.	EnSE 6251	Climate change impacts, adaptation and mitigation	14

(ii) Environmental Engineering

S/N	Course Ante	Course Name	Credits
1	EnSE 6251	Climate change impacts, adaptation and mitigation	14
2	EnSE 6252	Environmental Modelling	14

3	EnSE 6250	Environmental Chemistry	14
4	EnSE 6254	Atmospheric Sciences	14
5	EnSE 6258	Environmental Engineering Design and Project Management	14
6	EnSE 6267	Environmental Governance	14
7	EnSE 6266	Environmental Pollution	14

(II) PhD in Environmental Science and Engineering by Coursework and Dissertation

A list of courses for the PhD degree in EnSE programme is provided below in terms of course ante, name and credits. With the approval of the respective departments and supervisors, students may choose other courses on offer during the semester, within and/or outside EnSE.

Common Courses

S/N	Course Ante	Course Name	Credits
5.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
6.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
7.	*BuSH 6009	Organization Development and Leadership	10
8.	*BuSH 6010	Economics of Innovation and Entrepreneurship	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 7101	Research Methods and Communication	14
2.	MEWE 7102	Outreach and Internship	14
3.	MEWE7401	Graduate Seminars and cofference	20
4.	EnSE 7400	Dissertation	376

Specialty Core Courses

(i) Environmental Science

S/N	Course Code	Course Name	Credits
1.	EnSE 7250	Environmental Impact Assessment and Management	24
2.	EnSE 7251	Advanced Environmental Analytic Techniques	24
3.	EnSE 7253	Advanced Environmental Toxicology	24
4.	EnSE 7255	Advanced Industrial Ecology	24
5.	EnSE 7261	Ecology and Ecosystems	24
6.	EnSE 7262	Hazardous Waste Management	24
7.	EnSE 7264	Environmental Economics and Politics	24
8.	EnSE 7260	Advanced Remote Sensing and GIS for Environmental Sciences	24

Environmental Engineering

S/N	Course Code	Course Name	Credits

1.	EnSE 7250	Environmental Impact Assessment and Management	24
2.	EnSE 7251	Advanced Environmental Analytic Techniques	24
3.	EnSE 7256	Advanced Air Pollution Control Engineering	24
4.	EnSE 7257	Wastewater Treatment and Engineering	24
5.	EnSE 7259	Environmental Engineering Process Modelling	24
6.	EnSE 7260	Advanced Remote Sensing and GIS for Environmental Sciences	24
7.	EnSE 7264	Environmental Economics and Politics	24
8.	EnSE 7263	Solid Waste Management	24

(III) PhD in Environmental Science and Engineering (EnSE) by Research and Thesis

A list of courses for the PhD degree in EnSE is provided below in terms of course ante, name and credits. With the approval of the respective departments and the supervisors, students may choose other courses on offer during the semester, within and/or outside EnSE.

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3.	*BuSH 6009	Organization Development and Leadership	10
4.	*BuSH 6010	Economics of Innovation and Entrepreneurship	10

**BuSH 6009 and BuSH 6010 are to be taken as common core course at institutional level for those students who already covered BuSH 6007 and BuSH 6008 during Masters Studies at NM-AIST*

Programme Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 7101	Research Methods and Communication	14
2.	MEWE 7102	Outreach and Internship	14
3.	MEWE 7401	Research Seminars and Conferences	24
4.	EnSE 7400	Thesis	468

4.3.4.2 Mapping of Courses in Environmental Science and Engineering

(I) Master of Science in Environmental Science and Engineering by Coursework and Dissertation

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		MEWE 6102	Outreach and Internship	14
Specialty Core	Environmental Science	Student shall be advised to accrue at least 28 credits from a pool of programme core courses (per specialty) within the school or anywhere else within NM-AIST		28
	Environmental Engineering	Student shall be advised to accrue at least 28 credits from a pool of programme core courses (per specialty) within the school or anywhere else within NM-AIST		28
Seminars		MEWE 6401	Graduate seminar I	3
Total Credits for Semester I				**55**

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		MEWE 6102	Outreach and Internship	14
Specialty Core	Environmental Science	Student shall be advised to accrue at least 42 credits from a pool of programme core courses (per specialty) within the school or anywhere else within NM-AIST		42
	Environmental Engineering	Student shall be advised to accrue at least 42 credits from a pool of programme core courses (per specialty) within the school or anywhere else within NM-AIST		42
Seminars		MEWE 6401	Graduate seminar II	3
Total Credits Semester II				**69**

Semester III & IV

Course Category	**Course Ante**	**Course Name**	**Credits**
Graduate seminar	MEWE 6401	Graduate seminar III	3
	MEWE 6401	Graduate seminar IV	3
Dissertation	EnSE 6400	Dissertation	50
Total credits			**56**

Credits Mapping for Semester I-IV

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III-IV**	**Total**
1.	Common Core	10	10	-	20
2.	Programme Core	14	14		28

3.	Specialty Core	28	42	-	70
4.	Graduate Seminar	3	3	6	12
5.	Dissertation	-	-	50	50
Total		55	69	56	180

(II) PhD in Environmental Science and Engineering by Coursework and Dissertation

Semester I

Course Category		**Course Code**	**Course Name**	**Credits**
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
		*BuSH 6009	Organization Development and Leadership	10
Programme Core		MEWE 7101	Research Methods and Communication	14
Programme Core/Elective	Environmental Science	At least two specialty core courses to be chosen from a pool of prescribed courses for PhD on offer from within the school or outside as per advice.		48
	Environmental Engineering	At least two specialty core courses to be chosen from a pool of prescribed courses for PhD on offer from within the school or outside as per advice.		48
Graduate Seminar I				3
Total Credits for Semester I				**75**

Semester II

Course Category		**Course Code**	**Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
		*BuSH 6010	Economics of Innovation and Entrepreneurship	10
Programme Core		MEWE 7102	Outreach and Internship	14
Programme Core/Elective	Environmental Science	At least two specialty core courses to be chosen from a pool of prescribed courses for PhD on offer from within the school or outside as per advice.		48
	Environmental Engineering	At least two specialty core courses to be chosen from a pool of prescribed courses for PhD on offer from within the school or outside as per advice.		48
Graduate Seminar II				3
Total Credits for Semester II				**75**

Semester III -VI

Course Category	**Course Ante**	**Course Name**	**Credits**
Graduate seminar	EnSE 7401	Graduate seminar III	3
	EnSE 7401	Graduate seminar IV	3
	EnSE 7401	Graduate seminar V	4
	EnSE 7401	Graduate seminar VI	4
Dissertation	EnSE 7199	Dissertation	376

Total credits	**390**

Credits Mapping for Semester I-VI

S/N	Course Category	Semester I	Semester II	Semester III-IV	Total
1	Common Core	10	10	-	20
2	Programme core	14	14	-	28
4	Specialty core	48	48	-	96
5	Graduate Seminar	3	3	14	20
6	Dissertation	-	-	376	376
Total		**75**	**75**	**390**	**540**

4.3.5 Master's and PhD in Sustainable Energy Science and Engineering

The programes in Sustainable Energy Science and Engineering (SESE) offered by the school of MEWES are designed for both Master's and PhD levels. Both programmes aim to provide appropriate knowledge and skills in sustainable energy science and engineering within manufacturing sector, service industries and business enterprises. Graduates of the Sustainable Energy Science and Engineering will be able to work in a variety of areas, including private sector, energy consultancies and renewable start-up companies, international financial organizations and development agencies (e.g. World Bank, UNDP), governmental organizations (e.g. ministry of energy), energy think-tanks and Non-Governmental Organizations (NGOs) dealing with clean energy solutions. Under this program, research and thesis mode is only offered at PhD level.

The MSc Program in SESE has three specializations in which students may specialize in one of them. The specializations under MSc Program in SESE are:

(i) Renewable Energy Engineering

(ii) Sustainable Power Generation and Energy Utilization

(iii) Smart Grid Technology

Students joining the Master's degree in Sustainable Energy Science and Engineering (MSc SESE) at NM-AIST shall be required to complete two (2) common core courses, two (2) program common core courses and at least five (5) courses from the pool of specialty courses or anywhere else within NM-AIST depending on the student's area of research to fulfil the 70-credit requirement under guidance of a supervisor and head of department. The courses can be taken any semester within the timeframe of Master's program when a course is offered, however, it is encouraged to finish courses in the first two semesters and concentrate on research in the remaining semesters. Students shall also be required to complete the credits for the Graduate Seminar and doing research throughout the entire period of study. Students will

be required to take at least 130 credits comprising of course work, outreach, and graduate seminar. The 130 credits and 50 credits for Dissertation gives the minimum total credits (180 credits) required to graduate with a Master's degree at NM-AIST.

The PhD in SESE under course work and dissertation has two specializations in which students may specialize in one of them. The specializations under PhD Program in SESE are:

(i) Renewable Energy Engineering

(ii) Sustainable Power Generation and Energy Utilization

A PhD student in Sustainable Energy Science and Engineering (PhD in SESE) under course work and dissertation shall take a total of 8 courses. Two (2) common core courses from the school of Business Studies and Humanities (BuSH) and two (2) program common core courses from the school of Materials, Energy Water and Environmental Sciences (MEWES) and four (4) courses to be chosen from the pool of specialty courses or any school within NM-AIST depending on research topic/specialization under guidance of supervisor(s) and the head of department or dean of school. The courses can be taken any semester within the timeframe of PhD program when a course is offered, however, it is encouraged to finish courses in the first two semesters and concentrate on research in the remaining semesters. Students shall also be required to complete the credits for the Graduate Seminar. Students doing the PhD in Sustainable Energy Science and Engineering (PhD in SESE) programmes by Coursework and Dissertation at NM AIST-Arusha will be required to flexibly take courses amounting to a minimum of 164 credits and 376 credits from research dissertation.

A PhD student under the programme of Sustainable Energy Science and Engineering (PhD in SESE) by Research and Thesis shall take a total of 5 courses, two (2) common core courses from the school of Business Studies and Humanities (BuSH) and two (2) programme common core courses from the school of Materials, Energy, Water and Environmental Sciences (MEWES) and graduate semminars. PhD students by research and thesis in Sustainable Energy Science and Engineering can specialize in three (3) areas:

(i) Renewable Energy Engineering

(ii) Sustainable Power Generation and Energy Utilization and

(iii) Smart Grid.

4.3.5.1 Programme Outlines Sustainable Energy Science and Engineering

(I) Master's in Sustainable Energy Science and Engineering by Coursework and Dissertation

A list of courses for the Master's degree in SESE programme is provided below in terms of course ante, name and credits.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH6008	Technological Innovation and Entrepreneurship Management	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 6102	Outreach and Internship	14
3.	SESE 6401	Graduate Seminar	12
4.	SESE 6195	Dissertation	50

Specialty Courses

(i) Renewable Energy Engineering

S/N	Course Ante	Course Name	Credits
1.	SESE 6230	Renewable Energy Technology	14
2.	SESE 6231	Hybrid Renewable Energy Systems	14
3.	SESE 6232	Passive Solar Energy Technology	14
	SESE 6233	Bio-energy Systems	14
4.	SESE 6234	Energy Management	14
5.	*MaSE 6101	Thermodynamics and Phase Equilibria	14
6.	SESE 6235	Measurement Techniques in Energy Technology	14

(ii) Sustainable Power Generation and Energy Utilization

S/N	Course Ante	Course Name	Credits
1.	*MaSE 6101	Thermodynamics and Phase Equilibria	14
2.	SESE 6236	Combined Heat and Power Technology	14
3.	SESE 6237	Sustainable Power Generation System	14
4.	SESE 6238	Sustainable Energy Utilization Systems	14
5.	SESE 6239	Thermal Comfort and Indoor Climate	14
6.	SESE 6240	Applied Refrigeration and Heat Pump Technology	14
7.	SESE 6241	Hydraulic Turbo-machinery	14
8.	SESE 6242	Combustion Theory	14
9.	SESE 6235	Measurement Techniques in Energy Technology	14

(iii) Smart Grid Technology

S/N	Course Ante	Course Name	Credits

1.	SESE 6243	Introduction to Smart Grid	14
2.	*ICSE 6221	Advanced Electronics	14
3.	SESE 6244	Power Quality in Power Distribution Systems	14
4.	SESE 6245	Data Security and Privacy in Smart Grid	14
5.	*ICSE 6102	Data Communication and Computer Networks	14
6.	*ICSE 6223	Wireless and Mobile/Cellular Communications	14
7.	*ICSE 6103	Operating Systems	14
8.	SESE 6230	Renewable Energy Technology	14
9.	SESE 6231	Hybrid Renewable Energy Systems	14
10.	SESE 6234	Energy Management	

**Represents courses from outside the respective specialty but are regarded as specialty core courses irrespective of the code they carry.*

(II) PhD in Sustainable Energy Science and Engineering by Coursework and Dissertation

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6009	Organizational Development and Leadership	10
2.	BuSH 6010	Economics of Innovation and Entrepreneurship	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 7101	Outreach and Internship	14
3.	MEWE 7401	Graduate Seminars	20
4.	SESE 7195	Dissertation	376

Specialty Courses

Renewable Energy Engineering

S/N	Course Ante	Course Name	Credits
1.	*MaSE 7101	Advanced Thermodynamics and Phase Equilibria	24
2.	SESE 7230	Renewable Energy Technology: Advanced Course	24
3.	SESE 7232	Solar Energy Systems for Buildings and Cities	24
4.	SESE 7234	Energy Management and Audit	24
5.	SESE 7243	Renewable Energy Systems in Smart Grids	24

(i) Sustainable Power Generation and Energy Utilization

S/N	Course Ante	Course Name	Credits

1.	*MaSE 7101	Advanced Thermodynamics and Phase Equilibria	24
2.	SESE 7236	Applied Heat and Power Technology	24
3.	SESE 7241	Thermal Turbomachinery	24
4.	SESE 7242	Advanced Combustion Theory and Modeling	24
5.	SESE 7234	Energy Management and Audit	24

Represents courses from outside the respective specialty but are regarded as specialty core courses irrespective of the code they carry

(III) PhD in Sustainable Energy Science and Engineeringby Research and Thesis

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6009	Organizational Development and Leadership	10
2.	BuSH 6010	Economics of Innovation and Entrepreneurship	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 7102	Outreach and Internship	14
3.	SESE 7401	Research Seminars and Conferences	20
4.	SESE 7199	Thesis	**468**

