Better Edcuation
Better World

FACULTY OF MEDICAL LABORATORY SCIENCES

Undergraduate & Graduate

PROSPECTUS

National University - Sudan

5TH EDITION JULY 2024 - JUNE 2028

NU.EDU.SD

National University

5th Edtion July 2024 - June 2028

Copy Right

National Library Cataloging - Sudan
38. 190624 National University N.p
Prospectus National University/National University 3rd ed. - Khartoum: National University : 2015-06-05
95 p.: ill: 30 cm
ISBN: 978-99942-841-1-8
1 National University-Sudan - Directory.
A. Title
B. Qurashi M. Ali (E.D)

Disclaimer:

Neither the National University, nor any of its administrators or staff, shall be liable to and person or entity with respect to any loss or damage, or alleged to be caused, by the information contained or omitted form this publication

Welcome

Note from The President of NUSU

[www.nu.edu.sd]

01

This is the 5th Edition of the PROSPECTUS of the National University-Sudan (NUSU). In this document registered students will find information about the mission, vision and values of NUSU, and all programme details and activities. This edition includes both UNDERGRADUATE and GRADUATE course outlines. NUSU aims at high-class education in medical, technological and social sciences. This is reflected in this comprehensive outline. It describes the basis of NUSU's educational philosophies, programme objectives including the characteristics of the graduate, strategies and methods, degree structure, semester duration and credit hour load, and brief outline of content. This represent a narrow window into the complex organization of NUSU. More information on the rationale of modules, behavioural objectives, and assessment can be found in the curriculum of each Faculty. The calendars, year plans and timetables are issued for each semester with the exact dates for teaching sessions, other learning opportunities, assessment, feedback, and holidays.

NUSU is now 19 years old. It is still developing, and trying to set traditions of availing all activities in its publications, that may remain relevant for 3-4 years, before new editions are issued. The councils and committees of NUSU, while compiling this, are drawing their experience from lo-

cal and worldwide, up-to-date educational practices. Concurrently, other documents (Student Manual, Staff Handbook, Induction packages, and policies and procedures) are re-written and updated, in view of the emerging concerns about student welfare, environment, students with special needs, and virtual online educational resources.

There is a strong focus on synergy between modern education, developmental needs, and employment market requirements. This has laid down a wide area of maneuvers in the choice of specific disciplines and modules. In each discipline, a detailed career advice has been added in this edition to show students the opportunities available if they choose to be employed or opt to start their own business to employ others.

The reputability of NUSU has attracted students from about 25 countries and all continents. This representation requires quality of premises and services, as well as understanding of diversity, inclusiveness, and considerations for non-discrimination in the educational activities and campus life. International students and the Sudanese students whose families are living outside Sudan, receive special induction, supervision, and directives by the Deanship of Student Affairs, and regular courses shown in this prospectus as Sudanese Studies.

It is my pleasure to invite all qualified students to join NUSU's exciting new and innovative educational programmes. Students, parents, and sponsors are welcome to visit the campus. They will receive guidance from the HELP DESK at the Main Gate. They will be escorted to buildings and connected with the leadership of the university or faculties. Our primary target is to create guest satisfaction. Your comments and feedback are important for us to continue improvement to meet our goals.

Last, but not least, we would like to invite our higher education colleagues, inside and outside the Sudan, to read this publication. Our special request: please have a critical look at this and show us our faults. You may suggest means of correcting them, and tell others about the positive and bright spots of this attempt. Your advice will be highly appreciated.

Prof. Qurashi M. Ali PhD, MD, FRCPE
President, National University, Sudan

www.nu.edu.sd

ACKNOWLEGEMENTS

02

Worldwide, the overall innovations and their modifications stem from the efforts of Professor Bashir Hamad. Every page of our documents could not be finalized, or brought to fruition, without his fatherly approval and comments or traces of his educational spirit. His direct and indirect contributions to the curriculum of this University and continuous encouragement are gratefully acknowledged, particularly those related to educational strategies, instruction, and evaluation. The following have reviewed and reorganized the final versions of this prospectus: Prof. A/Rahman Eltom MD,PhD, Prof. A Rahman Biri MD FRCP, Prof. Elthami Abdul Mageed PhD, (medicine), Hassan M. Ali PhD, Dr. Ahmed Abusham PhD and Dr. Salah Ibrahim PhD, and Dr. Fatma Mukhtar MSc. (pharmacy), Dr. Kamal Khalil MD.Dr. Elfatih A Mageed MD (physiotherapy), Dr. M. A. Siddiq PhD. Prof. Awad Haj Ali PhD. (computer and health informatics program), Prof. Ibrahim Ghandor and Dr. Abdalla Darous, Dr. Enas Badawi PhD, Dr. Arif Affan (dentistry), Prof. Sayda H. Elsafi MD, PhD and Dr. Nihal Mirza MD, Dr. M. Sirelkhatim, Dr. M. Abdelgadir, Dr. Maha Magoub (medical laboratory sciences), Dr.Abdel Moneim Saeed PhD, Dr. M. A. Elsheikh PhD Dr. Elsir Ali Saeed PhD, Dr. M. Elfadil PhD, Prof.Maha Esmeal (imaging technology), Prof. Awatif Ahmed PhD, and Ms. Fatma Bhruddin MSc, Dr. Sumia Ibrahim PhD (nursing and midwifery), Prof. Salih Faghiri PhD, Prof. Omer Elmagli PhD, and Prof. Hassan Kamal PhD, Dr. M. A. Osman, Dr. Mutaz Suliman, Dr. A Azim Almahal PhD, and Prof. A Gadir M. Ahmed PhD (management sciences). The contributions of Dr. Nadir Hasanain {Engineering) , Prof. A Latif Elboni and Dr. Ibrahim Mirghani (International Relations) are outstanding.The list, of those who, knowingly or unknowingly, contributed curricular details or ideas registered in Editor's memory or documents, is exhaustive. Our thanks are to the following professors: A/Hameed Lutfi, M.Y. Sukkar, Elbagir Ali El Faki, Amir El Mubarak, Omar Abdul Aziz, Othman Taha, Othman Khalafalla, Ali Habbour, Omar A. Mirghani, Awadelseed Mustafa, Mubarak Majzoub, M. Awadalla Salih, Hafiz El Shazali, Jaafar M. Malik, Othman Hamour, Ali Karar, A/Alla A/Wahid, El Tayeb Abdul Rahman, Eisa Othman El Amin, Mamoun Homeida, Hassan M. Ahmed, Ali Abdul Rahman Barri, Ibrahim M. A/Rahim, Ahmed A. Muhammadani, Mukhtar El-Khatim, A/Rahman A/Hafeez, Sayed M. Ahmed, Awad A/Rahman El-Awad, M. Elamin El-Sharif, Kamal Zaki, A/Rahman El-Tom, Ghazi Salahuddin, Bakri Osman Saeed, Mohyddin Majzoub, Jamal Suleiman, Abbas ElKarib, ElGamri ElRadi, Salah M. Omer, Majid Mustafa, Muzamil Hassan A/Qadir, M. A/Rahim A/AAl, Khalid Musa, Bakri Musa Abdul Karim, Tahir Othman Ali, Omar Siddiq, Fathel Rahman Ahmed Ali, A.Moneim Sahal, Omar Habbal, Mickell Seefldt, Ara Tekian, Margaret Uguroglu, Saleh A. Al Damegh, Zeinel Ab-

deen Karar, A/Rahman Eltom, Ahmed Fahal, Kamal Qurashi, Ammar Khamis, Elamin I. Eneima, Elsheikh A Elobeid, Sara M. Husein, Abubakr Suliman, Elfatih A/Majeed, Mabyua Mustafa, Mustafa Idris, Amin O Sidahmed, Ammar Eltahir, Mr. Suleiman M. Dafa'Alla, Salah Faraj, and many more, we will add them as soon as we are reminded. There is no intention of omission of any effort or opinion.

Most of the "Dentistry Curriculum" has been adapted, with permission, from experts all over the world, mainly deans and heads of departments in the Sudanese dental colleges, and institution in dental sciences. The outstanding effort of professors Ibrahim Ghandour, Yahya Eltayeb, Ibrahim Elkamil, Osman Elgindi, Ahmed Suliman, Abbas Ghariballa, Nadia A. Yahia, Elnur Ibrahim and the improvements made by Enas Badawi, Eman Khair, and Suha A/Gadir is gratefully acknowledged.

The Engineering curriculum has been designed by committees headed by Dr. Nadir Hasanain as dean and head of civil department, and valuable contributions by Prof. Seifeldin Sadig. The International Relations and diplomatic studies curriculum has been written first by Dr. Ibrahim Mirghani and has been edited and adapted to the national requirements by Prof. A Latif Albouni and Bakri A/Karim.

The whole idea could not have seen the light without the encouragement of the Investors' Corporation and Board of Trustees of the National University, who spend days every week responding to routine and emerging issues of financing. On their behalf, I would like to thank the genius and friendly contribution of Mr. Zahir Twahry for his artistic preparation of the 3rd and 4th editions and other NUSU publications. The final editing of most of the undergraduate manuscripts has been skillfully and patiently carried out by Prof. A Rahman Osman Beeri Former Secretary of Academic Affairs. The graduate prospectus has been compiled by Prof. M. M. A. Abulnur, Dean of Graduate Studies and Scientific Research, and Dr. M. Abd Al Kader and Dr. Hatem Al Rufaai.

WHAT IS THE NATIONAL UNIVERSITY?

03

1. MISSION, VISION AND VALUES

The **VISION** of the National University is to be a world-class leading provider of private higher education in the Sudan, in the aspects of elegance of environment and structures, excellence of curricula and learning strategies, quality of management systems, commitment of investors and employees to customer satisfaction (students, relatives, and regulators), distinguished graduates in academic achievements, general ethical standards, and concern with professionalism and original research production.

The **MISSION** is to: (1) constantly strive to provide efficient and best-in-class professionals, in their specialties, (2) meet and exceed our customer needs and expectations, and (3) stay ahead of the competition by creating safe and rewarding workplace facilities and innovating new quality output, services, and relationships in transparent, honest, and fair business.

The **VALUES** are : (1) obligations to treat the public and one another with personal and professional integrity, consideration, and mutual respect, (2) commitment to honesty, truthfulness, respect for human dignity, and professional ethical behaviour, (3) fair treatment of all citizens and employees, with no discrimination on the basis of morphology or ideology (4) promotion of democratic values, hard work, perseverance, commitment to success, accepting responsibility and accountability for one's conduct and obligations, and (5) creating and maintaining a respected reputation and positive image in the community as a trusted partner through excellent care of the individual and family, and responsibility towards the community and environmental problems and concerns.