4.3.5.2 Mapping of Courses in Sustainable Energy Science and Engineering

(I) Master of Science in Sustainable Energy Science and Engineeringby Coursework and Dissertation

Semester I

Course Category		Course Ante	Course Name	Credits
Common Core		BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Programme Core		MEWE 6101	Research Methods and Communication	14
		SESE 6401	Graduate Seminars	3
Specialty elective courses	Renewable Energy Engineerin	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Renewable Energy Engineering Specialty above) or anywhere else		28

	g	within NM-AIST depending on the student's area of research and specialization to fulfil the 70-credits requirement under guidance of a supervisor and head of department or dean of the school	
	Sustainable Power Generation and Energy Utilization	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Sustainable Power Generation and Energy Utilization Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the 70-credit requirement under guidance of a supervisor and head of department or dean of the school	28
	Smart Grid Technology	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Smart Grid Technology Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the 70-credits requirement under guidance of a supervisor and head of department or dean of the school	28
Sub-total Credits for Semester Total credits			55

Semester II

Course Category		**Course Ante**	**Course Name**	**Credits**
Common Core		BuSH 6008	Technological Innovation and Entrepreneurship Management	10
Programme Core		MEWE 6102	Outreach and Internship	14
		SESE 6401	Graduate Seminars	3
Specialty elective course	Renewable Energy Engineering	A student is required to choose at least three (3) courses from the pool of courses (as listed in the Table of Renewable Energy Engineering Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the 70-credit requirement under guidance of a supervisor and head of department or dean of the school		42
	Sustainable Power Generation and Energy Utilization	A student is required to choose at least three(3) courses from the pool of courses (as listed in the Table of Sustainable Power Generation and Energy Utilization Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the 70-credit requirement under guidance of a supervisor and head of department or dean of the school		42
	Smart Grid Technology	A student is required to choose at least three(3) courses from the pool of courses (as listed in the Table of Smart Grid Technology Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the 70-credit requirement under guidance of a supervisor and head of department or dean of the school		42
Sub-total Credits for Semester Total credits				**69**

Semester III & IV

Course Category	Course Ante	Course Name	Credits
Dissertation	SESE 6195	Dissertation	50
Seminars	MEWE 6401	Graduate seminars	6

Credits Mapping for Semester I-IV

S/N	Course Category	Semester I	Semester II	Semester III-IV	Total
1	Common core	10	10	-	20
2	Programme Core	14	14	-	28
3	Programme/Specialty/Elective	28	42	-	70
4	Graduate seminars	3	3	6	12
5	Dissertation	-	-	50	50
Total		**55**	**69**	**56**	**180**

(II) PhD in Sustainable Energy Science and Engineeringby Coursework and Dissertation

Semester I

Course Category		Course Code	Course Name	Credits
Common core		BuSH 6009	Organizational Development and Leadership	10
Programme Core		MEWE 6101	Research Methods and Communication	14
Specialty elective course	Renewable Energy Engineering	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Renewable Energy Engineering Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization under guidance of a supervisor and head of department or dean of the school.		48
	Sustainable Power Generation and Energy Utilization	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Sustainable Power Generation and Energy Utilization Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization under guidance of a supervisor and head of department or dean of the school		48
Graduate Seminar				3
Total Credits for Semester I				**75**

Semester II

Course Category		Course Ante	Course Name	Credits
Common core		BuSH 6010	Economics of Innovation and Entrepreneurship	10
Programme Core		MEWE 7102	Outreach and Internship	14
Specialty elective course	Renewable Energy Engineering	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Renewable Energy Engineering Specialty above) or anywhere else within NM-AIST depending on the		48

		student's area of research and specialization under guidance of a supervisor and head of department or dean of the school.	
	Sustainable Power Generation and Energy Utilization	A student is required to choose at least two (2) courses from the pool of courses (as listed in the Table of Sustainable Power Generation and Energy Utilization Specialty above) or anywhere else within NM-AIST depending on the student's area of research and specialization under guidance of a supervisor and head of department or dean of the school.	48
Graduate Seminar			3
Total Credits for Semester II			**75**

Semester III-VI

Course Category	**Course Code and Name**	**Credits**
Graduate seminar	SES7401: Graduate Seminars	3
Graduate seminar	SESE7401: Graduate Seminars	3
Graduate seminar	SESE 7401: Graduate Seminars	4
Graduate seminar	SESE7401: Graduate Seminars	4
Dissertation	SESE 7195: Dissertation	376

Credits Mapping Semesters I-VI

S/N	**Course Category**	**Semester I**	**Semester II**	**Semester III - VI**	**Total**
1	Institutional common core	10	10	-	20
2	School Common core	14	14	-	28
3	Program/Specialty/Elective	48	48		96
4	Graduate seminars	3	3	14	20
5	Research/dissertation			376	376
Total Credits for the whole program		**75**	**75**	**390**	**540**

(III) PhD in Sustainable Energy Science and Engineeringby Research and Thesis

Semester I

Course Category		**Course Ante**	**Course Name**	**Credits**
Common core		BuSH 6009	Organizational Development and Leadership	10
Programme Core		MEWE 6101	Research Methods and Communication	14
Specialty elective course	Renewable Energy Engineering	A student maybe advised to choose any course(s) as electives to gain skills in particular area of his research interests offered within and/or outside the department/schoolunder guidance of a supervisor and head of department or dean of the school.		-
	Sustainable Power Generation and Energy Utilization			-
	Smart Grid Technology			

Course Category	Course Ante	Course Name	Credits
Graduate Seminar			6
Total Credits for Semester I			30

Semester II

Course Category		Course Ante	Course Name	Credits
Common core		BuSH 6010	Economics of Innovation and Entrepreneurship	10
Programme Core		MEWE 7102	Outreach and Internship	14
Specialty elective course	Renewable Energy Engineering	A student maybe advised to choose any course(s) as electives to gain skills in particular area of his research interests offered within and/or outside the department/schoolunder guidance of a supervisor and head of department or dean of the school.		-
	Sustainable Power Generation and Energy Utilization			-
	Smart Grid Technology			-
Graduate Seminar				6
Total Credits for Semester II				30

Semester III-VI

Course Category	Course Code and Name	Credits
Graduate seminar	SESE 7401: Graduate Seminars	3
Graduate seminar	SESE7401: Graduate Seminars	3
Graduate seminar	SESE 7401: Graduate Seminars	3
Graduate seminar	SESE 7401: Graduate Seminars	3
Dissertation	SESE 7195: Dissertation	468

Credits Mapping Semesters I-VI

S/N	Course Category	Semester I	Semester II	Semester III - VI	Total
1	Institutional common core	10	10	-	20
2	School Common core	14	14	-	28
3	Graduate seminars and Conferences	6	6	12	24
4	Research/Thesis			468	468
Total Credits for the whole program		30	30	480	540

4.3.6 Master's and PhD in Materials Science and Engineering

The programes in Materials Science and Engineering (MaSE) offered by the School of MEWES at NM-AIST aims to develop and strengthen human resources and institutional capacity in impact-oriented training and research in materials science to best utilize the African natural resources. The programs will provide technical competence and critical thinking necessary to utilize modern materials science and engineering to help solve Africa's problems from infrastructure to health care to wealth creation through mineral processing. Fields of concentration may include bioengineering, polymer science, metallurgy, ceramics, electronic, energy, structural materials, and photonic materials. The hands-on project-based curriculum also will include courses in synthesis/processing, properties/structures, design and materials selection heat and mass transfer, electrochemistry and corrosion, biomaterials, composites and computation materials science.

The MSc and PhD ProgramS in MaSE have specializations. Students joining the Master's degree in Materials Science and Engineering (MaSE) at NM-AIST shall be required to complete two (2) institutional common core courses, two (2) school common core courses, at least four (4) courses from the pool of programme core courses, depending on the student's research area; supervisor must guide a student to take relevant courses. The remaining course(s) can be from any school within the institution to fulfil the 70-credits requirement, depending on the student's area of research. The courses can be taken anytime within the timeframe of Master's program whenever a course is offered. Students shall also be required to complete the credits for the Graduate Seminar and doing research throughout the entire period of study. For PhD program a minimum total of 540 credits are required for the award of a PhD degree. The 540 credits will comprise an appropriate combination of lectures, practical, research, independent studies, seminars, tutorials or assignments. Students joining the PhD degree in Materials Science and Engineering (MaSE) at NM-AIST shall be required to complete coursework of minimum 144 credits. The 144 credits comprise two (2) institutional common core courses (each 10 credits), two (2) common core courses at school level (each 14 credits), at least three (3) courses from the pool of programme core, depending on the student's research area; supervisor must guide a student to take relevant courses. The remaining course(s) can be from any school within the institution to fulfil the 96-credits requirement, depending on the student's area of research. The courses can be taken anytime within the timeframe of PhD program whenever a course is offered. Students shall also be

required to complete the credits for the Graduate Seminar and doing research throughout the entire period of study.

Doctorate students at NM-AIST undertaking PhD Programme by Research and Thesis will be required to flexibly take coursework amounting to a minimum of 48 credits during the first two semesters alongside developing the research proposal. The 48 Credits shall comprise an appropriate combination of two (2) common core at institutional level (each 10 credits), and at least two (2) common core at school level (each 14 credits). Students shall also be required to complete the credits for the Graduate Seminar and doing research throughout the entire period of study. A student may be required to take certain courses offered within MEWES or any school to bridge possible knowledge gaps in the respective PhD work as may be recommended by the supervisors and head of department but such courses will not be considered neither for the final degree evaluation nor GPA.

4.3.6.1 Programme Outlines for Materials Science and Engineering (MaSE)

(I) Master of Science in Materials Science and Engineering (MSc in MaSE) by Coursework and Dissertation

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 6102	Outreach and Internship	14

Program specialty Courses

S/N	Course Ante	Course Name	Credits
3.	MaSE 6201	Thermodynamics and Phase Equilibria	14
4.	MaSE 6202	Materials Characterization	14
5.	MaSE 6203	Programming Language in Materials Research	14
6.	MaSE 6204	Physical Metallurgy	14
7.	MaSE 6205	Energy Simulation in Building Design	14
8.	MaSE 6206	Composites Materials	14
9.	MaSE 6207	Instrumentation Techniques in Nuclear Research	14

S/N	Course Ante	Course Name	Credits
10.	MaSE 6208	Nanomaterials Science and Engineering	14
11.	MaSE 6209	Global Technology and Development	14
12.	MaSE 6210	Physical Chemistry	14
13.	MaSE 6211	Environmental Degradation of Materials	14
14.	MaSE 6212	Ceramic Materials	14
15.	MaSE 6213	Fracture Mechanics and Failure Analysis	14
16.	MaSE 6214	Sustainable Energy Resources and Energy Harvesting	14
17.	MaSE 6215	Thermoelectrics	14
18.	MaSE 6216	Solar Energy Systems	14
19.	MEWE 6401	Graduate Seminar	12
20.	MaSE 6400	Dissertation	50

(II) PhD in Materials Science and Engineering by Coursework and Dissertation

The list of courses for the PhD degree in Materials Science and Engineering (MaSE) programme is provided below in terms of course ante, name and credits. With the approval of respective departments, students may choose any courses on offer during the semester, within and/or outside the school.

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6009	Organizational Development and Leadership	10
2.	BuSH 6010	Economics of Innovation and Entrepreneurship	10

Programme Core Courses

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 6102	Outreach and Internship	14

Program Specialty Courses

S/N	Course Ante	Course Name	Credits
3.	MaSE 7201	Advanced Thermodynamics and Phase Equilibria	24
4.	MaSE 7202	Advanced Materials Characterization	24
5.	MaSE 7203	Advanced Composites Materials	24
6.	MaSE 7204	Applied Nanotechnology	24
7.	MaSE 7205	Modern Physical Chemistry	24
8.	MaSE 7206	Modern Ceramics	24
9.	MaSE 7207	Fracture Mechanics and Failure Analysis	24
10.	MaSE 7208	Thermoelectrics	24
11.	MaSE 7209	Modelling and Simulation in Materials Science	24

12.	MEWE 7401	Graduate Seminar	20
13.	MaSE 7400	Dissertation	376

(III) PhD in Materials Science and Engineering by Research and Thesis

A student pursuing a PhD degree in Materials Science and Engineering (MaSE) programme by research and thesis at NM-AIST shall be required to take all common core courses, present graduate seminars, develop research proposal and undertake research work before preparation of a thesis. The list of courses for the PhD degree in MaSE programme by research and thesis is provided below in terms of course ante, name and credits. With the approval of the respective departments, students may choose any courses on offer during the semester, within and/or outside the school.

Common Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6009	Organizational Development and Leadership	10
2.	BuSH 6010	Economics of Innovation and Entrepreneurship	10

Programme Core

S/N	Course Ante	Course Name	Credits
1.	MEWE 6101	Research Methods and Communication	14
2.	MEWE 6102	Outreach and Internship	14
3.	MEWE 7402	Graduate Seminar and Conference	24
4.	MaSE 7400	Dissertation	468

4.3.6.2 Mapping of Courses in Materials Science and Engineering (MaSE)

(I) Master of Science in Materials Science and Engineering by Coursework and Dissertation

The list of courses for the Master of Science in Materials Science and Engineering program is provided below:

Semester I

S/N	Course Ante	Course Name	Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
Program Core	MEWE 6401	Graduate Seminars	3
	MEWE 6101	Research Methods and Communication	14
	A student is required to choose two courses from the pool of courses (as listed above) and one elective course from anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the credit requirement under guidance of a supervisor and head of department or dean of the school		42
Sub-total Credits for Semester Total credits			**55**

Semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6010	Economics of Innovation and Entrepreneurship	10
Program Core	MEWE 6102	Outreach and Internship	14
	MEWE 6401	Graduate Seminars	3
	A student is required to choose two courses from the pool of courses (as listed above) to fulfil the credit requirement under guidance of a supervisor and Head of Department or Dean of the School		28
Sub-total Credits for Semester Total credits			**55**

Semester III & IV

Course Category	Course Ante	Course Name	Credits
Dissertation	MaSE 6400	Dissertation	50
Seminars	MEWE 6401	Graduate seminars	6

Credits Mapping for Semester I-IV

S/N	Course Category	Semester I	Semester II	Semester III-IV	Total
1	Common Core	10	10	-	20
2	Programme Core	42	56	-	98
3	Graduate seminars	3	3	6	12
4	Dissertation	-	-	50	50
Total		**55**	**69**	**56**	**180**

(II) PhD in Materials Science and Engineering by Coursework and Dissertation

Semester I

S/N	Course Ante	Course Name	Credits
Common Core	BuSH 6009	Organizational Development and Leadership	10
Program Core	MEWE 6401	Graduate Seminars	3
	MEWE 6101	Research Methods and Communication	14
	A student is required to choose two courses from the pool of courses (as listed above) to fulfil the credit requirement under guidance of a supervisor and head of department or dean of the school		48
Sub-total Credits for Semester Total credits			75

Semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH 6010	Economics of Innovation and Entrepreneurship	10
Program Core	MEWE 7102	Outreach and Internship	14
	MEWE 7401	Graduate Seminars	3
	A student is required to choose one course from the pool of courses (as listed above) and one elective course anywhere else within NM-AIST depending on the student's area of research and specialization to fulfil the credit requirement under guidance of a supervisor and head of department or dean of the school		48
Sub-total Credits for Semester Total credits			**75**

Semester II-VI

Course Category	Course Ante and Course Name	Credits
Graduate seminar	MEWE 7401: Graduate Seminars	3
Graduate seminar	MEWE 7401: Graduate Seminars	3
Graduate seminar	MEWE 7401: Graduate Seminars	4
Graduate seminar	MEWE 7401: Graduate Seminars	4
Dissertation	MESE 7400: Dissertation	376

Credits Mapping Semesters I-VI

S/N	Course Category	Semester I	Semester II	Semester III - VI	Total
1	Institutional common core	10	10	-	20
2	Program Core	62	62	-	124
3	Graduate seminars	3	3	14	20
4	Research/dissertation			376	376
Total Credits for the whole program		**75**	**75**	**390**	**540**

(III) PhD in Materials Science and Engineering by Research and Thesis

Semester I

Course Category	Course Ante	Course Name	Credits
Common core	BuSH 6009	Organizational Development and Leadership	10
Programme Core	MEWE 6101	Research Methods and Communication	14
	A student maybe advised to choose any course(s) as electives to gain skills in particular area of his research interests offered within and/or outside the department/school under guidance of a supervisor and head of department or dean of the school.		
Graduate Seminar			6
Total Credits for Semester I			30

Semester II

Course Category	Course Ante	Course Name	Credits
Common core	BuSH 6010	Economics of Innovation and Entrepreneurship	10
Programme Core	MEWE 7102	Outreach and Internship	14
	A student maybe advised to choose any course(s) as electives to gain skills in particular area of his research interests offered within and/or outside the department/school under guidance of a supervisor and head of department or dean of the school.		
Graduate Seminar			6
Total Credits for Semester II			30

Semester III-VI

Course Category	Course Ante and Name	Credits
Graduate seminar	MEWE 7401: Graduate Seminars	3
Graduate seminar	MEWE 7401: Graduate Seminars	3
Graduate seminar	MEWE 7401: Graduate Seminars	3
Graduate seminar	MEWE 7401: Graduate Seminars	3
Dissertation	MESE 7400: Dissertation	468

Credits Mapping Semesters I-VI

S/N	Course Category	Semester I	Semester II	Semester III - VI	Total
1	Institutional common core	10	10	-	20
2	Programme Core	14	14	-	28
3	Graduate seminars and Conferences	6	6	12	24
4	Research/Thesis			468	468
Total Credits for the whole program		30	30	480	540

4.4 School of Business Studies and Humanities (BuSH)

The School of Business Studies and Humanities (BuSH) is expecting to offer two programmes (Masters and PhD) in Innovation and Entrepreneurship Management. These programmes have been accredited by Tanzania Commission for Universities (TCU). ** The programmes will run subject to fulfilment of the recommendation from TCU.

4.4.1 Master's and PhD in Innovation and Entrepreneurship Management

4.4.1.1 Programme outline for Innovation and Entrepreneurship Management

(I) Master of Innovation and Entrepreneurship Management by Coursework and Dissertation

Students pursuing studies by coursework and dissertation must successfully complete not less than 180 credits of graded graduate coursework, including preparation of research proposal before proceeding to the research stage. Preparation of the research proposal is part of the coursework for students taking Master's by coursework and dissertation. The credit system shall be used to gauge the workload involved in the programme. Therefore, one credit shall imply 10 hours of lectures, practical, research, independent studies, seminars, tutorials or other assignments. A minimum total of 180 credits are required for the award of a Master's degree. The 180 credits will comprise an appropriate combination of lectures, practical, research, independent studies, seminars, tutorials or assignment for the common, programme, specialty core courses, elective courses (depending on the interest of the student and supervisors' recommendation) and dissertation/thesis.

The School offering a Master's degree programme shall specify core and compulsory courses as well as electives in the various fields of specialization. A candidate may be required to take certain courses that are pre-requisites for the Master's degree award if the candidate is found to have deficiency in the same, as the School may establish. These will not be weighted for the final degree evaluation. The Master's degree programmes for all the candidates shall be 24 months. A candidate shall be allowed to graduate in two years upon meeting all the degree requirements. Students will be allowed to extend studies to a maximum of 3 years, provided there are compelling reasons for the extension and proof of meeting the corresponding costs.

Common Core Courses

	Course Code	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH6008	Technological Innovation and Entrepreneurship Management	10
3.	BuSH 6101	Research Methods and Communication	14
4.	BuSH 6102	Outreach and Internship	14
Total Credits			48

Programme Core Courses

Students are required to study a total of five courses out of the eleven from the list of program core or as may be instructed by the school and accumulate a total of 70 credits. In order to achieve that: all students must study BIE 6101 and BIE 6102, furthermore, with the approval of respective schools, students may choose any other three courses from a prescribed pool of courses within and/or outside the school of BuSH. The courses must ensure the minimum required credit for Masters is reached.

List of Programme Core Courses for the Masters of Coursework and Dissertation

	Course Code	**Course Name**	**Credits**
Programme core			
1	BIE 6101	Strategic Management and Planning	14
2	BIE 6102	Small Business Creation and Development	14
Specialty course for Innovation Management			
1.	BIE 6201	Management of Technological of Innovations	14
Specialty course for Entrepreneurship Management			
1.	BIE 6221	Cooperate Entrepreneurship and Venture Strategy	14
Electives			
1.	BIE 6202	Breakthrough Technology and Product Commercialization	14
2.	BIE 6203	Service Innovation& Platform	14
3.	BIE 6222	Financial Management and Risk Analysis	14
4.	BIE6223	Organizational Behavior	14
5.	BIE 6301	Consumer Behavior	14
6.	BIE 6301	Strategic Marketing Globalization	14
Total Credits			70

4.4.1.2 Mapping of Courses for Master Programme by Coursework and Dissertation

Semester I

Course Category	Course Ante	Course Name		Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics		10
	BuSH 6101	Research methods & communication		14
Programme Core	BIE 6101	Strategic Management and Planning		14
Specialty/Elective	One specialty course and an elective course chosen from a pool of prescribed courses or some core courses on offer within and outside BuSH or as may be instructed by the school.			28
Seminars		BIE 6201	Graduate Seminars	4
Total Credits for Semester I				70

Semester II

Course Category	Course Ante	Course Name		Credits
Common Core	BUSH6008	Technological Innovation and Entrepreneurship Management		10
	BuSH 6102	Outreach and Internship		14
Programme Core	BIE 6102	Small Business Creation and Development		14
Specialty/Elective	One specialty course or an elective course chosen from a pool of prescribed courses or some core courses on offer within and outside BuSH or as may be instructed by the school.			14
Seminars		BIE 6202	Graduate Seminars	4
Total Credits for Semester I				56

Credits mapping for semester I-IV

S/N	Course Category	Semester I	Semester II	Semester III	Semester IV	Total
1	**Common core at institutional level**	10	10	-	-	20
	Common core at school level	28	28	-	-	56
2	**Programme core**	28	14	-	-	42
3	**Graduate Seminar**	4	4	2	2	12
4	**Dissertation**	-	-	30	30	60
Total		70	56	32	32	190

(II) Master of Innovation and Entreprenuership Management by Research and Thesis

Students joining the Master degree in Innovation and Entrepreneurship at NM-AIST shall be required to complete institutional common and programme core courses as indicated below.

Common Core Courses

	Course Code	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH6008	Technological Innovation and Entrepreneurship Management	10
3.	BuSH 6101	Research Methods and Communication	14
4.	BuSH 6102	Outreach and Internship	14
Total Credits			48

4.4.1.3 Mapping of Courses for Master Programme by Research and Thesis

Semester I

Course Category	Course Ante	Course Name		Credits
Common Core	BuSH 6007	Foundation of Law, Philosophy and Ethics		10
	BuSH 6101	Research Method and Communication		14
Graduate Seminars		BIE 6201	Research Seminar and Conferences	4
Total Credits for Semester I				28

Semester II

Course Category	Course Ante	Course Name		Credits
Common Core	BUSH6008	Technological Innovation and Entrepreneurship Management		10
	BuSH 6102	Outreach and Internship		14
Seminars		BIE 6202	Graduate Seminars	4
Total Credits for Semester II				28

Credits mapping for semester I-IV

S/N	Course Category	Semester I	Semester II	Semester III	Semester IV	Total
1	Common core at institutional level	10	10	-	-	20
	Common core at school level	14	14	-	-	28
2	Research Seminar and Conferences	8	8			16
3	Dissertation	-	-	63	63	126
Total		32	32	63	63	190

(III) PhD in Innovation and Entrepreneurship Management by Coursework and Dissertation

Students joining the PhD's degree in Entrepreneurship and Innovation Management at NM-AIST shall be required to complete institutional common core courses, programme core courses as well as elective courses depending on their professional interest and academic qualification.

4.4.1.4 Programme Outline for PhD by Coursework and Dissertation

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH 6008	Technological Innovation and Entrepreneurship Management	10
3	BuSH 7101	Statistics Research Methods and Communication	14
4	BuSH 6102	Outreach and Internship	14
	Total Credits		48
5	*BuSH 6009	Organization Development and Leadership	10
6	*BuSH 6010	Economics of Innovation and Entrepreneurship	10
	Total Credits		20

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008, if they did their Master's degree at NM- AIST*

Programme Core Courses

Students are required to study a total of four courses out of the nine from the list of programme core or as may be instructed by the school and accumulate a total of 96 credits. In order to achieve that, all students must study BIE 7101 and BIE 7102. Furthermore, those who would like to specialize in innovation management should take the course BIE 7202 (National

Innovation Systems and Governance) while those in entrepreneurship management should take the course BIE 7222 (Entrepreneurship for Sustainable Development of small enterprises). With the approval of respective schools/research supervisor, students may choose a minimum of one course from the prescribed pool of programme courses within and/or outside the school of BuSH. The courses must ensure the minimum required credit for PhD is reached.

List of other courses for the PhD programme

S/N	Course Code	Course Name	Credit
Programme core			
1	BIE 7101	Social Entrepreneurship	24
2	BIE 7102	Managing Innovations in Organizations	24
Specialty core			
3	BIE7202	National Innovation Systems and Governance	24
4	BIE7222	Entrepreneurship for Sustainable Development of small enterprises	24
Other courses			
5	BIE 7201	Strategic Imperatives for innovation and Development	24
5	BIE 7221	Global Sustainable Entrepreneurship Marketing	24
7	BIE7301	Marketing Information Systems	24
8	BIE 7302	Knowledge Creation, Development and Management	24
9	BIE 7303	Quality and Operation Management	24
	Total Credits to be accrued		96

4.4.1.5 Mapping of Courses for PhD Programme by Coursework and Dissertation

Semester I

Summary of all courses offered in semester I is presented in below:

Courses mapping for semester I

Course Category	Course Code	Course Name	Credits
Common Core	BuSH6007	Foundation of Law, Philosophy and Ethics	10
	*BuSH 6009	Organization Development and Leadership	10
	BuSH7101	Statistics Research Methods and Communication	14
Programme Core	BIE7101	Social Entrepreneurship	24
Specialty core	One course	Elected based on ones' specialty	24
Graduate Seminars and conference	BIE7401	Graduate Seminars/conference	6
Total Credits for Semester I			78

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008, if they did their Master's degree at NM- AIST*

Courses mapping for semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH6010	Economic of Innovation and Entrepreneurship	10
	BuSH7102	Outreach and Internship	14
Programme Core	BIE 7102	Managing Innovation in Organizations	24
Elective (s)	Minimum of one course	Elected from a pool of prescribed courses or some core courses on offer within and outside BuSH	24
Seminars	BIE7402	Graduate Seminars/conference	6
Total Credits for Semester I			78

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008, if they did their Master's degree at NM- AIST*

Semester III -VI

Courses mapping for semester III – VI

Course Category	Course Ante	Course Name	Credits
Seminars	BIE 7403	Graduate Seminars	2
	BIE7404		2
	BIE 7405		2
	BIE 7406		2
Dissertation	BIE 7900	Dissertation	376
Sub-total Credits for Semester III – VI			384

Credits mapping for semester I-VI

S/N	Course Category	Semester I	Semester II	Semester III – IV	Total
1	Common core	24	24	-	48
2	Programme core	24	24	-	48
4	Elective/specialty	24	24	-	48
5	Graduate Seminar	6	6	8	20
6	Dissertation	-	-	376	376
Total		78	78	384	540

(IV) PhD in Innovation and Entrepreneurship Management by Research and Thesis

Common Core Courses

S/N	Course Ante	Course Name	Credits
1.	BuSH 6007	Foundation of Law, Philosophy and Ethics	10
2.	BuSH6008	Technological Innovation and Entrepreneurship Management	10
3	BuSH7101	Statistics Research Methods and Communication	14
4	BuSH7102	Outreach and Internship	14
	Total Credits		**48**

5	*BuSH 6009	Organization Development and Leadership	10
6	*BuSH 6010	Economics of Innovation and Entrepreneurship	10
	Total Credits		**20**

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008, if they did their Master's degree at NM- AIST*

4.4.1.6 Mapping of Courses for PhD Programme by Research and Thesis

Semester I

Summary of all courses offered in semester I is presented in below:

Courses mapping for semester I

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH6007	Foundation of Law, Philosophy and Ethics	10
	*BuSH 6009	Organization Development and Leadership	10
	BuSH7101	Statistics Research Methods and Communication	14
Research Seminars and Conference	BIE7401	Graduate Seminars/conference	6
Total Credits for Semester I			30

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008, if they did their Master's degree at NM- AIST*

Semester II

Courses mapping for semester II

Course Category	Course Ante	Course Name	Credits
Common Core	BuSH6008	Technological Innovation and Entrepreneurship Management	10
	*BuSH 6010	Economics of Innovation and Entrepreneurship	10
	BuSH 7102	Outreach and Internship	14
Seminars	BIE7402	Graduate Seminars/conference	6
Total Credits for Semester I			30

**Core courses shall be taken by PhD students who have already covered BuSH 6007 and BuSH 6008, if they did their Master's degree at NM- AIST*

Credits mapping for semester I-VI

S/N	Course Category	Semester I	Semester II	Semester III	Semester IV	Total
1	Common core at institutional level	10	10	-	-	20
	Common core at school level	14	14	-	-	28
2	Elective	-	-	-	-	-
3	Research Seminar and Conferences	6	6	6	6	24
4	Thesis	-	-	-	468	468
Total		**30**	**30**	**6**	**474**	**540**

5.0 Fee Structure

NM-AIST is a campus-based Institution providing good social services in order to create a favorable environment for world class academic and research studies. Modest fees are charged commensurate with the homely accommodation and good academic facilities provided. The fees' structure is presented in Table 2 - 5, students from outside Tanzania are required to pay in American dollar (USD).