2. DOCUMENTS

The legal documents of the University include: (1) the University Charter, (2) Academic Regulations (3) Rules of Activity and Conduct (4) Study Fees' Regulations, (5) Employment Regulations, (6) National Employment Penalty Regulations, (7) Contracts and Salary Scale, (8) Job Descriptions, (9) Staff Handbook, (10) Students' Manual, (11) Quality Manual, (12) Teaching, Learning and Assessment Policy, (13) Prospectus and Curricula, (14) Organizational Chart, (15) Committee Structure, (16) Logbooks of students' skills and activities, (17) Year Plans, (18) Academic Calendars, (19) Programme Evaluation Forms, (20) Portfolio of Architectural and Structural Designs of Buildings, (21) External Examiners' Appointment, Reporting and Response documents and (22) numerous policies and procedures in areas of quality, safety, and non-discrimination.

3. BOARD OF TRUSTEES

The Board of Trustees (BOT) is formed according to the Charter to include the investors, the academicians, the representative of the Ministry of Higher Education, and public figures of interest in education or eminent individuals involved in social accountability issues of universities. The current BOT is chaired by Dr. Taha Eltayeb A. Elimam, and includes in its membership: Prof. Qurashi M. Ali, Dr. Amin O. Sidahmed, Dr. M. Sirelkatim Ali, Prof. A-Rahman Osman Beeri, Prof. Osama A-rahman Elamin, Eng. M. Awadelkarim Elgasim, Dr. Saad Subahi, Dr. Elhadi Bakheet, Eng. Yousif A. Yousif, Prof. A-Moneim Algousi, Dr. Ismail Qurashi, Prof. Hassan M. Ali, Deans of faculties, and representatives appointed by the Ministry of Higher Education and approved by the President of the Sudan.

4. RIGHTS

4.1 GENDER RIGHTS

Throughout this manual (and the webpage) every effort has been made to use he/she, his/her, him/her. It may not be possible to assure that this fair use has been consistent. Any such unintended mistake should be taken to mean both sexes. Females have been addressed in situations of special concerns, in gender-specific issues, mainly out of respect for their specialized roles.

4.2 EXCLUSION OF LIABILITY AND DISCLAIMER

Throughout this manual (and the webpage) every effort has been made to ensure that expert, accurate, and up-to-date guidance has been included. The administrative and academic authority continuously updates the NUSU data and academic regulations to satisfy the emerging needs, more quickly than publications would reflect. Approved changes are shown at the official noticeboards of the University. Accordingly, neither the Ministry of Higher Education, nor the NUSU administration, shall be liable to any person or entity with respect to any loss or damage caused or alleged to be caused by the information contained or omitted from this manual (or the webpage).

4.3 COPYRIGHTS

a. The curriculum timetable and course details resemble many of those (or may contain parts) in other colleges in which the "President of NUSU" has been the main or essential member in the bodies responsible for curriculum design and evaluation. In many institutions he has been one of the driving forces for innovation. These institutions include: University of Gezira (Sudan), Sultan Qaboos University (Oman), Omdurman Islamic University, Alzaeim Al-Azhari University, University of Medical Science and Technology, African International University, National Ribat University, Al-Razi University (Sudan), and Al Qassim University (Saudi Arabia). Major innovations have been added to improve on the experience of the above institutions. This manual (and the webpage), in addition to comprehensive compilations in each program document (to be given to each student) is an entity of its own. Therefore, the total set of details, which is not available in any other institution so far, may not be

copied or published without written permission from the National University- Sudan.

b. The teaching material available in the webpage, and other published material in the University notes, is original and should not be reproduced for commercial use, in any form without written permission of the National University- Sudan. Non-profitable teaching purposes are allowed. Our teachers and colleagues, who are mentioned in the "Acknowledgements", are free to use this material because it is all from them, we could not single out what is ours from theirs.

5. ENTRANCE REQUIREMENTS

A. Applications must be through the Ministry of Higher Education (Sudan) Admission Directorate, based on passing a fresh Sudan (or equivalent) School Certificate or equivalent qualification (please see relevant booklets provided at that office). Older 5-10 years' School Certificates may be considered, if vacancies are there, and details are approved by the Admission Office. The newly introduced online application dismiss disqualified applicants automatically.

B. Direct applications are welcome, but will be entered online by the University to the Admission Directorate for approval.

C. International applications will be processed similarly, but candidates are advised to follow the application procedure in the webpage, and wait for a response, before arriving in the Sudan. The NUSU Administration takes 5 working days (after receipt of application) to finalize acceptance. Electronic communication is preferred. For security reasons. A student who is granted acceptance by the NUSU will NOT be allowed by the Ministry of Internal Affairs to transfer to any other university after arrival, except after studying and passing, at least, one academic year..

D. Mature students qualified with a previous health science professional degree may be considered. In this case early application is recommended (6 months before national intake in September every year), because of the time it may take for the approval of the School Certificate by Ministries of General Education and Higher Education, Sudan.

E. Final decision on acceptance depends on the results of an interview to confirm if the student has the aptitude to join a specialty, and is free from physical and psychological inabilities that are not compatible with the responsibilities of a specific or hardship profession. But individuals with special needs are welcome and will find NUSU a conducive environment of values against discrimination.

F. Transfer NUSU from other universities may be considered for enrollment in Semesters 2, 3, 4 or 5 only, based on the approval of the General Directorate of Admission in the Ministry of Higher Education.

6. STAFF AND RECRUITMENT

Academic and administrative staff interested in joining the National University-Sudan, may show their intention by filling the e-recruitment form included in the webpage. A response will be sent

by e-mail within 48 hours, and further instructions will follow. Appointment of academic staff is based on academic excellence in the areas of research and teaching. Academic applicants with no research records or grants will not be considered for full-time positions in this university. Full- and part-time staff list may be looked up in Academic Staff section of the webpage.

Applicants interested in joining other private educational institutions in the Sudan can reach them through our web-page. The employment conditions and salary scale are not (currently) available in this manual or website.

7. LOCATION AND MAPS

A. The Country: The best advantage of this National University is that it is located in Sudan, an Afro-Arab country with rich human and natural life resources. The inhabitants are either Arabs or Africans.. The Sudan educational institutions are known, worldwide, for their academic excellence, ethical heritage and professional teaching perfection. A Sudanese national, wherever he/she may be is unique in considerateness, courtesy, and hospitality. In almost 80% of the country, it is the safest in the world. A single lady can jog in Khartoum, or any other city, in the middle of the night unbothered. Sudanese abide voluntarily by strong moral codes and respect for females as foreigners. The media-nourished concepts of North-South or West-East conflicts have largely exaggerated the reality. The color of people has no significance in this country, maybe the only country in the world where color has never and can never be a real cause of conflict. Media are prototyping other countries' dilemmas on a local setup that has got some developmental problems. It is interesting that the Arabs in this country are mainly non-white, and the non-Arabs are not necessarily black, contrary to what the media have publicized. The luckiest person in the world, any moment, is the one who has been received by a Sudanese host.

Prot Sudan

Khartoum

B. The City: The capital is Khartoum, a city made up of three cities striding the White Nile, Blue Nile as they join to form the River Nile. This has given it unique panoramic landscapes and scenery. There are about 4-6 million inhabitants, mostly in traditional houses, known for their spacious yards. Khartoum city is the official capital crowded with governmental offices, ministries, embassies and international organizations. There are some affluent districts where the price of a house may be as expensive as in New York or Tokyo, and other areas of modest housing. Therefore students have a wide range of choice. Transportation used to be a problem, now it is quite easy, but still, students are advised to find accommodation as near as possible to the University premises.

C. Premises and Environment : (See map). The National University permanent building is located in the Eastern part of Khartoum called Al Raqi District, near the Khartoum-Medani Highway, in an affluent newly established residential area. This region has an interlacing and frequent network of transport, yet the wide roads give no impression of crowdedness, or noise pollution. This accessibility is an invaluable asset for an educational institution. The University block, a purpose-built structure, assumes a masterpiece of architectural innovation (see pictures). The National University is open to students and staff for 18 hours on weekdays and 6 hours on weekends. The library, self-directed learning facilities are available for registered students and staff. Limited access to research laboratories is allowed for certain students who are involved in staff's research projects. Certain sport facilities (Basket- ball and volleyball) are within the premises. In-door recreational facilities are available in the Cafeteria. The source of pride for the University is the design of its beautiful, environmentally friendly, and durable facilities that support its mission. Students and employees are expected to respect and work towards achieving that. Directives from them to their visitors are very important to maintain and improve the level of standards of perfection we intend to reach. There are few similar, or near, buildings of excellence of space and quality, so far, in higher education institutions in the Sudan.

   A 10-floor teaching hospital building stands next to the main University block and accommodates over 300 beds with full tertiary care facilities. A 5-floor building accommodate the Faculty of Engineering. NUSU owns a 35000 M2 area in Albagair Suburban Area, in which a new campus is being built. It includes a rural hospital.

8. PROGRAMME FEES

A list of tuition fees is published by the MHESR every year. Private institutions keep updating such list, but a student accepted in one particular academic year will NOT be charged with the fees published for fresh students. Fees cover teaching and administrative activities of the University including laboratories and in-campus training. Accommodation and food subsidies are NOT included. Transportation to and from the University or off-campus training sites is NOT included, but the University tries to provide that for selected activities. Additional fees are variable for compensations of absence or failure. Students pay for all courses Training outside the campus and examinations [substitute or supplementary], scheduled in the Summer or Holidays, based on the credit hour load of the courses. Fees for such compensations are usually not published in Academic Calendar, but requested by students or their sponsors.

Background

Medical Laboratory Sciences (MLS) play pivotal roles in the various health care professions. They provide invaluable information for diagnosis, treatment and prevention of diseases. Since its establishment in 2009, the MLS educational programme of National University-Sudan (NUSU) equips students with essential knowledge and techniques to develop their future professional career in the diagnosis of diseases and/or performing medical research.

Our Vision

The MLS Faculty of NUSU aims to be a leading institute in the country, providing professional education through an excellent learning environment and facilities, a well-structured curriculum, and reputable, positive ethical codes of learning and practice.

Our Mission

Prepare and graduate highly competent Medical Laboratory Scientists, up-to-date, research-oriented, with a strong commitment to solving health problems, in a rich science environment, aligning with a comprehensive and devout health team.