Table 2: Fees for Master's Students by Coursework & Dissertation and Coursework and Project

		Tanzanian Master's Students (TZS)			Master's Students from EAC/SADC Countries (USD)			Master's Students from NON-EAC/SADC Countries (USD)		
A: DIRECT UNIVERSITY COSTS		**YEAR 1**	**YEAR 2**	**TOTAL**	**YEAR 1**	**YEAR 2**	**TOTAL**	**YEAR 1**	**YEAR 2**	**TOTAL**
1	Tuition Fee	3,850,000	4,450,000	8,300,000	1,833	2,119	3,952	2,750	3,179	5,929
2	Registration Fee	50,000	50000	100,000	25	25	50	50	50	100
3	Medical Capitation	50,000	50,000	100,000	25	25	50	50	50	100
4	TCU Fees	20,000	20,000	40,000	10	10	20	10	10	20
5	Students Union	45,000	45,000	90,000	25	25	50	25	25	50
6	Identity Card	15,000	15000	30,000	7	7	14	10	10	20
	TOTAL DIRECT UNIVERSITY COSTS	**4,030,000**	**4,630,000**	**8,660,000**	**1,925**	**2,211**	**4,136**	**2,895**	**3,324**	**6,219**
B: INDICATIVE DIRECT STUTENTS COSTS										
1	Books and Stationery Allowance	290,000	290,000	580,000	145	145	290	145	145	290
2	Stipend	7,200,000	7,200,000	14,400,000	3,600	3,600	7,200	3,600	3,600	7,200
3	Accommodation*	1,440,000	1,440,000	2,880,000	600	600	1200	600	600	1200
4	Setling allowance	200,000		200,000	95		95	95		95
5	Research Costs**	2,000,000	6,000,000	8000000	1,000	3,000	4000	1,000	3,000	4000
6	Scientific Publications/Patent		600,000	600000		300	300		300	300
7	Dissertation Production		600,000	600000		300	300		300	300
	TOTAL DIRECT STUDENTS' COSTS	**11,130,000**	**16,130,000**	**27,260,000**	**4440**	**8945**	**13385**	**4440**	**8945**	**13385**
	GRAND TOTAL (A+B)	**15,160,000**	**20,760,000**	**35,920,000**	**6,365**	**11,156**	**17521**	**7,335**	**12,269**	**19604**

C: ADMINISTRATIVE FEES FOR STUDENTS WHO EXTEND STUDIES				
1	Registration fees	50,000	25	50
2	TCU Fees	20,000	10	10
3	Students ID	15,000	7	10
4	Medical Capitation	50,000	25	50
5	Students Union	45,000	25	25
	TOTAL	**180,000**	**92**	**145**

Table 3: Fees for PhD Students by Coursework and Dissertation

		Tanzanian PhD Students (TZS)				PhD Students from EAC/SADC Countries (USD)				PhD Students from NON-EAC/SADC Countries (USD)			
A: DIRECT UNIVERSITY COSTS		**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**
1	Tuition Fee	4,650,000	4,500,000	7,000,000	16,150,000	2,214	2,143	3,333	7,690	3,321	3,214	5,000	11,535
2	Registration Fee	50,000	50,000	50,000	150,000	25	25	25	75	50	50	50	150
3	Medical Capitation	50,000	50,000	50,000	150,000	25	25	25	75	50	50	50	150
4	TCU Fees	20,000	20,000	20,000	60,000	10	10	10	30	10	10	10	30
5	Students Union	65,000	65,000	65,000	195,000	31	31	31	93	35	35	35	105
6	Identity Card	15,000	15,000	15,000	45,000	7	7	7	21	10	10	10	30
	TOTAL DIRECT UNIVERSITY COSTS	**4,850,000**	**4,700,000**	**7,200,000**	**16,750,000**	**2,312**	**2,241**	**3,431**	**7,984**	**3,476**	**3,369**	**5,155**	**12,000**
B: INDICATIVE DIRECT STUTENTS COSTS													
1	Books and Stationery Allowance	290,000	290,000	290,000	870,000	138	138	138	414	145	145	145	435
2	Stipend	7,200,000	7,200,000	7,200,000	21,600,000	3,429	3,429	4,000	10,858	3,600	3,600	4,200	11,400
3	Accommodation*	1,440,00	1,440,00	1,440,00	4,320,00	686	686	686	2058	600	600	600	1800

		0	0	0	0								
4	Settling allowance	200,000			200,000	95			95				
5	Research Costs**	2,000,000	6,000,000	7,000,000	15000000	952	2,857	3,333	7143	1,000	3,000	3,500	7500
6	Scientific Publications/Patents		600,000	600,000	1200000		300	300	600		300	300	600
7	Dissertation Production			800,000	800000			400	400			400	400
	TOTAL DIRECT STUDENTS' COSTS	**11,130,000**	**15,530,000**	**17,330,000**	**43,990,000**	**4348**	**8363**	**8857**	**21568**	**4345**	**8645**	**9145**	**22135**
	GRAND TOTAL (A+B)	**15,980,000**	**20,230,000**	**24,530,000**	**60,740,000**	**6,660**	**10,604**	**12,288**	**29552**	**7,821**	**12,014**	**14,300**	**34,135**
C: ADMINISTRATIVE FEES FOR STUDENTS WHO EXTEND STUDIES													
1	Registration Fees				50,000				25				50
2	TCU Fees				20,000				10				10
3	Students ID				15,000				7				10
4	Medical Capitation				50,000				25				50
5	Students Union				65,000				31				35
	TOTAL				**200,000**				**98**				**155**

Table 4: Fees for Master's Students by Research and Thesis

		Tanzanian Master's Students (TZS)			**Master's Students from EAC/SADC Countries (USD)**			**Master's Students from NON-EAC/SADC Countries (USD)**		
A: DIRECT UNIVERSITY COSTS		**YEAR 1**	**YEAR 2**	**TOTAL**	**YEAR 1**	**YEAR 2**	**TOTAL**	**YEAR 1**	**YEAR 2**	**TOTAL**
1	Tuition Fee	3,850,000	4,450,000	8,300,000	1,833	2,119	3,952	2,750	3,179	5,929
2	Registration Fee	50,000	50,000	100,000	25	25	50	50	50	100
3	Medical Capitation	50,000	50,000	100,000	25	25	50	50	50	100
4	TCU Fees	20,000	20,000	40,000	10	10	20	10	10	20
5	Students Union	45,000	45,000	90,000	25	25	50	25	25	50
6	Identity Card	15,000	15,000	30,000	7	7	14	10	10	20

	TOTAL DIRECT UNIVERSITY COSTS	**4,030,000**	**4,630,000**	**8,660,000**	**1,925**	**2,211**	**4,136**	**2,895**	**3,324**	**6,219**
B: INDICATIVE DIRECT STUTENTS COSTS										
1	Books and Stationery Allowance	290,000	290,000	580,000	145	145	290	145	145	290
2	Stipend	7,200,000	7,200,000	14,400,000	3,600	3,600	7,200	3,600	3,600	7,200
3	Accommodation*	1,440,000	1,440,000	2,880,000	600	600	1200	600	600	1200
4	Setling allowance	200,000		200,000	95		8690	95		
5	Research Costs**	3,000,000	5,000,000	8000000	1,500	2,500	4000	1,500	2,500	4000
6	Scientific Publications/Patents	600,000	600,000	1200000	300	300	600	300	300	600
7	Dissertation Production		600,000	600000		300	300		300	300
	TOTAL DIRECT STUDENTS' COSTS	**12,730,000**	**15,130,000**	**27,860,000**	**6240**	**7445**	**13685**	**6240**	**7445**	**13685**
	GRAND TOTAL (A+B)	**16,760,000**	**19,760,000**	**36,520,000**	**8,165**	**9,656**	**17821**	**9,135**	**10,769**	**19904**
C: ADMINISTRATIVE FEES FOR STUDENTS WHO EXTEND STUDIES										
1	Registration fees			50,000			25			50
2	TCU Fees			20,000			10			10
3	Students ID			15,000			7			10
4	Medical Capitation			50,000			25			50
5	Students Union			45,000			25			25
	TOTAL			**180,000**			**92**			**145**

Table 5: Fees for PhD Students by Research and Thesis

		Tanzanian PhD Students (TZS)				PhD Students from EAC/SADC Countries (USD)				PhD Students from NON-EAC/SADC Countries (USD)			
A: DIRECT UNIVERSITY COSTS		**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**TOTAL**
1	Tuition Fee	4,650,000	4,500,000	7,000,000	16,150,000	2,214	2,143	3,333	7,690	3,321	3,214	5,000	11,535
2	Registration Fee	50,000	50,000	50,000	150,000	25	25	25	75	50	50	50	150
3	Medical Capitation	50,000	50,000	50,000	150,000	25	25	25	75	50	50	50	150
4	TCU Fees	20,000	20,000	20,000	60,000	10	10	10	30	10	10	10	30
5	Students Union	65,000	65,000	65,000	195,000	31	31	31	93	35	35	35	105
6	Identity Card	15,000	15,000	15,000	45,000	7	7	7	21	10	10	10	30
	TOTAL DIRECT UNIVERSITY COSTS	**4,850,000**	**4,700,000**	**7,200,000**	**16,750,000**	**2,312**	**2,241**	**3,431**	**7,984**	**3,476**	**3,369**	**5,155**	**12,000**
B: INDICATIVE DIRECT STUTENTS COSTS													
1	Books and Stationery Allowance	290,000	290,000	290,000	870,000	145	145	145	435	145	145	145	435
2	Stipend	7,200,000	7,200,000	7,200,000	21,600,000	3,600	3,600	3,600	10,800	3,600	3,600	3,600	10,800
3	Accommodation*	1,440,000	1,440,000	1,440,000	4,320,000	600	600	600	1800	600	600	600	1800
4	Settling allowance	200,000			200,000	95				95			
5	Research Costs**	4,000,000	8,000,000	6,000,000	18000000	2000	4,000	3,000	9000	2000	4,000	3,000	9000
6	Scientific Publications/Patents	600,000	600,000	600,000	1800000	300	300	300	900	300	300	300	900
7	Dissertation Production			800,000	800000			400	400			400	400
	TOTAL DIRECT STUDENTS' COSTS	**13,730,000**	**17,530,000**	**16,330,000**	**47,590,000**	**6740**	**8645**	**8045**	**23430**	**6740**	**8645**	**8045**	**23335**
	GRAND TOTAL (A+B)	**18,580,0**	**22,230,0**	**23,530,**	**64,340,0**	**9,05**	**10,8**	**11,4**	**3141**	**10,21**	**12,01**	**13,20**	**35,33**

		00	**00**	**000**	**00**	**2**	**86**	**76**	**4**	**6**	**4**	**0**	**5**

C: ADMINISTRATIVE FEES FOR STUDENTS WHO EXTEND STUDIES				
1	Registration Fees	50,000	25	50
2	TCU Fees	20,000	10	10
3	Students ID	15,000	7	10
4	Medical Capitation	50,000	25	50
5	Students Union	65,000	31	35
	TOTAL	**200,000**	**98**	**155**

OTHER COSTS FOR MASTER'S STUDENTS			
	Application Fee	50,000	USD 25
2	Graduation Gown Hiring		50,000 TZS
3	Penalty for Late Registration		50,000 TZS
4	Extra Copy of Transcript		30,000 TZS
5	Replacement of Lost/Damaged certificate		100,000 TZS
6	Progress Report		10,000 TZS
7	Caution Money		300,000 TZS
8	Certification of Certificate/Transcript		5,000 TZS Per Copy
9	Appeal Fee		50,000TZS
10	Dissertation/Thesis Re-examination Fees		350,000 TZS

OTHER COSTS FOR PhD STUDENTS			
1	Application Fee	65,000	USD 32
2	Graduation Gown Hiring		50,000 TZS
3	Penalty for Late Registration		100,000 TZS
4	Extra Copy of Transcript		30,000 TZS
5	Replacement of Lost/Damaged certificate		100,000 TZS
6	Progress Report		10,000 TZS
7	Caution Money		300,000 TZS
8	Certification of Certificate/Transcript		5000 TZS Per Copy

9	Appeal Fee	50,000 TZS
10	Dissertation/Thesis Re-examination Fees	900,000 TZS

OTHER INFORMATION

1 *Costs of accommodation in University Hostels range from 90,000/=to 120,000/= per month.

2 All Tanzanian Students are required to join the National Health Insurance Scheme or any other Health Insurance Scheme legally providing services in Tanzania.

3 Regional and International Students shall be required to have Medical Insurance which covers them within and outside Tanzania.

4 Direct Students Cost are Indicative for minimum costs to provide guidence to sponsors.

5 **Research Costs can be lower depending on the type and needs of the research to be done.

6.0 Academic Staff Profiles

School of Life Sciences and Bioengineering

Core Staff

1. ***Ernest R Mbega***, PhD, Senior Lecturer and **Ag. Dean of the School**

BSc in Agricultural General (Sokoine University of Agriculture, Morogoro, Tanzania); MSc in Crop Science (Sokoine University of Agriculture, Morogoro, Tanzania); PhD in Plant Pathology/Bacteriology (University of Copenhagen, Denmark)

Specialization: Molecular Plant Pathology

Research Interest: Molecular Plant Pathology/Microbiology, Detection and Management of phyto-pathogens, Molecular Biology of Plant-microbe interaction, Microbial Biodiversity, Bio pesticides, Agricultural Biotechnology, Sustainable Agriculture.