Our Values:

The NUSU- FMLS core values include:

- Commitment to quality and professionalism in teaching and training.
- Upholding ethical conduct and scientific transparency.
- Treating all individuals fairly, regardless of background or belief.
- Engaging with communities through outreach and public service.
- Adopting modern technologies and promoting research and continuous improvement.

- Teamwork and Collaboration: Embracing multidisciplinary cooperation and mutual respect.

Our Objectives:

- To graduate health professionals with a Bachelor of Medical Laboratory Science (B.MLS) Honours who are competent in laboratory sciences and related skills, possess a strong community orientation, and uphold social and ethical commitments, while staying informed about and applying current and emerging evidence-based developments in laboratory science education and practice.
- To contribute to community development by delivering high-quality health services through the programme's health institutions and other collaborating organisations.
- To partner in the design and implementation of health programmes and plans that effectively utilise MLS specialists' expertise.
- To promote continuous education and professional development through self-directed lifelong learning by technologists.
- To strengthen medical and health research in Medical Laboratory Science by leveraging the University's infrastructure and national and international networks and collaborations.

The Programme Learning Outcomes

Upon completion of the programme, the graduates will be able to:

- In their professional practice, graduates shall observe ethics that align with the nation's values, beliefs, and norms as defined by the Sudan Allied Health Professions Council, and maintain respectful and honest relationships with their families, colleagues, and professionals across all sectors involved in health.
- Appreciate the value of diversity and multi-ethnicity in solving laboratory work with empathetic, humane and fair practice.
- Integrate basic, community, laboratory and clinical sciences in solving community, family and individual health problems relevant to laboratory sciences.
- Use scientific knowledge in investigating health problems, according to known methods and procedures, and show understanding of the scientific structural (anatomical), functional (physiological, biochemical), morbid (microbiological, pathological), and therapeutic (pharmacological) background related to the problem.
- Take specimens in a timely and professional manner, and arrange for the comfort of the patient and relatives, especially in tests that take longer.

- Follow correctly the practical steps of completion and explanation of testing biochemical, haematological, immunological, microbiological and histochemical components in biological specimens.
- Differentiate colour, smell, clarity and viscosity of biological and chemical specimens relevant to human health.
- Run laboratory tests using common equipment and take safety precautions for fellow workers, patients, the public, equipment, and the building when handling chemicals and specimens.
- Manage the investigative plan in emergencies and life-saving situations, and decide and act properly on cases needing referrals to specialised centers and personnel.
- Accept to work in all settings according to needs, and act to improve the health service delivery system both quantitatively and qualitatively.
- Encourage community participation and help in recruiting various sectors in defining health-related problems, planning and providing suitable solutions, recognising the community beliefs, ethics and traditional practices.
- Adhere to the “health team” approach, acting as an efficient member, accepting labour and responsibilities given to its members, and promoting both effectiveness and homogeneity among members.
- Continue to consider elements of efficiency, costing and economic implications in their approach to (and choice of) laboratory procedures.
- Acquire the skills of teaching, learning and communicating efficiently to carry out their duties in health education and in winning the confidence of patients and their families.
- Show respect to patients, supervisors and colleagues using productive communication with each of them, and observing confidentiality at all levels of communication and care.
- Acquire the skills of independent learning and contribute to availing opportunities for that.
- Planning and implementing continuous educational activities to upgrade their abilities and those of their colleagues in the health team, benefiting from the rising tide of information technology.
- Carry out health and health-related research, alone or with other members of the team, in health or with other relevant sectors, using known (or approved) scientific methods.
- Acquire postgraduate qualifications in the discipline of their choice, recognising the needs of society for certain specialities, particularly parasitology, immunology,

molecular biology, drug development, production and maintenance of medical laboratory equipment, media, reagents and other supplies.

Departments

The five integrated academic departments that make up the Faculty of Medical Laboratory Sciences serve as the foundation for scientific training, laboratory instruction, and applied diagnostic research. Together, these departments offer a thorough programme that combines professional ethics, quality assurance concepts, practical laboratory experience, and theoretical underpinnings. With this framework, the faculty guarantees the training of knowledgeable, moral, and research-focused laboratory specialists who can assist scientific innovation, public health, and disease diagnosis.

The Departments are:

Medical Microbiology

This field investigates pathogenic microorganisms (bacteria, viruses, fungi, and parasites) and their diagnostic laboratory processes. Bacteriology, Virology, Mycology, Parasitology, and Immunology are among the courses given from first to fourth year, in addition to intense practical training in specialised labs.

Haematology and Immunohematology

This discipline studies blood components, blood diseases, and immune-haematological techniques. Haematology, blood cell morphology, immunology, and blood group serology are all included in the curriculum. Students acquire practical experience analysing blood samples and interpreting diagnostic results.

Clinical Chemistry

This branch looks at the biochemical analysis of bodily fluids for diagnostic purposes. It covers topics such as general biochemistry, clinical chemistry, and hormonal and enzymatic analysis. The training focuses on the use of advanced analytical techniques and the interpretation of test results for metabolic and systemic diseases.

Parasitology and Medical Entomology

The department studies parasitic organisms that harm humans as well as the arthropods that transmit diseases. The courses cover Parasitology, Medical Entomology, Epidemiology, and Vector Control Techniques, including practical sessions on specimen collection, preparation, and microscopic identification.

Histopathology and Cytology

This department teaches knowledge and practical skills for diagnosing pathological alterations in tissues and cells using histological techniques and microscopy. Histology, cytology, and histopathological techniques are all covered in the courses. Students learn how to treat tissues, stain them, prepare slides, and analyse pathological findings.

The faculty of MLS currently offers:

A four-year Bachelor (Honours) in five key disciplines, including:

- Clinical Chemistry
- Microbiology
- Haematology and Immunohaematology
- Histopathology and Cytology
- Parasitology and Medical Entomology

Postgraduate programmes including:

- Higher Diploma in MLS
- Master's by course and dissertation in MLS:
- Clinical Chemistry
- Microbiology and Infection Control
- Haematology and Immunohaematology
- Histopathology and Cytology
- Parasitology and Medical Entomology
- Master's and PhD by research in:
- Clinical Chemistry
- Microbiology
- Haematology and Immunohaematology
- Histopathology and Cytology
- Parasitology and Medical Entomology
- Immunology

Administration

- Dr.Sababil Salih Abdalla ALI
- Faculty Dean

- Associate Professor of Molecular Biology and Parasitology
- Miss: Zolfa Abdalla
- Registrar

Staff :

Name	Academic Rank	E-Mail
Dr. Mohammed Abdelgader Mahdi Osman	Associate Professor	Mohamed.gader78@gmail.com
Dr. Sababil Salih Abdalla Ali	Associate Professor	Sababilsalih@gmail.com / Sababil.ali.mls@nu.edu
Dr. Mona Omer Ahmed Awad Ekarim	Assistant Professor	Mona0omer81@hotmail.com
Dr. Qutoof Hashim Taha SidAhmed	Assistant Professor	Qutoofhashimtaha2015@gmail.com
Dr. Samar Abdelrazeg Abdelrahman Salih	Assistant Professor	Samar.abdelrazeg@gmail.com
Dr. Sara Elsheikh Mohammed Elsheikh	Assistant Professor	Sara.elsheikhmoh6@gmail.com
Afra Hassan Saadeldin Hassan	Lecturer	Afra.hassan@hotmail.com
Amal Abdelrazig Elfaki Elagab	Lecturer	Amoo0oola22190@hotmail.com
Amna Fathi Ahmed Mohamed	Lecturer	Amnafathi2017@gmail.com
Elham Abdallahi Elneel	Lecturer	elhamelneel@hotmail.com
Elham Ibrahim Mohammed Ibrahim	Lecturer	davisilham@gmail.com
Ibrahim Awad Ramadan	Lecturer	ibra.medlabs@gmail.com
Mai Salah Abdallh Ismail	Lecturer	Mi0ia9ala7@gmail.com
Nusiba Mohanned Azim	Lecturer	Nosiba Mohammed 623@gmail.com
Sagda Kamal Eldein Mokutar Mohamed	Lecturer	Sajdaosman123@outlook.com
Sahar Omer Abd-Alghani Taha	Lecturer	Shsahar71@gmail.com
Salah Abdalla Boshara Marajan	Lecturer	marajansalah@gmail.com
Tagwa Hafiz Abdelkabeer Alrasheed	Lecturer	Tagwahafiz17@gmail.com
Taiba Mohamed Abdalla Jabralla	Lecturer	taibamabdalla@gmail.com
Yousra Ismail Adam	Lecturer	Yousrasad91@gmail.com
Ekram Musa Alhussein Ahmed	Teaching Assistant	Musaekram5@gmail.com
Esra Whab ALLa Ahmed Hago	Teaching Assistant	Esraawahaballa99@gmail.com
Fatima Altaeyb Mustafa Mohammed	Teaching Assistant	fatimaaltaeb6@gmail.com

Semester 1 [21 CHs - 18 weeks]

	Title	Code	Weeks	Units			CHs
				Th	Tut	Prac	
1	English Language-1	MLS-ENGL-111	Longit.	3	-	-	3
2	Human Genetics	MLS-GENE-112	Longit.	2	-	-	2
3	General Chemistry	MLS-GCHM-113	Longit.	2	-	1	3
4	Physiology-1	MLS-PHYS-114	Longit.	2	-	-	2
5	Basic Biochemistry	MLS-BIOC-115	Longit.	3	-	-	3
6	Computer Sciences	MLS-COMP-116	Longit.	2	-	1	3
7	Anatomy	MLS-ANAT-117	Longit.	2	-	1	3
8	Physics for Medical Equipment and Investigations	MLS-PHYS-118	Longit.	2	-	-	2
				18		3	21

Examination of longitudinal courses (+re-sits) 2 weeks

Courses or examinations for late comers and failures

Semester 2 [20 CHs- 18 weeks]

	Title	Code	Weeks	Units			CHs
				Th	Tut	Prac	
1	English Language-2	MLS-ENGL-121	Long.	3	-	-	3
2	Physiology-2	MLS-PHYS-122	Long.	3	-	-	3
3	Biochemistry (Metabolism)	MLS-BIOC-123	Long.	2	-	-	2
4	Histology	MLS-HHIST-124	Long.	2	-	1	3
5	Lab Safety	MLS-SAFE-125	Long.	2	-	-	2
6	Introduction to Medical Ethics	MLS-ETHI-126	Long.	2	-	-	2
7	Introduction to Medicine and Medical Education	MLS-MEDU-127	Long.	2	-	-	2
8	Clinical Laboratory Mathematics	MLS-MATH-128	Long.	1	-	-	1
9	Biostatistics	MLS-STAT-129	Long.	2	-	-	2
				19	-	1	20