2. ***Joram Buza***, PhD, Professor

Bachelor of Veterinary Medicine (Sokoine University of Agriculture); MSc. Veterinary Pathology and Microbiology (University of Nairobi); PhD Veterinary Microbiology (Sokoine University of Agriculture)

Area of Specialization: Immunology, Proteomics, Communicable and non – communicable diseases, One Health.

Research interest: Vaccinology, diseases diagnosis and surveillance, genetic and environmental determinants of communicable and non-communicable diseases.

3. ***Hulda Shaidi Swai,*** PhD, Professor

BSc General University of Dar es Salaam; MSc (Technology and Development in Chemical Engineering) University of London, Imperial College of Science and Technology; PhD in Biomedical Materials Science University of London, Queen Mary &Westerfield College

Specialization: Application of Nanotechnology in medical research (including animal health) – Nanomedicine

Research interest: Use of nanomedicine to improve bioavailability, toxicity solubility and dosage in existing drugs and also can add value in drug discovery programs.

4. ***Martin Kimanya,*** PhD, Associate Professor

BSc in Food Science and Technology (Sokoine University of Agriculture); MSc in Food Science and Technology (Ghent University, Belgium); PhD in Applied Biological Sciences - Chemistry (Ghent University, Belgium).

Specialization: Mycotoxin Risk Assessment, Human Nutrition and Food Safety.

Research interest: Risk assessment and management for chemical toxins (fumonisins, aflatoxins, Deoxynivalenol, food additives, veterinary drug residues, pesticide residues and heavy metals) in food; Nutritional epidemiology.

5. ***Gabriel M. Shirima,*** PhD, Associate Professor

BVM (Sokoine University of Agriculture, Tanzania); MVM in Veterinary Public Health (Sokoine University of Agriculture, Tanzania); PhD in Epidemiology of Zoonoses (Glasgow University, UK).

Specialization: Emerging and re-emerging of infectious zoonoses, One Health

Research interest: Eco One health, Zoonoses, epidemiology and Surveillance,

	management of zoonoses Food safety and AMR.
6.	***Linus Munishi,*** PhD, (D.Phil.), Associate Professor B.Sc. (Hons.) Wildlife Management (Sokoine University of Agriculture); M.Sc. in Natural Resource Management (Sokoine University of Agriculture); PhD (Nelson Mandela Metropolitan University, SA and University of Washington, USA) **Specialization:** Ecology, Conservation Biology, Conservation Genetics, Biodiversity and Climate Change and Natural Resources Management **Research interests:** My research work integrates several aspects including: Ecology, Restoration ecology, biodiversity, conservation genetics, and aspects of environment/Agro-Ecology/biodiversity and sustainable development.
7.	***Athanasia O. Matemu,*** PhD, Senior Lecturer BSc. Food Science and Technology - Sokoine University of Agriculture, Tanzania. MSc. Agriculture (Food Bioscience and Biotechnology) - Shinshu University, Japan. PhD. Agricultural Sciences (Functional Foods) - Shinshu University, Japan. **Specialization:** Food Science; Food Bio/technology, Functional foods **Research interest:** Processing of agro-products/by-products (Post-harvest losses management & value addition). Functional foods for health (Bioactive compounds, Probiotics & Prebiotics) Underutilized food resources: Indigenous food plants, edible/inedible wild mushrooms; wild fruits and vegetables, edible insects. Food safety: microbiological and chemical toxins.
8.	***Neema Kassim,*** PhD, Senior Lecturer BSc Home Economics and Human Nutrition (Sokoine University of Agriculture); MSc and PhD in Food Science and Technology - majoring in Food Hygiene and Safety (Gyeongsang National University-South Korea). **Specialization:** Food safety and Nutrition **Research interest:** Risk assessment and management of chemical contaminants (mycotoxins, heavy metals, and veterinary drug and pesticide residues) in food, WASH and Community Nutrition.
9.	***Musa Chacha,*** PhD, Senior Lecturer Bachelor of Science (Ed) (University of Dar es Salaam, Tanzania); MPhil & PhD in Natural Products Chemistry (University of Botswana, Botswana) **Specialization:** Natural Products Chemistry **Research Interest:** Development of antimicrobial, anticancer and insecticidal agents from medicinal plants, marine invertebrates and microorganisms.
10.	***Mpolya, Emmanuel Abraham,*** PhD, Senior Lecturer BScN (University of Dar es Salaam - MUCHS-Tanzania); MMedSci (Tohoku University Graduate School of Medicine - Japan); PhD (The Graduate University for Advanced Studies - SOKENDAI- Japan) **Specialization:** Biostatistics, Epidemiology, Mathematical Epidemiology, Health Economics and Statistical Programming using R. **Research Interests:** Statistical Design and Analysis, Statistical Programming, Epidemiology (Randomized Trials, Longitudinal repeated-measures analysis, Causal inference analysis), Mathematical Epidemiology, Health Economics (Health Technologies Assessment - HTA).

11. ***Elingarami Sauli***, MD, PhD, Senior Lecturer
BSc in Medicine (St. Petersburg State Pavlov Medical University- Russia); MSc in Biomedicine (Linkoping University –Sweden); PhD in Biomedical Engineering (Southeast University –China)

Specialization: Biomedicine
Research Interests: Molecular epidemiology of cancer and other NCDs, DNA microarrays, Biomarker diagnostics, Maternal and Child Health

12. ***Edna Edward Makule,*** PhD, Senior Lecturer
BSc Food Science and Technology (Sokoine University of Agriculture); MSc Food Technology (University of Ghent and KU-Leuven, Belgium). PhD in Natural Sciences Major in Pharmacognosy - University of Regensburg, Germany.

Specialization: Food Science, and Technology, Pharmacognosy.

Research Interest: Agri-Foods value addition and products development; Post-harvest handling technologies for fruits, vegetables, cereals and nuts; Effect of processing on Agri-foods physical chemical properties, functional properties and Nutrients retention.

13. ***Haikael D. Martin,*** PhD, Senior Lecturer
BSc Home Economics and Human Nutrition, MSc Human Nutrition (Sokoine University of Agriculture), PhD in Life Science and Bioengineering (Nelson Mandela African Institution of Science and Technology, Arusha, Tanzania).

Specialization: Human Nutrition

Research interests: Nutritional management of disease/conditions, Non-Communicable diseases – Diabetes, Hypertension and cancers, Personalized nutrition care, Maternal and child nutrition, Nutrition-Agriculture linkages, nutrition and food systems, nutrition assessment.

14. ***Pavithravani B Venkataramana***, PhD, Post. Doc, Lecturer
BSc Agriculture (University of Agricultural Sciences. Bangalore, India), MSc Seed Science and Technology (University of Agricultural Sciences. Bangalore, India); PhD Seed Science and Technology (University of Agricultural Sciences. Bangalore, India).

Area of Specialization: Seed Technology and Plant Molecular Markers

Research interest: Seed quality testing, Seed enhancement techniques, seed storage studies, Germplasm characterization (morphological and genotypic), Application of molecular markers for crop improvement, cropping systems.

15. ***Sr. John-Mary Vianney,*** PhD, Post-Doc, Lecturer
BSc Biology - Molecular Biology (Dominican University of California, USA);
MSc Biological Sciences - Neurobiology (Western Michigan University, USA);
PhD Biological Sciences - Neurobiology (Western Michigan University, USA).

Area of Specialization: Neurobiology
Research Interest: Neural related diseases in humans (and animals);

- Mechanism(s)underlying neural degeneration (nerve death) and factors enhancing neural regeneration;
- Environmental factors affecting human nervous system;

Non-communicable diseases especially diabetes and cardiovascular diseases in relation to the nervous system.

16. ***Jofrey Raymond,*** PhD, Lecturer
BSc Food Science and Technology (Sokoine University of Agriculture); MSc Life Science and Bioengineering (Food Science and Industrial Biotechnology) at Nelson Mandela African Institution of Science and Technology); PhD in Life Science (Food and Nutritional Sciences) at Nelson Mandela African Institution of Science and Technology.

Specialization: Food and Nutritional Sciences

Research Interest: Nutraceutical products development and commercialization, Novel technologies in food and nutrition, Nutrition and natural health innovations, Climate-smart nutrition innovations, Food systems and environments for better nutrition, Healthcare nutrition innovations and technologies, Maternal, infant and child nutrition innovations, Microbiome and personalized nutrition, Nutritional biochemistry and metabolism, Linear and goal programming in nutrition

17. ***Francis Moyo,*** Ph.D., Lecturer
BSc Forestry (Sokoine University of Agriculture); MSc. Dryland biodiversity (Addis Ababa University); MSc. Environmental forestry and agriculture development (Bangor, UK/Copenhagen University, Denmark); Ph.D. in Biodiversity Conservation (TechnischeUniversität Dresden, Germany)

Specialization: Political Ecology

Research interests: Environmental Justice and Governance, Ecosystem Functions and Services, Restoration Ecology.

18. ***Angela G. Mkindi,*** Ph.D., Lecturer

BSc Environmental Sciences and Management (Sokoine University of Agriculture); MSc. Environmental Science and Engineering (Environmental Science (The Nelson Mandela African Institution of Science and Technology); PhD Life Sciences (Sustainable Agriculture) (The Nelson Mandela African Institution of Science and Technology-Arusha-Tanzania)

Area of Specialization: Agro ecology, Crop pest management.

Research interest: Biodiversity, Sustainable agro ecological crop pest management, in maize/legume systems, Botanical pesticides research, Ecosystem services enhancements in croplands, promoting induced systemic responses in crops using natural products, Antimicrobial activities of natural products on bean disease causing pathogens, Farmer-Research-Networks for sustainable agricultural crop production.

19. ***Issakwisa B. Ngondya,*** PhD., Lecturer
BSc. Wildlife Management (Sokoine University of Agriculture-Tanzania)
MSc. Agricultural Science- Major: Forest Resources (Gyeongnam National University of Science and Technology-South Korea)
PhD. Life Sciences- Major: Biodiversity Conservation & Ecosystem Management (The Nelson Mandela African Institution of Science and Technology-Tanzania)

Area of Specialization: Restoration Ecology

Research interest: Plant community ecology; Restoration of degraded rangelands using nature based approaches

20. ***Akida Ignas Meya***, PhD, Lecturer.
BSc Agronomy (Sokoine University of Agriculture - SUA, Tanzania), MSc Crop

Science (Sokoine University of Agriculture - SUA, Tanzania). PhD in Bioscience Engineering (KU Leuven, Belgium)

Specialization: Agronomy; Biology of Crop Production, Soil Fertility Management, Plant Nutrition, Land Evaluation for Crop Production.

Areas of interest: Integrated soil fertility management in the tropics, plant nutrition, weed biology, plant pathology (mycology) and integrated pest management.

21. **Esther G. Kimaro,** PhD, Lecturer
BVM (Sokoine University of Agriculture, Tanzania); MVS in Veterinary Public Health (Massey University, Palmerstone North, New Zealand); PhD in Veterinary Science (The University of Sydney, Australia).

Area of specialization: One Health, Epidemiology and Surveillance, Participatory epidemiology, Tropical parasitology and Vector-Borne diseases, Animal health management.

Research interests: Spatial epidemiology, Emerging and Re-emerging zoonosis, Climate Change and Infectious diseases, Modeling of infectious diseases, Rapid Risk assessment for animal health threats

22. ***Juliana Godifrey,*** MSc, Assistant Lecturer
BSc Education (Sokoine University of Agriculture); MSc Life Sciences (Nelson Mandela African Institution of Science and Technology – Tanzania)

Specialization: Sustainable Agriculture

Research Interest: Ecosystem services enhancement in cropped land; post-harvest management of storage insect pests; Agro-ecological crop pest management.

*Currently is on study leave pursuing PhD studies at Nelson Mandela African Institution
of Science and Technology – Tanzania.

23. ***Elkana Hezron,*** MSc, Assistant Lecturer
B.Sc. Biology (The University of Dodoma– Tanzania); M.Sc. Biodiversity Conservation (The University of Dodoma– Tanzania)

Specialization: Biodiversity Conservationand Ecosystem Management

Research interest: Sustainable use and management of natural resources, Ecosystem goods, functions and Services, Plants-Animal interactions, Restoration ecology, Population ecology, Genetic conservation, Human-Wildlife interactions and other cross-cutting aspects of biological sciences

*Currently is on study leave pursuing PhD studies at Nelson Mandela African Institution
of Science and Technology – Tanzania.

24. ***Clara Justine Mollay***, MSc., Assistance Lecturer
BSc Home Economics and Human Nutrition (Sokoine University of Agriculture); MSc in Human **Nutrition and Rural Development:** Main subject Human Nutrition (Ghent University, Belgium)

Specialization and Research interest: Human Nutrition, Non communicable diseases, Food quality and safety.

*Currently is on study leave pursuing PhD studies at Nelson Mandela African Institution of Science and Technology – Tanzania.

25. ***Mashamba Lucas Philipo,*** MSc, Assistant Lecturer
BSc in Agronomy (SUA- Tanzania); Masters of Science in Crop Science (Improvement) (SUA- Tanzania)

Specialization: Plant Genetics

Research interests: Crop improvement for abiotic stress tolerance, biotic stress resistance, nutritional quality and other related crop production research for enhancing food security

*Currently is on study leave pursuing PhD studies at Nelson Mandela African Institution
of Science and Technology – Tanzania.

26. ***George Semango,*** MSc, Assistant Lecturer
BSc in Biotechnology and Laboratory science (Sokoine University – Tanzania); Msc in Medical Microbiology, Immunology with Molecular Biology- Coursework (KCMC-Tanzania); MSc in Biomedical Sciences – Human Pathobiology and Infectious Diseases (Radboud University Nijmegen, The Netherlands)
Research interest: Epidemiology and Surveillance of Zoonoses, Molecular diagnostics, HIV and related malignancies

*Currently is on study leave pursuing PhD studies in the School of Life Sciences, Nelson Mandela African Institution of Science and Technology

27. **Richard A. Giliba,** MSc, Assistant Lecturer
BSc Forestry (Sokoine University of Agriculture - SUA, Tanzania),
MSc Human Ecology, Major in Environment and Development (Vrije University Brussels, Belgium); MSc. Advanced studies in Human Ecology, Major in Forest Ecology and Management (Vrije University Brussels, Belgium); MSc Geographical Information Sciences, Major in Spatial Ecology (Lund University, Sweden).
PhD Natural Science, Major in Spatial Ecology-ongoing (Leuphana University, Germany).

Area of Specialization: Spatial Ecology, Landscape and Functional Ecology, Ecological Modelling, Remote Sensing and GIS, Biophysical Data Analysis.

Research Interests: Landscape ecology and connectivity, Biodiversity conservation and management, Species distribution modelling, Conservation modelling, Remote sensing and GIS for natural resources management, and Data science.

*Currently is on study leave pursuing PhD in Natural Science, Major in Spatial Ecology- at Leuphana University, Germany.

Adjunct Professors/Faculty

1.	***Theresa Allen,*** *PhD, Professor* **Affiliation:** University of Alberta; Canada University of British Columbia in Canada.
2.	***Anne F Grobler****, PhD, Professor* **Affiliation:** North-West University in South Africa.
3.	***Person Mnkeni****, PhD, Professor* **Affiliation:** University of Fort Hare (UFH) in South Africa.
4.	***Omowunm Sadik****, PhD, Professor* **Affiliation:** The State University of New York at Binghamton (SUNY Binghamton) - USA.
5.	***Runner R. T. Majindar,*** *PhD, Professor* **Affiliation:** University of Botswana Chairperson NAPRECA.
6.	***Timothy E. Simalenga****, PhD, Professor* **Affiliation:** CCARDESA, Centre for Coordination of Agricultural Research and Development in Southern Africa.
7.	***Frank Boury,*** *PhD, Professor* **Affiliation:** University of Angers (France).
8.	***Wayne Getz,*** *PhD, Professor* **Affiliation:** College of Natural Resources, University of Berkeley, USA.
9.	***Thomas Clemen,*** *PhD, Professor* **Affiliation:** Department of Computer Science, Hamburg University of Applied Sciences Hamburg, Germany.
10	***Ignas Heitkoenig,*** *PhD, Professor* **Affiliation:** Resource Ecology, Wageningen University, The Netherlands.
11.	***Nicky Knox,*** *PhD, Professor* **Affiliation:** Namibian Institute of Science and Technology, Windhoek, Namibia.
12.	***Honorata Masanja,*** *PhD, Professor* **Affiliation:** Ifakara Health Institute.
13.	***Sarah Moore,*** *PhD, Professor* **Affiliation:** Ifakara Health Institute
14.	***Ephraim Changare Njau,*** *PhD, Professor* **Affiliation:** Pharmaceutical consultant
15.	***Robert Madime-Ngolo,*** *PhD, Professor* **Affiliation:** USAID, Uganda
16.	***Joyce Kinabo,*** *PhD, Professor* **Affiliation:** Department of Food Science and Technology, SUA.
17.	***Titus A.M. Msagati,*** *PhD, Professor* **Affiliation:** University of South Africa College of Science Engineering and Technology

18.	***Bernard Elias Chove**, PhD, Professor* **Affiliation**: Department of Food Technology, Nutrition and Consumer Sciences, SUA.
19.	***Joshua Idassi**, PhD, Professor* **Affiliation:** The Cooperative Extension Program at North Carolina Agricultural and Technical State University**.**
20.	***Alexandr Parlesak,** PhD, Professor* **Affiliation:** University College Copenhagen (UCC), Denmark.
21.	***Bruno de Meulenaer**, PhD, Professor* **Affiliation:** Department of Food Technology, Food Safety and Health, Ghent University**.**
22.	***Ali Hassanali,** PhD, Professor* **Affiliation:** ICTP-Italy.
23.	***Sayoki Mfinanga,** PhD, Professor* **Affiliation:** National Institute for Medical Research (NIMR).
24.	***Admire Dube,** PhD, Professor* **Affiliation:** University of the Western Cape in South Africa.
25.	***Festo Kavishe,** PhD, Professor* **Affiliation:** Independent Consultant in Dar es Salaam.
26.	***Henry Laswai,** PhD, Professor* **Affiliation:** Department of Food Technology, Nutrition and Consumer Science, SUA.
27.	***Theobald Mosha**, PhD, Professor* **Affiliation:** Department of Food Technology, Nutrition and Consumer Sciences, SUA.
28.	***Judith Kimiywe,** PhD, Professor* **Affiliation:** Kenyatta University.
29.	***Morris Agaba,** PhD, Professor* **Affiliation:** Uganda.
30.	***Raphael Mrode,** PhD, Professor* **Affiliation**: Scottish Rural College, Edinburgh, United Kingdom.
31.	**Thomas. L. Marsh,** *PhD, Professor* **Affiliation:** Paul G. Allen, School for Global Animal Health, Washington State University
32.	***Lisa. J. Faust,** PhD, Professor* **Affiliation:** Vice President of Conservation and Science, Lincoln Park Zoo, Chicago.
33.	***Hugo de Boer,** PhD, Professor* **Affiliation:** Uppsala University, Sweden.
34.	***Lugano Kusiluka,** PhD, Professor*

	Affiliation: Mzumbe university.
35.	***Isabella M. Cattadori,*** *PhD, Professor* **Affiliation**: Department of Biology and The Huck Institute, CIDD - Center for Infectious Disease Dynamics.
36.	***Michael P Coffey,*** *PhD, Professor* **Affiliation:** Team Leader Animal Breeding and Genomics and Head of Genetic Evaluation Unit.
37.	***Grace Adira Murilla,*** *PhD* **Affiliation:** KALRO-Biotechnology Research Institute.
38.	***Anna Estes,*** *PhD* **Affiliation:** Penn State University, USA.
39.	***Samora Macrice,*** *PhD* **Affiliation:** Dept of Ecosystems and Conservation, SUA.
40.	***James Kahurananga,*** *PhD* **Affiliation:** Previously Botanist at Nairobi Herbarium, Director of Maasai Steppe Heartland.
41.	***Sarah Arnold,*** *PhD* **Affiliation**: Natural Resources Institute University of Greenwich, UK.
42.	***Amos Omore,*** *PhD* **Affiliation:** International Livestock Research Institute (IITA).
43.	***Rachel Santymire,*** *PhD* **Affiliation*:*** Department of Biological Services, Western Illinois University, Macomb, IL.
44.	***Mizeck G. G. Chagunda,*** *PhD* **Affiliation:** Reader in Dairy Science, Hohenheim University, Stuttgart, Germany.
45.	***Sarah Durant,*** *PhD* **Affiliation:** Theme leader and Reader, People, Wildlife and Ecosystems, Zoological Society London.
46.	***Joseph Ogutu,*** *PhD* **Affiliation:** Statistician, Researcher, University of Hohenheim, Stuttgart.
47.	***Margaret Udahogora,*** *PhD* **Affiliation:** University of Maryland-Unites States.
48.	***Akwilina Mwanri,*** *PhD* **Affiliation:** Sokoine University of Agriculture (SUA) Researcher in Human Nutrition
49.	***Akamu Jude Ewunkem,*** *PhD* **Affiliation:** University of North Carolina at Greensboro.
50.	***Francis Muigai Ngure,*** *PhD* **Affiliation:** Cornell University.
51.	***Evelin Geubels,*** *PhD* **Affiliation:** Ifakara Health Institute.
52.	***Nico Govella,*** *PhD* **Affiliation:** Ifakara Health Institute.
53.	***Fredros Okumu,*** *PhD* **Affiliation:** Ifakara Health Institute.
54.	***Grace Wyn Mwangoka,*** PhD **Affiliation:** Ifakara Health Institute.

55.	***Fatuma Manzi,*** *PhD* **Affiliation:** Ifakara Health Institute.
56.	***Salum Abdulla,*** *PhD* **Affiliation:** Ifakara Health Institute.
57.	***Samson Kiware,*** *PhD* **Affiliation:** Ifakara Health Institute.
58.	***Catherine Kreppel,*** *PhD* **Affiliation:** Ifakara Health Institute.
59.	***Dickson Lwetoijera,*** *PhD* **Affiliation:** Ifakara Health Institute.

School of Computational and Communication Science and Engineering

Core Staff

1. ***Shubi Felix Kaijage***, PhD, Senior Lecturer, **Ag. Dean of the School**

   BSc in Electrical Engineering (University of Dar es Salaam, Tanzania), M.Eng in Electrical and Electronics Engineering and Dr. Eng. in Electronics and Information Engineering (University of the Ryukyus, Okinawa, Japan)

   Specialization and **Research Interest**s: Electronics Engineering, Optics and Photonics, Photonic Crystal Fibers/waveguides, Fiber Optics Communications, Terahertz Wave Technology, Fiber to the Home (FTTH), wireless sensor networks-WSN, radio frequency identification-RFID technologies and IoT.

2. ***Verdiana Grace Masanja***, PhD, Professor

   BSc. Science (Mathematics and Physics) (University of Dar es Salaam (UD), Tanzania), MSc. Mathematics (UD), Equalisation MSc. Physics (Technical University of Berlin (TUB), Germany), Dr.-Ing. (Fluid Mechanics) (TUB)

   Specialization and **Research Interest**s: Fluid Dynamics, Applied and Computational Mathematics, Numerical Mathematics, Mathematical modelling, Statistical Modelling, Industrial Mathematics

3. ***Dmitry Kuznetsov***, PhD, Associate Professor

   MSc and PhD in Mathematics (Yaroslavl State University, Leningrad State University, Russia)

   Specialization and **Research Interest**s: Algebraic Geometry; Applied Mathematics; Applied Statistics.

4. ***Anael Sam,*** PhD, Senior Lecturer

   BSc, MSc and PhD in Electronics Engineering (Institute of Electronics and Photonics, Slovak University of Technology, Slovak Republic).

   Specialization and **Research Interest**s: Radio, Multimedia and Mobile Communication Systems; Electronics and Telecommunication Engineering, Software Quality Assurance Engineering; Wireless and Mobile Networks Planning and Optimization.

5. ***Kisangiri Francis Michael,*** PhD, Senior Lecturer

   MSc and PhD in Telecommunication Engineering (Wroclaw University of Technology Poland).

   Specialization and **Research Interest**s: Wireless & Mobile Communications; Computational Electromagnetics and Artificial intelligence.

6. ***Dina Zawadi Machuve,*** PhD, Senior Lecturer

   BSc Electrical Engineering (University of Dar es Salaam, Tanzania), MSc Electrical Engineering (Tennessee Technological University, USA). PhD in Information and Communication Science and Engineering (Nelson Mandela

African Institution of Science and Technology, Tanzania)

Specialization and **Research Interest**s: Data Science; Data Engineering; Bioinformatics; Agriculture Informatics & STEM Education in Schools

7. ***Mussa Ally Dida****,* PhD, Senior Lecturer

   BSc Computer Engineering and Information Technology (University of Dar es Salaam); Msc Telecommunication Engineering (University of Dodoma). PhD in Information and Communication Engineering (Beijing Institute of Technology).

   Specialization and **Research Interest**s: Communication Systems Modelling, Information Technology; ICT for Development.

8. ***Edith Talina Luhanga****,* PhD, Lecturer

   BEng (Hons) Electronic and Computer Engineering (University of Nottingham, UK); MSc Advanced Computing Science (University of Nottingham, UK). Dr-Eng Information Science (Nara Institute of Science and Technology, Japan).

   Specialization and **Research Interest**s: Ubiquitous computing, Human-computer interactions, Artificial Intelligence.

   *On Post-Doctoral Training

9. ***Silas Steven Mirau,*** PhD, Lecturer

   B.Ed in Science majoring Mathematics (University of Dar es Salaam); MSc Technomathematics and Technical Physics (Lappeenranta University of Technology, Finland); PhD in Applied Mathematics and Statistics-Beijing Institute of Technology (BIT), Republic of China.

   Specialization and **Research Interest**s: Modeling of Time series data; Application of Information Geometry.

10. ***Ramadhani Saidi Sinde,*** PhD, Lecturer

    BSc and MSc Engineering and Technologies in Telecommunication (Moscow Technical University of Communication and Informatics), Postgraduate Diploma in Wireless and Mobile Computing (Center for Development of Advanced Computing, India) and PhD in Information and Communication Science and Engineering (NM-AIST).

    Specialization: Electronics and Telecommunication Engineering

    Research Interests: Telecommunications and Informatics; Wireless and Mobile Communication; Wireless Sensor Networks; Internet of Things and Embedded Systems.

11. ***Devotha GodfreyNyambo****,* PhD, Lecturer

    BSc Computer Science (Ruaha Catholic University, formerly Ruaha University College); MSc Information and Communication Science and Engineering (NM-AIST), PhD in Information and Communication Science and Engineering (NM-

AIST).

Specialization: Applied Machine Learning.

Research Interest: Applied Machine Learning, Real-world modeling and Agent-Based modeling and simulations.

12. ***Neema Mduma***, PhD, Lecturer

    BSc in Information Technology (Tumaini University Iringa); MSc Information and Communication Sciences and Engineering (NM-AIST), PhD in Information and Communication Sciences and Engineering (NM-AIST).

    Specialization: Machine Learning Applications

    Research Interest: Applied Machine Learning, Mobile Health and ICT for Development

13. ***Jema David Ndibwile***, Dr Eng, Lecturer

    BSc in Information, Communication Technology (Open University Tanzania); M.Tech Computer Network & Information Security (Jawaharlal Nehru University, India), Dr Engineering in Information Science (Nara Institute of Sceince and Technology, Japan).

    Specialization: Security Algorithm, Human Computer Interactions, Penetration Testing and Vulnerability Assesment

    Research Interest: Developing security algorithms for smartphone, Internet-of-things (IoT), user-centric cybersecurity domains, Machine learning to offer personalized security intervention and decision support.

    **On Leave without Pay*

14. ***Elizabeth Sylvester Mkoba,*** *PhD, Lecturer*

    BSc Computer Science (Osmania University, India); MSc Computer Science in Computer Applications and Technology (Central South University, China); Master's in Business Administration – MBA (The Open University of Tanzania); PhD in Information Technology Project Management (University of Johannesburg, South Africa)

    Specialization and Research Interests: IT project management, IT project audit and assurance, Agile project management, Digital transformation strategy

15. ***Maranya M. Maranya,*** PhD, Lecturer

    B.Ed (Sc) (The university of Dodoma); MSc in Applied Mathematics (2014) and Ph.D in Applied Mathematics (2021), (NM-AIST).

    Specialization: Applied Mathematics

    Research Interests: Disease modeling; Behavior modeling; Prey-predator systems.

16. ***Avik Dutta*,*** M.Tech, Assistant Lecturer, Project Engineer ***CDAC***

    B.Tech Computer Science Engineering (WBUT formally IIIT Kolkata);

    M.Tech Information Technology with specialization in Security and Banking Technology (IDRBT & University of Hyderabad).