Examination of longitudinal courses (+re-sits) 2 week

SUMMAR 1 AND ELECTIVES

1. Medical terminology- Laboratory and data collection (MLS-SUM-131) 2 CHs
2. 1000 –word report on "Internet Sources of Medical Laboratory Sciences" 1CH (E-131) 2CHs
3. Health Care System Elective (SUM-ELEC-132):2 CHs

4. Repeat courses or examinations for late comers and failures.

FIRST YEAR PROGRAMME EVALUATION

Semester 3 [20 CHs- 17 weeks]

	Title	Code	Weeks	Units			CHs
				Th	Tut	Prac	
1	Basic Professional Skills-1	MLS-SKIL-211	Long.	-	-	2	2
2	Introduction to MLS	MLS-INTR-212	2	2	-	-	2
3	Basic Immunology	MLS-IMUN-215	3	2	-	1	3
3	Basic Pathology	MLS-PATH-213	2	3	-	-	3
4	Basic Haematology	MLS-BHEM-214	5	2	-	2	4
6	Serology and Immunohaematology	MLS-SERO-216	2	1	-	1	2
7	Clinical Biochemistry-1	MLS-CCHM-217	6	2	-	2	4
			20	12	-	8	20

Examination of longitudinal courses (+re-sits) 1 week

Semester 4 [21 CHs- 18 weeks]

	Title	Code	Weeks	Units			CHs
				Th	Tut	Prac	
1	Basic Professional Skills-2	MLS-SKIL-221	Long.	-	-	2	2
2	Basic Histology and Histological Techniques	MLS-HIST-222	5	2	-	2	4
3	Medical Entomology and Parasitology	MLS-PARA-223	2	2	-	1	3
4	Basic Microbiology	MLS-BMIC-224	4	2	-	2	4
5	Protozology	MLS-PROT-225	4	2	-	2	4
6	Clinical Microbiology-1	MLS-CMIC-226	4	2	-	2	4
			19	10	-	11	21

Examination of longitudinal courses (+re-sits) 1 week

SUMMAR 2 AND ELEVTIVE MODULES

1. Research methodology and scientific writing- Rural Research Residency (MLS-REC- 231) 2 CHs
2. Repeat courses or examinations for late comers and failures.

Semester 5 [22 CHs - 20 weeks]

	Title	Code	Weeks	Units			CHs
				Th	Tut	Prac	
1	Basic Professional Skills-3	MLS-SKIL-311	Long.	0	0	2	2
2	Clinical Biochemistry -2	MLS-CCHM-312	6	3	0	3	6
3	Helminthology	MLS-HLMT-313	4	2	0	2	4
4	Cytological and Histopathological Techniques	MLS-CYTO-314	6	3	0	3	6
5	Clinical Microbiology-2	MLS-CMIC-315	4	2	0	2	4
			20	**10**	**0**	**12**	**22**

Examination of longitudinal courses (+re-sits) 1 week

Repeat courses or examinations for late comers and failures.

Semester 6 [21 CHs- 21 weeks]:

	Title	Code	Weeks	Units			CHs
				Th	Tut	Prac	
1	Basic Professional Skills-4	MLS-SKIL-321	Long.	0	0	2	2
2	Public Health	MLS-PUBH-322	3	2	0	0	2
3	Laboratory Management and Quality Assurance	MLS-QUAL-323	3	2	0	0	2
4	Advanced Haematology	MLS-HEMA-324	6	3.5	0	3.5	7
5	Molecular Biology and Techniques	MLS-MLBT-325	3	2	0	1	3
6	Introduction to Research	MLS-RESH-326	2	2	0	0	2
7	In-Service Training	MLS-TRIN-327	3	0	0	2	2
			20	**11.5**	**0**	**8.5**	**20**

Examination of longitudinal courses (+re-sits) 1 week

SUMMAR 3 AND ELECTIVES

1. Rural Hospital Laboratory Residency (MLS-SUM-331), 2 CHs/Block 2 weeks
2. Elective (E332): A 1000 work essay on malpractice in MLS 1CH
3. Repeat courses or examinations for late comers and failures.

Semester 7 [20 CHs – 20weeks] and Semester 8 [22 CHs- 20 weeks]

Examinations (2weeks)

GRADUATION AND CLERKSHIP EVALUATION is at the end of each clerkship= see ISO-9001 forms of programme evaluation.

Clinical Chemistry	Haematology and Immuno-haematology	Histopathology and Cytology	Microbiology and Clinical Immunology	Parasitology and Medical Entomology
		Semester 7		
Primary Care Clinical Chemistry MLS-CCHM-411 **6 CHs (6 weeks)**	Anaemias and Haemoglobin Disorders Investigations MLS-HAEM-411 **8 CHs (8 weeks)**	Cytology and Cytological Techniques MLS-HIST-411 **5 CHs (6 weeks)**	Immunological Techniques MLS-MICR-411 **6 CHs (6 weeks)**	Parasitology and Immuno-parasitology MLS-PARA-411 **8 CHs (8weeks)**
Advanced Clinical Chemistry MLS-CCHM-412 **6 CHs (6 weeks)**	Leukaemias and Lymphomas Investigations MLS-HAEM-412 **6 CHs (6 weeks)**	Histopathological Techniques MLS-HIST-412 **7 CHs (7 weeks)**	Bacteriological Techniques MLS-MICR-412 **8 CHs (8 weeks)**	Tropical Diseases and Public Health MLS-PARA-412 **8 CHs (8weeks)**
Clinical Chemistry and Public Health MLS-CCHM-413 **6 CHs (6 weeks)**	Haemostasis and Bleeding Disorders Investigations MLS-HAEM-413 **4 CHs (4 weeks)**	Immunohistochemical Techniques MLS-HIST-413 **4 CHs (3 weeks)** Electron Microscopy Techniques MLS-HIST-415 **2 CHs (2 weeks)**	Mycology MLS-MICR-413, 4 CHs (4 weeks)	Medical Entomology MLS-PARA-413 **2 CHs (2 weeks)**
Evidence Based Practice in Medical Laboratory Sciences MLS-CCHM-414 **2 CHs (2 weeks)**	Evidence Based Practice in Medical Laboratory Sciences MLS-HAEM-414 **2 CHs (2 weeks)**	Evidence Based Practice in Medical Laboratory Sciences MLS-HIST-414 **2 CHs (2 weeks)**	Evidence Based Practice in Medical Laboratory Sciences MLS-MICR-414 2 CHs (2 weeks)	Evidence Based Practice in Medical Laboratory Sciences MLS-PARA-414 **2 CHs (2 weeks)**
		Semester 8		
Clinical Chemistry Equipments MLS-CCHM-421 **6 CHs (6 weeks)**	Basic Haematological Diagnosis MLS-HAEM-421 **6 CHs (6 weeks)**	Cytogenetics and Molecular Techniques MLS-HIST-421, **6 CHs (6 weeks)**	Virology Techniques MLS-MICR-421 **6 CHs (6 weeks)**	Basic Parasitological Diagnosis MLS-PARA-421 **6 CHS (6 weeks)**
Basic Clinical Chemistry Diagnosis MLS-CCHM-422 **6 CHs (6 weeks)**	Field Training in Clinical Haematology and Blood Banking MLS-HAEM-422 **6 CHs (6 weeks)**	Basic Histopathological Diagnosis MLS-HIST-422 **6 CHs (6 weeks)**	Infection Control MLS-MICR-422, **6 CHs (6 weeks)**	Field Training in Parasitology Techniques and Infection Control MLS-PARA-422 **6 CHs (6 weeks)**
Laboratory Management and Economics MLS-CCHM-423 **2 CHs (2 weeks)**	Laboratory Management and Economics MLS-HAEM-423 **2 CHs (2 weeks)**	Laboratory Management and Economics MLS-HIST-423 **2 CHs (2 weeks)**	Laboratory Management and Economics MLS-MICR-423 **2 CHs (2 weeks)**	Laboratory Management and Economics MLS-PARA-423 **2 CHs (2 weeks)**
Health Information System MLS-CCHM-424 **2 CHs (2 weeks)**	Health Information System MLS-HAEM-424 **2 CHs (2 weeks)**	Health Information System MLS-HIST-424 **2 CHs (2 weeks)**	Health Information System MLS-MICR-424 2 CHs (2 weeks)	Health Information System MLS-PARA-424 **2 CHs (2 weeks)**
Graduation Project MLS-RESH-425 **6 CHs (Longitudinal)**	Graduation Project MLS-RESH-425 **6 CHs (Longitudinal)**	Graduation Project MLS-RESH-425 **6 CHs (Longitudinal)**	Graduation Project MLS-RESH-425 **6 CHs (Longitudinal)**	Graduation Project MLS-RESH-425 **6 CHs (Longitudinal)**

GRADUATION

OUTLINE OF COURSES

NOTE: In each course the outline includes the basic concepts. Detailed behavioural objectives and hourly timetables will be designed later by specific coordinators.

Title	Code	Semester/Duration	Credits
ENGLISH LANGUAGE-1	MLS-ENGL-111	1 /Longitudinal15 weeks	3

15 weeks longitudinal course .The sources of health information in the World are still in English. The Internet navigation to obtain information is basically in English. Some of the patients, attending clinics in Sudan, may only speak English language, especially with open-up of borders with economic development and of globalization. Passing the English language examination is an essential entry requirement to universities in Sudan. The general objectives of this course include: (1) correct pronunciation of medical terns, including those related to health services in the country, (2) correct reading and showing understanding of texts from medical books, (3) expressing one's self in good English describing his daily activities, career ambitions, present problems in health and current attempts at management, and (4) translating some pieces from English to Arabic, and three others from Arabic to English, both sets from medical literature.

Title	Code	Semester/Duration	Credits
HUMAN GENETICS	MLS-GENE-112	15weeks Longitudinal/ 1	2

A 15 weeks longitudinal course that covers the general principles of human genetics and its applications on health. The details include: (1) the biological functions of cells, (2) nucleic acids, (3) protein synthesis and its control, (4) mutation and genetic engineering and its practical applications in laboratory procedures and genetic diseases, (5) Mendel's theory in inheritance, (6) the bases of molecular genetics in man, (7) chromosomes , DNA, the steps of transcription of information contained in DNA helix, the role of RNA and ribosomes in manufacturing enzymes and protein, (8) classification of genetic disorders and mention their clinical significance, (9) outline of the main chromosomal abnormalities and how they occur and the congenital errors they lead to, (10) an attempt to recognize the normal and abnormal chromosome patterns and (11) the latent effect of chemical, physical and constitutional factors on embryological development.