    Specialization and Research Interests: Wireless RRM in MAC layer and Machine Learning

    **Pursuing PhD studies at IIIT Delhi, India*

17. **Sanket Mohan Pandhare*,** M.Tech, MBA, Assistant Lecturer, Project Engineer, CDAC.

    B.E Computer Science and Engineering(Chatrapati Shivaji University Kolhapur Maharashtra); Master in Business Adminstration specialized in Information Technology (Savitribai Phule University Pune)

    Specialization and Research Interests: Infrasture Visualization Technologies, System Management and Security, Green Computing Data Centre Management, Network Security,

18. **Lawrence Nehemiah*** MSc, Assistant Lecturer

    BSc Computer Science (Ruaha University College); Master's in Information Communication Science and Engineering (NM-AIST)

    Specialization and Research Interests: Data science, Health informatics, EHRs, Human Computer Interaction, Web and mobile applications.

    **Pursuing PhD studies at University of Antwerp, Belgium.*

19. **Edwiga K. Renald,** MSc, Assistant Lecturer

    BSc in Mathematics and Statistics (Mwenge Catholic University); MSc. Mathematical and Computer Sciences and Engineering (NM-AIST);

    Specialization: Applied Mathematics and Computational Science

    Research Interests: Mathematical Epidemiology (Modelling the Dynamics and Effects of Diseases

    **On study leave pursuing PhD studies*

20. **Sifa Yohana Baseka,** MSc, Assistant Lecturer

    Bachelor of Education in Mathematics (University of Iringa); Master's in Mathematical and Computer Sciences and Engineering (NM-AIST)

    Specialization: Applied Mathematics and Computational Science

    Research Interests: Computational Fluid Dynamics

Adjunct Professors/Adjunct Faculty

1.	***Padmanabhan Seshaiyer,*** *PhD, Professor* **Affiliation**: George Mason University, USA **Specialization and Research Interest:** Computational Mathematics, Computational Biomechanics, Mathematics Education
2.	***Livingstone S. Luboobi****, PhD, Professor* **Affiliation:** Strathmore University, Nairobi, Kenya **Specialization and Research Interest:** Mathematical Epidemiology – Modeling the Dynamics and Effects of Diseases
3.	***Lena Trojer,*** *PhD, Professor* **Affiliation:** Blekinge Institute of Technology, Sweden **Specialization and Research Interest:** ICT for development, Innovation System for Development, ICT and Gender Research
4.	***Thomas Clemen,*** *PhD, Professor, Dr.* **Affiliation:** Hamburg University of Applied, Germany **Specialization and Research Interest:** Computer Science and Engineering
5.	***Karen Bradshaw,*** *PhD, Professor* **Affiliation:** Rhodes University, South Africa **Specialization and Research Interest:** Parallel and Distributed Processing, Cloud Computing, Robotics and Internet of things
6.	***Pirkko Anneli Nykänen,*** *PhD Professor* **Affiliation:** Emerita, Tampere University, Finland
7.	***Jesuk KO,*** PhD, Professor **Affiliation:** Higher University of San Andrés (UMSA), Bolivia
8.	***Anthony Vodacek,*** *PhD, Professor* **Affiliation:** Rochester Institute of Technology (RIT), USA; **Specialization:** Remote Sensing Science and related mathematical modeling
9.	***Ernest Fokoué,*** *PhD, Professor* **Affiliation:** Rochester Institute of Technology (RIT), USA **Specialization:** Bayesian Statistics and Computer Science
10.	***Michel Tchuenche,*** *PhD, Professor* **Affiliation:** The Avenir Health firm in Washington DC, USA; ***Specialization:*** Mathematical Epidemiology
11.	***Matti Heiliö,*** *PhD, Professor* **Affiliation:** Lappeenranta University of Technology (LUT), Finland, **Specialization:** Development of Computational software for road construction and engineering
12.	***Matylda Jablonska- Sabuka,*** *PhD, Professor* **Affiliation:** Lappeenranta University of Technology (LUT) **Specialization:** Techno-mathematics and Financial & Actuarial Mathematics
13.	***Jagdish Prakash,*** *PhD, Professor* **Affiliation:** University of Johannesburg, South Africa **Specialization:** Fluid Mechanics and applications in Engineering problems

14.	***Luzango Pangani Mfupe,*** *PhD (Adjunct Faculty)* **Affiliation**: Council for Scientific and Industrial Research (CSIR); South Africa
15.	***Ciira wa Maina,*** *PhD (Adjunct Faculty)* **Affiliation:** Dedan Kimathi University of Technology, Nyeri, Kenya
16.	***Mvurya Mgala,*** *PhD (Adjunct Faculty)* **Affiliation:** Technical University of Mombasa, Kenya
17.	***Prof. Lazaro Busagala,*** *PhD* **Affiliation:** Director General, Tanzania Atomic Energy Commission, Tanzania

School of Materials, Energy, Water and Environmental Sciences
Core Staff

1. ***Revocatus Machunda**, PhD, Associate Professor* and **Dean of the School**

   BSc. General – Chemistry and Applied Microbiology (Hons.) (University of Dar es Salaam, Tanzania); MSc. Environmental Science (University of Dar es Salaam); PhD. Environmental Science and Engineering (Gwangju Institute of Science and Technology, South Korea)

   Specialization: Environmental Chemistry, Applied Microbiology; Electrochemistry and Catalysis.

   Research Interest: Defluoridation of water supply, Biogas production and filtration, Carbon Dioxide (CO_2) conversion into platform chemicals, Toxicology of Pesticides.

2. ***Karoli Nicholas Njau,** PhD, Professor*

   BSc. Process Engineering (University of Dare s Salaam); MSc. Chemical Engineering (Norwegian Institute of Technology, Norway; PhD Environmental Engineering (University of Technology, Eindhoven, the Netherlands).

   Specialization: Bio-systems Engineering; Water Quality Improvement, Process Design

   Research Interest: Constructed Wetlands for pollution control; Reactor Engineering and Optimization; Smart solutions for environmental management.

3. ***Askwar Hilonga**, PhD, Associate Professor*

   BSc Ed. (University of Dar es Salaam, Tanzania), MSc Chemistry (University of Dar es Salaam, Tanzania), PhD (Hanyang University, South Korea).

   Specialization: Nano materials; Nanotechnology; Materials Characterization

   Research Interest: Application of Nanotechnology and Appropriate Technology for solving real challenges in the society and industry; Materials characterization techniques; relationships between synthesis processes and the properties of the final products; microstructural control to synthesize inexpensive materials with superior properties desired for large-scale industrial production

   Specialization: Structural materials; Material performance under a wide range of conditions

   Research Interest: Characterization techniques and predict the behavior of materials; relationships between synthesis processes and the properties of the final products; microstructural control to synthesize inexpensive materials with superior properties desired for large-scale industrial production

4. ***Kelvin Mark Mtei**, Associate Professor*

   BSc. Agronomy (Sokoine University of Agriculture, Tanzania); MSc. Environmental Science (University of Dar es Salaam, Tanzania); Postgraduate Diploma Biosafety in Plant Biotechnology (University of Ghent); PhD Agricultural Sciences (University of Bonn).

   Specialization: Environmental (Land/soil) pollution; Sustainable Agriculture;

   Research Interests: Agro-environment, soil/land pollution, Soil quality management,

sustainable agriculture, system and site-specific agro-technology application.

5. ***Anna Msigwa,*** *PhD, Lecturer*

Bachelor of Environmental engineering (Ardhi University, Tanzania); Master's in Hydrology and Water Resources Engineering (Nelson Mandela African Institution of Science and Technology, Tanzania)

Research Interest: Impacts of climate change on water resources, soil and crop production, water resources management and rainwater harvesting to improve people's livelihood.

6. ***Hans C. Komakech****, PhD, Senior Lecturer*

BSc. Civil Engineering (Makerere University, Uganda); MSc. Water Resources Management, IHE, Delft; MSc. Water and Wastes Engineering, Water Engineering Development Centre (WEDC) (Loughborough University, UK); PhD. Water Resources Management (IHE, Delft the Netherlands)

Specialization: Water resources management; urban sanitation; irrigation development and governance.

Research Interest: surface and groundwater management; irrigation development and urban sanitation management.

7. ***Yusufu Abeid Chande Jande,*** *PhD, Senior Lecturer*

BSc. Mechanical Engineering (Middle East Technical University, Ankara Turkey) MSc. Mechanical Engineering (Middle East Technical University, Ankara Turkey); PhD in Mechanical Engineering (Hanyang University, Seoul South Korea).

Specialization: Capacitive deionization and Selective laser sintering

Research Interests: Capacitive deionization for desalination, ionic liquids purification, and energy consumption minimization in solvent-based CO2 capture. Production of uniformly porous and graded porous structures using selective laser sintering process.

8. ***Mwemezi J. Rwiza****, PhD, Senior Lecturer.*

BSc Wildlife Management (Sokoine University of Agriculture, Tanzania); MSc Environmental studies and Sustainability Science (Lund University, Sweden); PhD in Earth Sciences and Environmental Engineering (Gwangju Institute of Science and Technology, South Korea).

Specialization and Research Interests: Innovations, Sustainability, Rehabilitation of Mined Lands, Water Chemistry, Environmental Chemistry, Wastewater Treatment, Water Quality Engineering, Adsorption Phenomena, Climate Change and Societal Transformation.

9. ***Thomas T. Kivevele,*** *PhD, Senior Lecturer*

BSc Electro-Mechanical Engineering (University of Dar es Salaam, Tanzania); MSc Mechanical Engineering (Energy) (Tshwane University of Technology, South Africa); PhD Mechanical Engineering (Energy) (Tshwane University of Technology, South Africa)

Specialization: Electro-Mechanical Engineering and Renewable Energy.

Research Interests: Renewable Energy (Solar Energy and Bio-energy), Air-borne emissions in heat and power generation, Utilization of bio waste for fuel applications as well as Bio-materials drying technologies/heat pump drying technology.

10. ***Anita Mukarugaika Rugaika,*** *PhD, Lecturer*

BSc Environmental Sciences and Management (Sokoine University of Agriculture, Tanzania); MSc Environmental Technology and Management (Ardhi University, Tanzania); PhD of Engineering Science in Chemical Engineering (KU Leuven, Belgium).

Specialization: Resource recovery from wastewater, water quality improvement, environmental pollution

Research Interest: Constructed wetlands for pollution control, wastewater treatment and resource

11. ***Juma Rajabu Selemani****, PhD, Lecturer*

BSc. Environmental Sciences and Management (Sokoine University of Agriculture, Tanzania); BSc (Hons) Meteorology (University of Pretoria); MSc. Climate Studies (Wageningen University); PhD Environmental Science (East China Normal University).

Specialization: Environmental Pollution, Climate Change and Water Quality.

Research Interest: Climate Change Impact, Mitigation and Adaptation measures, Water Quality and environmental isotopes.

12. ***Grite Nelson Mwaijengo,*** *PhD. Lecturer*

BSc. (Hons)., Aquatic Environmental Science and Conservation (University of Dar es salaam, Tanzania); MEng., Environmental Engineering **(**Chongqing University); PhD Biology (KU Leuven, Belgium)

Specialization: Aquatic Ecology, River and Wetland Ecosystems Health, Water quality monitoring and assessment and water resources management.

Research Interest: Application of GIS and remote Sensing, and Eco-hydrological tools in the assessment of river and wetland ecosystems, impact of land-use and climate change on water resources, spatial stream network models, landscape ecology and biological assessment of riverine and wetland systems.

13. ***Fina J. Lesafi*,*** *MSc, Assistant Lecturer*

BSc. Ed (hons) (University of Dar es salaam, Tanzania); Masters in Chemistry, University of Dar es salaam

Specialization: Material Science, Physical Chemistry

Research Interest: Structural materials Catalyst

**Pursuing PhD studies at Nelson Mandela African Institution of Science and Technology – Tanzania.*

14. ***Sophia Bakili,*** *MSc, Assistant Lecturer*

BSc Education (hons) (University of Dar es Salaam, Tanzania); Master's in

Environmental Science and Engineering (Nelson Mandela African Institution of Science and Technology, Tanzania)

Specialization: Environmental Science, Renewable Energy-Biomas

Research Interest: Biogas, Biofuel

**Pursuing PhD studies at Nelson Mandela African Institution of Science and Technology – Tanzania.*

15. ***Elizabeth Makauki,*** *MSc, Assistant Lecturer*

BSc Ed, (The Saint Augustine University of Tanzania); Master's in Environmental Science and Engineering (Nelson Mandela African Institution of Science and Technology – Tanzania)

Specialization: Environmental Science, Energy production and purification, Water purification

Research Interest: Clean Energy, Clean water and Nanotechnology

16. ***Ruthi Lorivi Moirana****, *MSc, Assistant Lecturer*

Bachelor of Environmental Science and Management (Sokoine University of Agriculture, Tanzania); MSc Environmental Science and Engineering (Harbin Institute of Technology, China)

Specialization: Water and Wastewater Treatment

Research Interest: Integrated water resource

**Pursuing PhD studies at Nelson Mandela African Institution of Science and Technology – Tanzania*.

17. ***Tusekile Alfredy*,*** *MSc, Assistant Lecturer*

BSc Ed (University of Dar es Salaam, Tanzania); Master's in Materials Science and Engineering (Nelson Mandela African Institution of Science and Technology, Tanzania)

Specialization and Research interest: Energy materials, Desalination methods and materials for water treatment

**Pursuing PhD studies at Nelson Mandela African Institution of Science and Technology – Tanzania.*

18. ***Nelson Simon Mpumi*****,MSc. Assistant Lecturer*

BSc Ed, (Sokoine University of Agriculture, Tanzania) Master's in Environmental Science and Engineering (Nelson Mandela African Institution of Science and Technology, Tanzania)

Specialization: Environmental chemistry, Environmental microbiology and biotechnologies, Environmental pollution, Pesticidal Plants, Environmental Friendly Pesticides, Botanical Pesticides

Research Interest: Water Treatment purification and Environmental Friendly Pesticides!

**Pursuing PhD studies at Nelson Mandela African Institution of Science and Technology – Tanzania*.

19. ***Isack Kandola,*** *MSc, Assistant Lecturer*

BSc. Ed (The Saint Augustine University of Tanzania); Master's in Materials Science and Engineering (Nelson Mandela African Institution of Science and Technology, Tanzania)

Specialization: Energy Materials, Bio gas purification

Research Interest: Molten carbonate fuel cells, biogas upgrading, production, maximization, safety, storage and transportation.