Title	Code	Semester/Duration	Credits
GENERAL CHEMISTRY	MLS-GCHM-113	Longitudinal 16 weeks/ 1	3

This is a16 week's longitudinal courses focus on basic general chemistry, organic chemistry and analytical chemistry.

Title	Code	Semester/Duration	Credits
PHYSIOLOGY -1	MLPHYS-114	Longitudinal 16 weeks/ 1	2

This is a 16 weeks Longitudinal .This course presents general concepts and principles that are basic to the functions of all body systems (2) It describes relationship between human and environment by studying; body composition and body fluids, transport across cell membrane, membrane potential, excitable tissues, autonomic nervous system and regulation of body temperature (3) Additional aspect is to describe the physiological arrangement which serve to restore the normal state by understanding homeostasis and feedback systems (4) Students are required to describe and outlines the general organization and functions of blood system in terms of blood components, functions and typing, blood coagulation system and immunology (5) Apply physiological knowledge in laboratory practice to solidify theoretical knowledge .

Title	Code	Semester/Duration	Credits
BASIC BIOCHEMISTRY	MLS-BIOC-115	Longitudinal 16 weeks/ 1	3

This is a 16 weeks longitudinal course focus on basic biochemistry of carbohydrates, proteins, lipids, nonprotein nitrogenous sub, vitamins enzymes hormones trace elements and buffer.

Title	Code	Semester/Duration	Credits
COMPUTER SCIENCES	MLS-COMP-116	Longitudinal 16 weeks/ 1	3

This is a 16 weeks Longitudinal course focus on basic component of computers, identification of computer applications such as Word, Excel, PowerPoint, Access and Internet Explorer and application of computer in health sciences education.

Title	Code	Semester/Duration	Credits
ANATOMY	MLS-ANAT-117	Longitudinal 16 weeks/ 1	3

This is a 16 weeks longitudinal course focus on the gross anatomy of human body system especially the respiratory, cardiovascular, digestive, urinary, reproductive, nervous and endocrine system.

Title	Code	Semester/Duration	Credits
PHYSICS FOR MEDICAL EQUIPMENTS AND INVESTIGATIONS	MLS-PHYS-118	Longitudinal 16 weeks/ 1	2

This is a 16 weeks longitudinal course includes: (1) the basic principles of general physics important for the technical background of many medical equipments, and (2) physical chemistry, gas laws, and physics of light, and radiation.

Title	Code	Semester/Duration	Credits
ENGLISH LANGUAGE-2	MLS-ENGL-121	15weeks Longitudinal/2	3

This is a 15 weeks longitudinal course. The general objectives of this course include:(1) Understand sentences and frequently used expressions related to very basic personal and family information, shopping, local geography, employment etc (2) Communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters (3) Describe in simple terms aspects of your background, immediate environment and matters in areas of immediate need.

Title	Code	Semester/Duration	Credits
PHYSIOLOGY 2	MLPHYS-122	Longitudinal 15 weeks/ 2	2

A 15 weeks longitudinal course .This course presents physiological functions of each human body organs and systems (Cardio-vascular system, respiratory system, gastro-intestinal system, renal system and nervous system (2) it integrates the facts and concepts of physiology to explain health problems.

Title	Code	Semester/Duration	Credits
(BIOCHEMISTRY (METABOLISM	MLS-BIO-123	Longitudinal 15 weeks/ 2	2

This is a 15 weeks longitudinal course .This course includes the study of metabolism such as (1) Carbohydrates, lipids, proteins and nucleic acids metabolism, as well as the study of (2) Vitamins function (3) Metabolic Effects of Insulin and Glucagon (4) Diabetes Mellitus (5) Obesity (6) Biotechnology and Human Disease.

Title	Code	Semester/Duration	Credits
HISTOLOGY	MLS-HIST-124	Longitudinal 16 weeks/ 2	3

This is a 16 weeks longitudinal course. This course include :((1) The histological characteristics of epithelial, connective, muscular and nervous tissue (2) The histological characteristics of different body systems.

Title	Code	Semester/Duration	Credits
LAB SAFETY	MLS-SAFE-125	Longitudinal 16 weeks/ 2	2

This is a 16 weeks longitudinal course.The general objectives of this course include :(1) Under-

stand the overview of the field of medical laboratory technology (2) be familiarization with laboratory safety, safe laboratory design. (3) How to practice safe handling of pathogenic micro-organisms and their toxins in the biological laboratory that accomplished through the application of containment principles and the risk assessment, and (4) know how to prevent and/or minimize occupational and environmental exposure from hazardous materials usage and hazardous activities being conducted in the laboratory environment.

Title	Code	Semester/Duration	Credits
INTRODUCTION TO MEDICAL ETHICS	ME-ETHI-126	Longitudinal 16 weeks/ 2	2

This is a 16 weeks longitudinal course focus on, (1) principle of ethical guidelines (2) History of medical ethics. (3) Health professional relationships (4) Ethics of medical research (5) Policy, laws in medical laboratories.

Title	Code	Semester/Duration	Credits
INTRODUCTION TO MEDICINE AND MEDICAL EDUCATION	MLS-MEDU-127	Longitudinal 16 weeks/ 2	2

This is a 16 weeks longitudinal course, that includes: (1) a simple medical problem that emphasize the meaning and message of health, (2) health care delivery system in the country, (3) the role of the physician in health care, (4) role of other professional and administrative staff, (5) priority health problems, (6) concepts and principles of learning, (7) adult education and learning, (8) student centred and problem-based learning, (9) instructional techniques (lecture, small group etc), (10) student assessment methods, (11) holistic approach to patient's problems, (12) interdisciplinary and partnership concepts, (13) curriculum development, (14) program evaluation, (15) leadership and (16) professional ethics.

Title	Code	Semester/Duration	Credits
CLINICAL LABORATORY MATHEMATICS	MLS-MEDU-128	Longitudinal 16 weeks/ 2	1

This is a 16 weeks longitudinal course, which includes: (1) Provides an opportunity to students to understand and internalize the basic mathematical concepts through concrete situations (2) Sound base for more abstract thinking (3) gives greater scope for individual participation.

Title	Code	Semester/Duration	Credits
BIOSTATISTICS	MLS-STAT-129	Longitudinal 16 weeks/ 2	2

This is a 16 weeks longitudinal course on basic statistics as applied to health, to include: (1) introduction to statistics, (2) probabilities, (3) data summary, (4) presentation; (5) measurement of central tendency; (6) interpretation of variation (dispersion), (7) population means, (8) normal distribution, (9) frequency distribution, (10) sampling techniques, (11) calculation and interpre-

tation of the concept of confidence interval, (12) the concept of p-value and its interpretation, (13) the normal and skewed frequency distribution of biomedical data, and (14) apply the appropriate test of significance for a given data set and a given research methodology (using t test as an example).

Title	Code	Semester/Duration	Credits
BASIC PROFESSIONAL SKILLS	MLS-SKIL-211+221+311+321	and 6/ Longitudinal 3,4,5	each 2 semester

These are two hours weekly longitudinal course, on which the students are introduced to basic skills in clinical chemistry, haematology, histopathology, microbiology and parasitology and its related laboratory investigations.

Title	Code	Semester/Duration	Credits
INTRODUCTION TO MLS	MLS-INTR-212	Longitudinal 13 weeks /3	2

This is a 2 weeks Block course, which introduces newly enrolled to the administrative professional and technical responsibilities of the medical laboratory technologists, the major technical areas are the basics and laboratory sciences: (1) parasitology (2) microbiology (3) clinical chemistry (4) haematology (5) histopathology, The professional competences include:(1) the organization of health system, hospital and laboratory (2) communication (3) legal and ethical issue (4) pursuit of certification, licensure and continuous professional development. The administrative duties include (1)managing a laboratory assuring quality,(2) purchase of equipments and supplies,(3) facilitating the flow of patients and servicess4) observing the economic burden and impact of infra structure, consumables and services on the patient, family, community, health provider and institutional stake holders.

Title	Code	Semester/Duration	Credits
BASIC IMMUNOLOGY	MLS-IMUN-215	Longitudinal 13 weeks /3	3

This is a 3 weeks Block course, course which: (1) reviews basic immunology (structure and function of the immune system) and (2) addresses the immunological defects and disorders including: (a) hypersensitivity reactions, (b) autoimmune disease, (c) transplantation rejection, and (d) immunodeficiency disorders. It includes (3) tumour immunology, (4) antigen presentation, (5) major histocompatibility complex molecules, (6) detection of lymphocytes and (7) complement deficiency.

Title	Code	Semester/Duration	Credits
BASIC PATHOLOGY	MLS-PATH-213	Longitudinal 14 weeks /3	3

This is a 2 weeks Block course, include: (1) cellular injury, (2) cellular adaptation mechanisms (3) healing and repair (4) general pathology of inflammation, neoplasia and abnormal cell growth.

Title	Code	Semester/Duration	Credits
BASIC HAEMATOLOGY	MLS-BHEM-214	Longitudinal 14 weeks /3	4

This is a 4 weeks Block, which covers the basics of haematology and stages of haematopoiesis and the factors affecting it and the different types of anaemia. The study also includes the chemical structure, synthesis, functions and genetic defects of haemoglobin and types of white blood cells and laboratory methods of diagnosis acute and chronic leukaemias and the mechanism of blood clotting and coagulation and the laboratory methods of studying it. The course also covers the primary and secondary blood groups and their antibodies and their clinical use, precautions of blood transfusion and methods of detecting antibodies and determining the resulting complications of mismatching the different blood units. It also covers the organization of haematology laboratory and blood banks of Hospital including ways of collecting, transferring, registering the different blood samples and recording results and interpreting them and confirming quality control test. The course also includes student contribution to the different ways of preparing blood derivatives and identifying the possible complication on transfusing blood.

Title	Code	Semester/Duration	Credits
SEROLOGY AND IMMUNOHAEMATOLOGY	MLS-SERO-216	Longitudinal 14 weeks /3	2

This is a 2 weeks Block course is designed to give the student an introduction to the basic immunologic and genetic principles governing blood group systems and general aspects of blood transfusion practice.

Title	Code	Semester/Duration	Credits
CLINICAL BIOCHEMISTRY-1	MLS-CCHM-217	Longitudinal 14 weeks /3	4

This is 4 weeks Block course that discusses the role of clinical chemistry in medicine and explains terms and units used in the subject. It focuses on the principle of reagent preparation and storage, introduction to instruments such as colorimeter and spectrophotometer identification and description of various types of specimens used in clinical laboratories, with particular emphasis on the analysis of urine (qualitative and quantitative analysis), plasma proteins and carbohydrates. Liver functions and liver function tests.

Title	Code	Semester/Duration	Credits
BASIC HISTOLOGY AND HISTOLOGICAL TECHNIQUES	MLS-HIST-222	Longitudinal 13 weeks /4	4

This is a 4 weeks Block course. It covers: (1) the basics of tissue preparation for light microscopy, (2) cellular and tissue decay and basics of tissue fixation: types of histological cytological fixatives, (3) the processes of dehydration, clearing and embedding in paraffin wax and the other embedding media and (4) tissue sectioning. It also covers (5) the basics of cytological and

histological staining. It describes (6) the non sectioning methods for processing tissues for light microscopy such as smears and imprints. It covers the histological characteristics of different body tissues.

Title	Code	Semester/Duration	Credits
MEDICAL ENTOMOLOGY AND PARASITOLOGY	MLS-PARA-223	Longitudinal 13 weeks /4	3

This is a 13 weeks longitudinal course. Insects have tremendous potential for transmitting pathogens that cause disease in human and other animals. The disease-causing organisms include protozoa, viruses, bacteria, and worms. The deadliest disease worldwide is malaria which is vectored by mosquitoes, which can also transmit viruses (including those causing encephalitis) and filarial nematodes. Other vectors include flies and tics. It concerned with vectors' surveillance and control, considering the operational control personnel as one of the health team. There is special emphasis on: (1) insects and closely related arthropods that impact human health, (2) the life cycles of the vectors and parasites, their geographical distribution, ecology, and (3) the epidemiology, presentation and broad management and control of the diseases caused by them. These include parasites of the intestinal tract, blood-borne parasites and those found in other body sites.

Title	Code	Semester/Duration	Credits
BASIC MICROBIOLOGY	MLS-BMIC-224	Longitudinal – 7 weeks /4	4

This is a 4 weeks Block course that covers the ways of specimen collection for clinical microbiology investigation and selecting the growth media and basics components and assuring vaccination and sterilization for microbial decontamination and the precautions to be followed when dealing with biologically hazardous sources in microbiology lab. It describes the proper procedures for selecting the proper specimen for anaerobic culture including: proper sampling, handling and investigation, determining samples adequacy, sterilization techniques, decontamination, identifying gram positive and gram negative and the methods of isolating pure growth.

Title	Code	Semester/Duration	Credits
PROTOZOLOGY	MLS-PROT-225	Longitudinal 13 weeks /4	4

This is a a 4 weeks Block course that reviews the basics of parasitology which includes classification of clinically important parasites: endoparasites, in addition to exoparasite and study of life cycles, and ways of occurrence of disease together with brief clinical description and determining the most suitable clinical specimens for laboratory diagnosis using the light microscopy and other laboratory tests. Students are practically trained to methods of diagnosis that include direct light and electron microscopic examination and centrifugation and immunoserological methods including ELISA. It includes also: the basics of using fixatives and sample processing, suitable methods of collecting worms, assessing parasite load, performing concen-

tration method to examine eggs and parasites, preparation of blood smears and identify blood parasites, with special emphasis on prevention and diagnosis of malaria.

Title	Code	Semester/Duration	Credits
CLINICAL MICROBIOLOGY-1	MLS-CMIC-226	Longitudinal – 7 weeks /4	4

This is a 7 weeks longitudinal course provides the student with theoretical and practical knowledge about different medically important pathogens including: Gram positive cocci and Gram negative cocci, and their laboratory isolation and identification procedures.

Title	Code	Semester/Duration	Credits
CLINICAL BIOCHEMISTRY-2	MLS-CCHM-312	Block – 6 weeks/5	6

A four - week block covers the chemical aspects of medical laboratory analyses that include: lipids, non-protein nitrogenous substances, electrolytes, enzymes, vitamins. Principle of different instruments such as flame photometer, ion selective electrodes, immunological techniques, chromatography, electrophoresis and automation. Introduction to endocrinology and CSF analysis.

Title	Code	Semester/Duration	Credits
HELMINTHOLOGY	MLS-HLMT-313	Block – 4 weeks/5	4

This is a four week-block module that review the basic of Helminthology which includes classification of clinically important metazoa : tapeworms, round worms and schistosomes and study of life cycles and ways of occurrence of disease together with a brief clinical description and determines the most suitable clinical specimens for laboratory diagnosis using the light microscope and other laboratory test .student are practically trained to method of diagnosis that include light microscope examination and immunological methods include ELISA. it include also the basic of using fixative and sample processing ,suitable methods of collection worms, assessing parasite load performing concentration method to examine egg and parasites, preparation of blood smears and identify blood parasites with special emphasis on prevention and diagnosis of Schistosomasis

Title	Code	Semester/Duration	Credits
CYTOLOGICAL AND HISTOPATHOLOGICAL TECHNIQUES	MLS-CYTO-314	Block -6 weeks/5	6

This is a four-week block course. It covers: (1) the basics of cytological and histological staining and the common techniques for special staining of cells and tissues and how to prepare these stains, (2) the non sectioning methods for processing cells for light microscopy such as smears and imprints, (3) training on equipments of histological techniques as tissue processors, embedding centres, rotary and automatic microtomes, multi-program automatic linear and rotary slide stainers and cover slippers, (4) the basics of immunohistological staining, (5) performing

immunohistological staining, (6) identifying results, and (7) applying safety measures in histology laboratories.

Title	Code	Semester/Duration	Credits
CLINICAL MICROBIOLOGY-2	MLS-CMIC-315	Block – 4 weeks/ 5	4

This is a four week-block course during which the basic microbiological techniques reviewed and focus on the study of : (1) enterobactereas, acid fast bacilli and atypical bacteria including their morphology, functional and biochemical structure ,(2) method of causing disease (3) a brief clinical description of disease to decide on the most proper sample from which to isolate the organisms and study their requirements.(4) exclusion and inclusion criteria in the reception of the sample, (5) introduction to virology and mycology, and (6) methods of isolating pure growth from mixed culture.

Title	Code	Semester/Duration	Credits
PUBLIC HEALTH	MLS-PUBH-322	Block – 3 weeks/6	2

This is two week block course. They consist of theoretical studies on health system, the socioeconomic, psychological, behavioural and environmental factor related to epidemiology of disease and affecting its management, as well as primary health care. Most of the time is this course is devoted to weekly visits to health centres and villages trying to understand the health problems and help the local people and authorities in suggestions and involvement in solving them. This is possible through the study of epidemiology and health research, and the methods used in community medicine to investigate epidemics, maternal and child health, and control of endemic and communicable diseases.

Title	Code	Semester/Duration	Credits
LABORATORY MANAGEMENT AND QUALITY ASSURANCE	MLS-QUAL-323	Block – 3 weeks/6	2

This is a three-week block course focused on: (1) Concepts of total quality management emphasized on laboratory management. (2) Phases of quality assurance (3) Types and implementation of quality control (4) Methods validation (5) Standard operating procedures (6) Accreditation of medical laboratories.

Title	Code	Semester/Duration	Credits
ADVANCED HAEMATOLOGY	MLS-HEMA-324	Block – 6 weeks/6	7

This is a six- week block module during which the basic haematology is reviewed and the basic principles of haematological disorders are introduced, those are: anaemias, leukaemias, coagulopathies and their causes, diagnostic workup with emphasis or the laboratory procedures and how the laboratory results are interpreted and audited. The haematology laboratory setup will be outlined, at this stage.

Title	Code	Semester/Duration	Credits
MOLECULAR BIOLOGY AND TECHNIQUES	MLS-MLBT-325	Block – 3 weeks/6	3

This is a three week-block course in which students are trained technically in the practical aspects of molecular biology. They are supposed to review genetics which they did earlier, and gain a thorough understanding of the biological systems amenable to such analyses. These systems cross all disciplines and include: (1) molecular genetics of bacteria and viruses, with emphasis on genes and molecules that enable these microbes to cause disease, (2) mechanisms and consequences of changes in gene expression during development, differentiation, and disease, (3) regulation of cell growth, behaviour, and interactions with other cells and the extracellular matrix, (4) regulation of the immune system which influences disease susceptibility/resistance, (5) development through evolution of gene sequences and of anatomical form, and (6) a review of the biochemistry of gene replication and recombination, and (7) application of molecular techniques.

Title	Code	Semester/Duration	Credits
INTRODUCTION TO RESEARCH	MLS-RESH-326	Block – 2 weeks /6	2

This is a two week-block course which focuses on the synthesis of professional knowledge, the skills and the attitudes in preparation for professional employment and life-long learning, Students are trained to perform a small research project on one topic of the medical laboratory sciences, that enables them to collect data, review literature, obtain results and discuss their findings in the form of presentations. The student should: (1) describe research methodology, write a meaningful proposal and generate a hypothesis, (2) collect up-to-date information on a particular topic, using proper sampling techniques, (3) execute the research and analyze the data collected, (4) discuss the results obtained with relevant literature and reach conclusions, (5) write down a research paper, and (6) present the findings in front of the class and discuss with colleagues and staff.

Title	Code	Semester/Duration	Credits
IN-SERVICE TRAINING	MLS-TRIN-327	Block – 3 weeks/6	2

This is an exposure to actual training in health institutions in laboratory technology. It includes sending students to well equipped and served hospital to learn how MLS is practiced, and spend a three-week apprentice period where they observe, perform and present actual service under supervision of senior technologists and physicians. Specific detailed logbooks are designed to assure standardized training.

Title	Code	Semester/Duration	Credits
PRIMARY CARE CLINICAL CHEMISTRY	MLS-CCHM-411	Block – 6 weeks/7	6

This is a six- week block course which considers:(1) the local laboratory procedures at the primary level, (2) the reasons that they are considerably less advanced than those used at hospital

laboratories, (3) learning to perform an increasing number of laboratory tests apart from the routine analyses of ESR, haemoglobin, glucose and microscopic cell count, (4) learning how these additional test are done and the possible sources of errors, like the test strip analyses, analyses for monitoring a disease which might prevent or decrease complications, (5) accessing and harmonizing with the nearest hospital care, (6) applying continuous method assessment protocols for quality assurance under advisory boards, (7) observing continuity of primary care and keeping medical records, using the patient as his/her source of reference. Staff should seek opportunities for continuing education to optimize the use of clinical chemistry in primary care in order to keep total cost of primary care down.