20. ***Masumbuko Semba*,*** *MSc, Assistant Lecturer*

BSc in Fisheries and Aquaculture (University of Dar es Salaam); MSc in Marine Sciences (University of Dar es Salaam).

Specialization: Geographic Information System, Remote Sensing Technology, Spatial & Statistical Analysis, print ready publication layout and graphic designs.

Research Interest: Application of Geo-technology for Resource management, Turning Data into Information, Developing Data Products, Computation Data Analysis, Geo-Design, Graphic Design, Automating and Modeling

**Pursuing a PhD at University of Dar es Salaam*

21. **Gordian Rocky Mataba,** *MSc, Assistant lecturer*

B.Sc. Wildlife Management from Sokoine University of Agriculture (SUA) M.Sc. Marine and Lacustrine Science and Management from Vrije Universiteit Brussel (VUB)-Belgium

Specialization: Areas of specialization and research interests are aquatic ecology (rivers, lakes, oceans, temporary ponds, wetlands), ecotoxicology, environmental monitoring and remediation, fisheries ecology.

Currently doing PhD in Science a sandwich Programme between the Nelson Mandela African Institution of Science and Technology (NM-AIST) and Vrije Universiteit Brussel (VUB) in Belgium. The PhD study explores different strategies to control mosquito oviposition and larval development using knowledge from aquatic ecology and ecotoxicology.

22. ***Gordiana Philipo,*** *MSc, Assistant lecturer*

B.Sc. Electrical and Electric Engineering from National Institute of Technology (NIT) M.Sc. Masters of Sustainable Energy Science Engineering from Nelson Mandela Africa Institute of Science and Technology-Tanzania.

Specialization: Management System for an Isolated Solar Micro-Grid.

Currently doing PhD in Electrical Engineering and Sustainable Energy from Pader Born University, Germany.

Adjunct Professors/Faculty

1. ***WU Hui,*** *PhD, Professor*

	Affiliation: Deputy Director of State Key Laboratories of Estuarine and Coastal Research. ECNU, China
2.	***Pius Yanda,*** *PhD, Proffessor* **Affiliation:** University of Dar es Salaam
3.	***Chary Rangacharyulu,*** *PhD, Professor* **Affiliation:** University of Saskatchewan
4.	***Frederick C. Kahimba,*** *PhD, Eng., Professor* **Affiliation:** Director General, TEMDO
5.	***Tulakemelwa Mhamilawa,*** *PhD, Associate Professor* **Affiliation:** Michigan State University, Michigan U.S. A
6.	***Chicgoua Noubactep,*** *PhD, Associate Professor* **Affiliation**: University of Gottingen, Germany
7.	***Celestin Nzanzu Mudogo,*** *PhD* **Affiliation**: AKA Betzel University of Hamburg, Institution of Biochemistry and Molecular Biology.
8.	***Fidele Ntie-Kang,*** *PhD* **Affiliation**: Chemistry department, University of Buea South West Region, Cameroon
9.	***Charles R. Gervas,*** *PhD* **Affiliation:** Director SAUT –Arusha Centre
10.	***Ben Beeckmans,*** *PhD* **Affiliation**: Member of IAVCEI Director of Ecosciences Ltd.

School of Business Studies and Humanities

Core Staff

1. ***Kelvin Mark Mtei****, PhD, Associate professor* and **Dean of the School**

BSc. Agronomy (Sokoine University of Agriculture, Tanzania), MSc. Environmental Science (University of Dar-Es-Salaam, Tanzania), Postgraduate Diploma Biosafety in Plant Biotechnology (University of Ghent), PhD Agricultural Sciences (University of Bonn)

Specialization: Environmental (Land/soil) pollution; Sustainable Agriculture;
Research interests: agro-environment, soil/land pollution, Soil quality management, sustainable agriculture, system and site-specific agro-technology application

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2. ***Liliane Pasape****, PhD, Senior Lecturer,*

BSc. Animal Science (Sokoine University of Agriculture, Tanzania), MBA International Business (Indian Institute of Foreign Trade, India); PhD Business Administration International Marketing (University of Dar Es Salaam, Tanzania)

Specialization: Business Strategies and Management; Marketing and Commercialization together with Ecotourism Management.
Research interests: International Business Management, Entrepreneurship and Strategic Marketing, Innovation and Technology Management as well as Ecotourism and Sustainable Development.

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3. ***Ahmad Kipacha,*** *PhD, Senior Lecturer*
BA Education (University of Dar Es Salaam, Tanzania), MA Applied Linguistics
(University of Dar Es Salaam, Tanzania); PhD Linguistics, SOAS (University of London, UK)

Specialization: General and Applied Linguistics, Philosophy and Ethics, Academic writing skills, Technical and Business, Communication Skills; Ethnographic Research Methods;
Research Interests: Culture preservation, Indigenous Technology Academic Entrepreneurship and Innovation Systems.

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4. ***Janeth Marwa,*** *PhD, Lecturer*
B.A Office Management (Bugema University, Uganda), MBA Management (Bugema University, Uganda); PhD in Organization Development and Transformation (Cebu, Philippines).

Specialization: Organization change and Leadership
Research Interests: Innovation Leadership, Entrepreneurship, Total Quality Management, Knowledge Management and Natural Resource Management.

5**.** ***Paschal Banga Nade,*** *PhD, Lecturer*
BA with Education, Geography &Linguistics (University of Dar Es Salaam, Tanzania)
MA Demography (University of Dodoma, Tanzania); PhD in Entrepreneurship Education (Sokoine University of Agriculture, Tanzania).

Specialization: Entrepreneurship, Business Communication, Demography, Education.
Research Interests: Entrepreneurship, Business Communication, Population and Development, Strategic Planning, Education, Gender and Development.

6. ***Antony Nyangarika****, PhD, Lecturer*

Diploma of Russian Language and Literature at V.N. Karazina Kharkov National University, Kharkov, in Ukraine

BSc in Economics & Business at V.N. Karazina Kharkov National University, Kharkov, in Ukraine,

MSc in Economical Cybernetics at Kharkov National University of Radio Electronics Kharkov, Ukraine;

Doctor of Philosophy in Applied Economics, Beijing Institute of Technology, Beijing, China;

Specialization: Applied Economics, Energy Economics and Planning, Energy Finance, Frontiers of Development Economics.

Research interests:

Energy Economics, Energy Finance, Climate Policy & Climate Change, Energy Security and Control, Frontiers of Development Economics, Energy Modeling, Carbons Emissions, Energy Efficiency, Energy Economics & Planning, Energy Conservation and management, Applied Economics

7. ***Josephine Joseph Mkunda,*** *PhD, Lecturer*

BSc in Food Science and Technology (Sokoine University of Agriculture, Tanzania); MSc in Agricultural Economics (Sokoine University of Agriculture, Tanzania); PhD in Life Sciences.

Specialization: Human Nutrition and Food Safety, Business Management, Business Development and Entrepreneurship, Business strategy and Innovation,

Research interests: Food Security analysis, Policy Analysis, Value Chain Analysis, Market analysis, Business Model Development.

8. ***Gabriel C. Malima*,*** *MSc, Assistant Lecturer*

BSc. Agriculture General (Sokoine University of Agriculture, Tanzania), MBA Entrepreneurship and Marketing (Tumaini University, Tanzania); MSc. Management of Development – Rural Development and Communication (Van Hall Larenstein University, Netherlands)

Specialization: Management, Entrepreneurship, Innovation and Technology.

Research interests: Technology and Innovation Development, Food Security, Marketing, Entrepreneurship, Public Private Partnerships (PPP) and Natural Resources Management.

*Pursuing PhD studies (School of Management and Economics, Beijing Institute of Technology).

9. ***Emmanuel Stephen Mollel,**** *MSc, Assistant Lecturer*

Bachelor of Business Administration (Mount Meru University, Tanzania), MSc. Entrepreneurship (Mzumbe University-Morogoro, Tanzania)

Specialization: Entrepreneurship and Innovation, Marketing, and Management.
Research Interests: Innovation and Innovation Policies, Entrepreneurship and Marketing.

*Pursuing PhD studies (Management and Economics), Open University of Tanzania.

10. ***Kurwa Guyashi *,*** *MSc, Assistant Lecturer*

Bachelor of Business Administration (BBA) in accounting (University of Arusha), MSc. in Accounting and Finance (Mzumbe University), Certified Public Accountant (The National

Board of Accountants and Auditors Tanzania, and Certified Professional Banker (Tanzania Institute of Bankers)

Specialization: Accounting, Banking and Finance
Research Interests: Financial innovation, financial inclusion, microfinance, management control systems, and entrepreneurship.
*Pursuing PhD studies, university of Dodoma (UDOM)

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13. ***Kulwa Mang'ana *,*** *Assistant Lecturer*

Bachelor of Cooperative Management and Accounting (Sokoine University of Agriculture; MuCOBS, Tanzania), Masters in Business Management (Moshi Cooperative University - MoCU)), Procurement and Supply Management Foundation certificate (PSMFC), Professional level (III) certificate - Graduate Category (PSTPB), Associate Certified Public Accountant, ACPA(T) (National Board of Accountants & Auditors)

Specialization: Accountancy and Business Management
Research Interest: Financial literacy, Entrepreneurship Innovation and Business Management
*Pursuing PhD studies (Agribusiness), Sokoine University if Agriculture-SUA

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11. ***Apaisaria A. Nyange. MA, Assistant Lecturer.***

Diploma in Science Education (Monduli Teachers' College, Tanzania), Bachelor of Education specializing in Accounting and Management (University of Arusha, Tanzania) and MA Educational Management and Leadership (University of Arusha, Tanzania).

Specialization: Business Management, Management and Leadership, Educational Administration.

Research Interests: Innovation Leadership, Organization Management and Educational Administration.

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12. ***Njile Shashi, MSc.*** *Assistant Lecturer*
Bachelor of Science (BSc) in Agricultural Economics and Agribusiness (Sokoine University of Agriculture), MSc. in Agricultural and Applied Economics (Sokoine University of Agriculture).
Specialization: Applied Agricultural Economics, Agribusiness Management, Natural Resources Management
Research Interest: Resource (Land & Water) Use Efficiency; Policy Analysis (PE, CGE Modelling); Technology Adoption and Sustainable Agricultural Intensification; Institutional Economics: Agric. Market Development; Food Security and Livelihood Strategies; Economics of Research and Development.

Adjunct Professors/Faculties

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1. ***Jerman Rose****, PhD, Adjunct Professor*
Affiliation: Washington State University-USA

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2. ***Conrad Shayo****, PhD, Adjunct Professor*.

	Affiliation: California State University, San Bernardino-USA.
3.	***Daniel Brockington,*** *PhD, Adjunct Professor* **Affiliation:** University of Sheffield-UK
4.	***Nicas Yabu,*** *PhD, Adjunct faculty* **Affiliation:** Principal, Bank of Tanzania Training Institute, Team Leader of Transformation Team of BOT Training Institute, Manager Research Department - Bank of Tanzania
5.	***Simeon Peter Sungi,*** *PhD, Adjunct Professor.* **Affiliation:** United State International University- Africa.
6.	***Wineaster Anderson****, PhD, Adjunct Professor* **Affiliation:** University of Dar Es Salaam
7.	***Martin T. Walsh,*** *PhD, Adjunct Professor* **Affiliation:** Wolfson College, University of Cambridge-UK
8.	***Simmy M. Marwa****, PhD, Adjunct Professor* **Affiliation:** University of Dedan Kimath, Nairobi-Kenya.
9.	***Raymond Sambuli Mosha****, PhD, Adjunct Professor.* **Affiliation:** Mount Meru University-Tanzania.
10.	***Sarone Ole Sena****, PhD, Adjunct Professor* **Affiliation:** MS Training Centre for Arusha Development Cooperation-Tanzania (MSTCDC)
11.	***Eliaman Laltaika****, PhD, Adjunct Faculty* **Affiliation:** Hon. Judge, High Court of Tanzania
12.	***Bakari George,*** *PhD Adjunct Faculty* **Affiliation**: Tengeru Institute of Community Development-Tanzania.
13.	***Emmanuel Constantine Lupilya***, *PhD Adjunct Faculty* Affiliation: e-Governance Agency-Tanzania.
14.	***Bukaza Chachage,*** *PhD, Adjunct Faculty* **Affiliation:** Open University of Tanzania.
15.	***Vicensia Shule,*** *PhD, Adjunct Professor.* **Affiliation:** University of Dar Es Salaam-Tanzania.
16.	***Claire Kelly****, PhD, Adjunct Faculty* **Affiliation:** Plymouth University, Drake Circus.
17	**Chris Mauki**, *PhD, Adjunct Faculty* **Affiliation:** University of Dar-es-Salaam
18.	**Charles Sokile,** *PhD, Adjunct Faculty* **Affiliation:** Oxford Policy Management OPM Tanzania
19.	***Florence Rutechura****, PhD, Adjunct Faculty* **Affiliation:** University of Dar-es-Salaam
20.	***Manongi C. Ntimbwa****, PhD, Adjunct Faculty* **Affiliation:** College of Business Education
21.	**Donath R. Olomi,** *PhD, Adjunct Faculty* **Affiliation:** Institute of Management and Entrepreneurship Development Dar-es-Salaam
22.	***Christine Noe****, PhD, Adjunct Professor* **Affiliation:** University of Dar-es-Salaam
23.	***Antoni Keya,*** *PhD, Adjunct Faculty*

Affiliation: University of Dar-es- Salaam

24. ***Epaphra Manamba*** *PhD, Adjunct Professor.*
Affiliation: Institute of Accountancy Arusha

25. ***Fransisca Marie Beer****, PhD, Adjunct Professor*
Affiliation: California State University

26. ***Elisante Ole Gabriel,*** *PhD Adjunct Professor*
Affiliation: Executive, High Court of Tanzania.

27. ***Tobias Alois Swai*** *PhD, Adjunct Faculty*
Affiliation: University of Dar-es-Salaam

28. ***Stephano Ponte,*** *PhD, Adjunct Faculty*
Affiliation: Copenhagen Business School, Denmark

29 ***Joseph J. French,*** *PhD, Adjunct Professor*
Affiliation: University of Northern Colorado

30. ***Charles Raphael,*** *PhD, Adjunct Faculty*
Affiliation*:* University of Dar-es-Salaam