Title	Code	Semester/Duration	Credits
ANAEMIAS AND HAEMOGLOBIN DISORDERS INVESTIGATIONS	MLS-HAEM-411	Block – 8 weeks/7	8

This is an eight-week block course which deals with clinical and laboratory presentations of iron deficiency, sideroblastic, megaloblastic anaemias, autoimmune haemolytic anaemias as well as anaemias due to chronic disease. It deals with diagnostic features of the inherited genetic disorders in which either the quality or quantity of haemoglobin is abnormal, among them the most common are sickle and thalassaemia. Students should know the follow up protocols of patients with such illnesses and outline the therapeutic approaches to each of them.

Title	Code	Semester/Duration	Credits
CYTOLOGY AND CYTOLOGICAL TECHNIQUES	MLS-HIST-411	Block – 6 weeks/7	5

This is a six-week block course which covers: (1) a review of the theoretical and practical aspects related to cell cycle, (2) cell renewal, replication, proliferation and neoplasia, (3) the chemical factors related to carcinogenesis, (4) classification of cancers and stages of its formation and its different histological features, (5) the methods of getting cells for microscopic examination including desquamated cells, needle aspiration and biopsies, (6) methods of laboratory diagnosis of different tumours including light and electron microscopy and (7) the immunohistological and cytological methods.

Title	Code	Semester/Duration	Credits
IMMUNOLOGICAL TECHNIQUES	MLS-MICR-411	Block – 6 weeks/7	6

\This is a six- week-block course which: (1) reviews basic immunology (structure and function of the immune system) and (2) addresses the immunological defects and disorders including: (a) hypersensitivity reactions, (b) autoimmune disease, (c) transplantation rejection, and (d) immunodeficiency disorders. It includes: (3) tumour immunology, (4) antigen presentation, (5) major histocompatibility complex molecules, (6) detection of lymphocytes and (7) complement deficiency.

Title	Code	Semester/Duration	Credits
PARASITOLOGY AND IMMUNOPARASITOLOGY	MLS-PARA-411	Block – 8 weeks/7	8

This is an eight- week-block course that: (1) reviews the basic parasitology and (2) introduces clinical methods in managing problems of patients with parasitic disease, starting with (a) the medical history and (b) physical signs, (c) relevant laboratory investigations, correlating that with patient conditions, and (d) studying the appropriate parasitic treatment and effects of various medications on the investigative profile of the patient. The module includes immunoparasitology a new term which was addressed as malaria and leishmania cell biology and immunology, molecular parasitology and mammalian genetics. It concentrates on: (1) molecules and processes involved in immunity and drug-resistance of parasites like malaria and leishmania, and expanded to include Toxoplasma gondii, an important pathogen in AIDS patients, (2) genome mapping of parasites and (3) immunogenicity trials of vaccines.

Title	Code	Semester/Duration	Credits
ADVANCED CLINICAL CHEMISTRY	MLS-CCHM-412	Block -6 weeks/7	6

This is a six- week course module which offers detailed study of the (1) common measurement methods used in laboratories for carbohydrates, amino acids, proteins, lipids, (2) liver function tests, (3) kidney function tests, (4) blood gases and pH, (5) digestive system and endocrine glands and the diseases associated with them, (6) enzyme concentration ANF, LDH and CK and their relation to angina pectoris and heart disease, (7) blood calcium level, (8) blood iron level, (9) serum amylase concentration, (10) amino acids, (11) clinically relevant hormones measurement by various methods, G6PD, (12) concentration of trace amounts of clinically relevant metals, (13) analysis of kidney and gall bladder stones, (14) analyses of cerebrospinal fluid biochemical components, (15) concentration of the types of lipoproteins, (16) analyses of seminal fluid, (17) PCR, and (18) dealing with automatic equipment's and those using dry chemical kits.

Title	Code	Semester/Duration	Credits
LEUKAEMIAS AND LYMPHOMAS INVESTIGATIONS	MLS-HAEM-412	Block – 6 weeks/7	6

This is a six-week block course, which addresses two major haematological disorders. Students are expected to define, classify, identify risk factors, outline clinical features and diagnostic algorithms, perform and discuss laboratory investigation and outline management for leukaemias and lymphomas. They should detail the description and recognize the microscopic features of all types before treatment, and the times of remissions and exacerbations.

Title	Code	Semester/Duration	Credits
HISTOPATHOLOGICAL TECHNIQUES	MLS-HIST-412	Block – 7 weeks/7	7

This is a seven-week block course during which basic techniques done in Module MLS-CYTO-315 are reviewed. The student carries out tissue preparation for light microscopy, using the

appropriate tissue fixation from the various types of histological cytological fixatives, through the processes of dehydration, clearing and embedding in paraffin wax and the other embedding media and tissue sectioning. He/she should apply cytological and histological staining and the common techniques for special staining of cells and tissues and how to prepare these stains. The module also covers non sectioning methods for processing cells and tissues for light microscopy such as smears and imprints. Towards the end of this course students are expected to use and maintain the equipment of histological techniques as tissue processors, embedding centres, rotary and automatic microtomes, multi-program automatic linear and rotary slide stainers and cover slippers, the basics of immunohistological staining, performing immunohistological staining and identifying results, and apply safety measures in histology laboratories.

Title	*Code*	*Semester/Duration*	*Credits*
BACTERIOLOGICAL TECHNIQUES	MLS- MICR- 412	Block – 8 weeks/7	8

This is an eight-week block course that covers the identification methods of Bacteria that cause infections in different body systems. It include the diseases, etiological agents, specimens collection, transportation and preservation and laboratory investigations of urinary tract infections, respiratory tract infections, skin infections, genital tract infections, central nervous system infections, blood circulation infections, gasterointestinal tract infections, water and milk examinations, methods of bacterial typing, methods of preservation of lab strains and.

Title	*Code*	*Semester/Duration*	*Credits*
TROPICAL DISEASES AND PUBLIC HEALTH	MLS-PARA-412	7/Block -8 weeks	8

This is an eight-block course which focuses on the study of parasitic tropical diseases in both theoretical and practical instructions. Such diseases are prevalent in tropical and subtropical regions, the methods of controls are more or less environmental associated with poor agricultural communities, and no vaccine is available so far. Malaria, trypanosomiasis, leishmaniasis, schistosomiasis, lymphatic filariasis and onchocerciasis are all common in Sudan and have to be reviewed using public health approaches and strategies of control including use of safe water, draining wetlands, application of insecticides, use of mosquito nets, development and use of vaccination, subsidizing treatment of cases, assist in the economic development of in the endemic regions.

Title	*Code*	*Semester/Duration*	*Credits*
CLINICAL CHEMISTRY AND PUBLIC HEALTH	MLS-CCHM-413	Block – 6 weeks/7	6

This is a six-week block course which discusses the controversial issue of relationship between the need and availability of clinical chemistry services. It requires student to study data from African countries and less-developed countries of the Western Pacific regions on the status of disease burden and the situation of available clinical chemistry research, collect local data on

the services provided to rural health care facilities in the under-served areas of the country and suggest methods of introducing such servicing considering cost and priorities.

Title	Code	Semester/Duration	Credits
HAEMOSTASIS AND BLEEDING DISORDERS INVESTIGATIONS	MLS-HAEM-413	Block – 4 weeks/7	4

This is a four-week block that covers the: (1) factors that control haemostasis, (2) natural mechanisms of blood clotting, (3) clotting antagonists, (4) carrying out test necessary to reveal the platelet count and functions, (5) investigations and test necessary to diagnose cases of bleeding tendencies, (6) investigations and examinations necessary to diagnose cases of blood clotting, (7) studying prothrombin and fibrinogen, (8) explaining the mechanism of platelet clot and its various components, (9) blood sampling methods, and (10) performing the necessary investigations to follow patients of anti-clotting clinics.

Title	Code	Semester/Duration	Credits
IMMUNOHISTOCHEMICAL TECHNIQUES	MLS-HIST-413	Block – 3 weeks/7	4

This is a three- week block course to study the localization of proteins in cells of a tissue section, making use of antibodies binding specifically to antigens in biological tissues, apply immunohistochemical staining to diagnose abnormal cells such as those found in cancerous tumours, find out specific molecular markers characteristic of important cellular events like cellular proliferation or death, understand the localization and distribution of biomarkers in biological tissues, and the method of visualizing antibody-antigen interactions like colour or fluorescence (immunofluorescence) The module includes practical application of the direct and indirect immunohistochemical techniques and diagnostic immunohistochemical markers. This may include directing therapy of tumours through targeting hormone receptors and exploiting monoclonal antibodies.

Title	Code	Semester/Duration	Credits
MYCOLOGY	MLS- MICR- 413	Block – 4 weeks/7	4

A four-week block course to study of the groups of fungi and yeasts regarding their classification, morphology, structural physiology, biochemical functions, methods of inducing disease. It includes brief clinical description of the diseases resulting from fungi, so as to decide on the most suitable samples from which to isolate the organisms and study their growth requirements

Title	Code	Semester/Duration	Credits
MEDICAL ENTOMOLOGY	MLS-PARA-413	Block – 2 weeks/7	2

This is a two- week block course concerned with the (1) study of insects and arthropods (vectors) that have an impact on human health, (2) the transmission of protozoa, viruses, bacteria and worms, that mainly affecting the blood and intestinal tract, (3) study of the habitat, geo-

graphical distribution and morphology of vectors, and (4) the surveillance and control methods used at the personal or environmental levels.

Title	Code	Semester/Duration	Credits
EVIDENCE BASED PRACRTICE IN MEDICAL LABORATORY SCIENCES	MLS-CCHM-414 MLS-HAEM-414 MLS-HIST-414 MLS-MICR-414 MLS-PARA-414	Block – 2 weeks/7	2

This is a two- week-block course that covers the clinical approach of evidence-based laboratory technology as a means to deliver appropriate care in an efficient manner to individual patients. The student should explain: (1) why do we need it. (2) How to integrate research evidence? (3) How to ask the right questions? (4) Searching the literature, (5) critical appraisal of the literature, (6) nature of qualitative research and how to appraise it, (7) systematic review, (8) meta-analysis, (9) developing evidence-based culture and (10) how clinical evidence can change laboratory practice.

Title	Code	Semester/Duration	Credits
ELECTRON MICROSCOPY TECHNIQUES	MLS-HIST-415	Block – 2 weeks/7	2

A two- week block course that includes the theoretical aspects of transmission and scanning electron microscopes noting the similarities and differences, and the methods of manual preparation of biological specimens for examination by each. This includes preparing fixatives such as glutaraldehyde, paraformaldehyde and metastaining with osmium tetra-oxide, dehydration, clearing and embedding in resins, types of resins, ultra-microtomy, staining. It covers the technique of using the ultra-microtome, producing ultrathin sections and staining with uranium acetate, and lead citrate. It involves training students to equipment for automatic preparation of histological and cytological specimens for electron microscopy and use of the automatic stainers. It also includes preparation of photographs, the common immunocytological staining methods for electron microscopy and applying safety measures in electron microscopy units.

Title	Code	Semester/Duration	Credits
CLINICAL CHEMISTRY EQUIPMENTS	MLS-CCHM-421	Block – 6 weeks/8	6

A six-week block course that presents a description of the basics of automatic analysis of clinical analytical chemistry laboratories including technical study of the different apparatuses, their uses that includes the electronic principles of operating them and affecting the interpretation of results. This includes: flame spectrophotometer, spectrophotometers, immunoflourescnce, fast adherence, interpreting mononucleosis test, Western blot test and interpreting the results, immunoblot analysis with care on patients specimens using automatic chemical analyzer, ki-

netic analyses of blood and other body fluids, immune diffusion osmotic measurement equipment, operating electrophoresis, ELISA and interpreting the results, PCR equipment and interpreting the obtained results, operating gas analyzers and chromatography. The technologist should be aware to identify the equipment problem before starting the test and keep inventory of manufacturer and maintenance details for each equipment.

Title	Code	Semester/Duration	Credits
BASIC HAEMATOLOGICAL DIAGNOSIS	MLS-HAEM-421	Block – 6 weeks/8	6

A six- week block course that describes the essential aspects of diagnosing hematologic disease, through an outline of clinical features and diagnostic laboratory criteria which have been detailed in earlier courses. It includes more recent sophisticated (molecular) diagnostic techniques in haematopathology, immunocytochemistry and immunophenotyping, in addition to the use of radioisotopes in the haematology laboratory, or other major emerging technologies before the student is graduated. It involves preparing blood and blood components for transfusion as well as selection of appropriate, compatible components for transfusion. It includes screening of potentials donors and recipients for unexpected antibodies and to select blood which lack offending antigens. It addresses the immunological aspects of umbilical cord blood transplantation and bone marrow transplantation. The diagnostic conclusions should be always audited by a qualified pathologist and/or clinician supervising the technologist.

Title	Code	Semester/Duration	Credits
CYTOGENETICS AND MOLECULAR TECHNIQUES	MLS-HIST-421	Block – 6 weeks/8	6

This is a six- week block course, which goes beyond the introduction in Module MLS-GENE-126, in semester 2. The students should do by themselves the molecular techniques in cytogenetic, utilizing advanced laboratory facilities. This is a preparation for practice in in-service training during this semester.

Title	Code	Semester/Duration	Credits
VIROLOGY TECHNIQUES	MLS- MICR-421	Block – 6 weeks/8	6

A six-week block course that deals with studying the groups of different viruses regarding definition, morphology, structure, replication, vital functions, classification, and ways of causing disease. A brief description of the clinical entities (e.g. hepatitis, influenza, he1pes, polio-AIDs, etc) is needed to specify the type of specimens taken for laboratory diagnosis. It includes isolating the viruses in cell cultures, and studying the disease effects on cells, tissues, organs and systems of the body. It covers the use of electron microscopy, and serological tests used to identify the viruses (complement fixation, direct fluorescence, PCR etc). Studying the routes of infection is important for disease control and prophylaxis.

Title	Code	Semester/Duration	Credits
BASIC PARASITOLOGICAL DIAGNOSIS	MLS-PARA-421	Block – 6 weeks/8	6

A six-week block module that reviews the basic and clinical parasitology in Modules MLS-PARA-223 and MLS-PARA-412, and introduces specific disease problems with clinical history for the students to make appropriate choice of laboratory investigations, show competence in carrying out these investigation through correct procedures and techniques and interpret the results and advice the patient on further steps of management in close contact with the supervising pathologist and/or clinician. The modern diagnostic molecular and immunological techniques should be included in student choice of investigation with realistic economic considerations and patient's capabilities and safety. The diagnostic conclusions should be always audited by a qualified pathologist and/or clinician supervising the technologist.

Title	Code	Semester/Duration	Credits
BASIC CLINICAL CHEMISTRY DIAGNOSIS	MLS-CCHM-422	Block -6 weeks/8	6

This is a six-week block course that reviews the basic Module MLS-CCHM-312 and discusses the role of clinical chemistry in diagnosis of specific disease entities, through clinical survey of patient problems and choice of appropriate investigation of liver function, renal function, blood gases or blood chemistry and provide interpretation of the laboratory results.The module includes a review of enzyme classification, basic molecular structure, functions and clinical importance. It also includes the nomenclature, sources, classes, functions and methods of hormonal assays. It outlines the immunological techniques of investigating and diagnosing disorders of enzymes and hormones.

Title	Code	Semester/Duration	Credits
FIELD TRAINING IN CLINICAL HAEMATOLOGY AND BLOOD BANKING	MLS-HAEM-422	Block – 6 weeks/8	6

A six- week block course based on the community or hospital using a logbook and carrying out. Supervised haematological examination and recording results. The contents of the logbook will be designed according to the common tests used in the country. The list should include testing skills related to prevention and control of blood diseases, as seen by experts from the National Programs in the Ministry of Health.

This course covers the basis and practice of blood banking and blood transfusion. The course reviews understanding blood group immunology, precautions of blood transfusion and methods of detecting antibodies and determining the resulting complications of mismatching the transfused blood. It also covers the organization of haematology laboratory and blood banks in hospitals including methods of collecting, transferring, registering blood samples and recording results and interpreting them, assuring quality control of all tests. The student assumes active role in preparing blood derivatives.

This module may also include a revision immunohaematology, which deals with preparing blood and blood components for transfusion as well as selection of appropriate, compatible components for transfusion. It includes screening of potentials donors and recipients for unexpected antibodies and to select blood, which lack offending antigens. It addresses the immunological aspects of umbilical cord blood transplantation and bone marrow transplantation.

Title	Code	Semester/Duration	Credits
BASIC HISTOPATHOLOGICAL DIAGNOSIS	MLS-HIST-422	Block – 6 weeks/8	6

A six- week block course concerned with the morbid anatomic and histological changes resulting from disease, including light microscopic appearance of inflammation, coagulation, consolidation, granulation, autolysis, tissue necrosis. It is the science of differentiating microscopically between normal and abnormal epithelial, connective, muscular and nervous tissues, the Microscopical characteristics of the common diseases of different body systems and the Microscopical manifestations of wound and bone healing and the basics of routine, special, immunological staining for examining diseased tissues. A technologist should name the lesions and diseases in various body regions, describe in detail the Microscopical appearance of acute and chronic inflammation, appearance of necrosis and fibrosis, recognize the value and technical limitations of needle biopsies and the procedures to reach a diagnosis, and correlate pathological history, radiographs and gross and Microscopical features to suggest a diagnosis. The diagnostic conclusions should be always audited by a qualified pathologist and/or clinician supervising the technologist.

Title	Code	Semester/Duration	Credits
INFECTION CONTROL	MLS-MICRO-422	Block – 6 weeks/ 8	6

A six- week block course that deals with sources of infection in the community and health institutions, in particular as related to medical/facilities, the measures of prevention, disinfection and sterilization, understanding the contagious and contaminating materials and the organisms likely to be transmitted from contacts with such material, identifying the potential sources of infection in laboratory and contamination of specimens, and appreciation the role of personal and laboratory safety measures.

Title	Code	Semester/Duration	Credits
FIELD TRANING IN PARASITOLOGY TECHNIQUES AND INFECTION CONTROL	MLS-PARA-422	Block – 6 weeks/8	6

A six- week block course based in the community or hospital using a logbook and carrying out. Supervised parasitological examination and recording results. The contents of the logbook will be designed according to the common investigations in the country. The list should include testing skills related to prevention, eradication or control of parasitic infections, as seen by experts from the National Programs in the Ministry of Health.

Title	Code	Semester/Duration	Credits
LABORATORY MANAGEMENT AND ECONOMICS	MLS-CCHM-423 MLS-HAEM-423 MLS-HIST-423 MLS-MICRO-423 MLS-PARA-423	Block – 2 weeks/8	2

This two- week block course, which presents detailed description of clinical laboratories management and planning regarding specimen collection, transport and storage and performing the different quality control tests beside studying communication means and analysis and recording the provisional results. The module also includes applying quality control to equipment and adopting safety procedures of clinical laboratories. The details include a short course on general management, administrative organization, laboratory forms, and written procedures for collecting and transporting specimens, protocols of safety, quality control tests, and all economical studies to ensure the feasibility and utilization of services and their cost for the public and owners, especially in complete or partial research laboratories.

Title	Code	Semester/Duration	Credits
HEALTH INFORMATION SYSTEM	MLS-CCHM-424 MLS-HAEM-424 MLS-HIST-424 MLS-MICR-424 MLS-PARA-424	Block – 2 weeks/8	2

This is a two- week block course, which introduces health information system (HIS) – terminology, classification and setup. The students need to spend sometime in the relevant department in the Federal and State Ministry of Health to see how the data collected and compiled. It includes also the internet sources of Health information system; they should prepare a critique of the current systems and suggest a design or protocol for better organization and computation of the laboratory data collected.

Title	Code	Semester/Duration	Credits
GRADUATION PROJECT	MLS-RESH-425	Longitudinal/8	6

This is a longitudinal course reserved to writing a short thesis, which can be a review or experimental research. No formal didactic timetable needed since students had a previous course on research methodology. Students will contact their supervisors to decide on the topic title, and advise students to start and progress in writing. The cost of research and examinations is the responsibility of the candidate.

الجامعة الوطنية ـ السودان
National University Sudan

Undergraduate & Graduate

PROSPECTUS

National University - Sudan

5TH EDITION JULY 2024 - JUNE 2028

National University - Sudan

- Top Quality premises, facilities and policies
- Stimulating, scientific, evidence-based and structured curricula
- Qualified professionals and competent academic researchers
- Individual attention to each student for ideal mentoring
- Continuous multimodality assessment
- Self-directed leaning strategies
- Socail accountability

ISBN 978-99942-841-1-8