

National University

National University – Sudan

Faculty of Graduate Studies

Faculty of Medical Laboratory Sciences

(Ph.D.) & (MS.c.) by Research in Parasitology

1. Introduction (Background)

Doctor of Philosophy (PhD) by Research in Medical Laboratory Sciences are research-intensive postgraduate programs offered by the Faculty of Medical Laboratory Sciences, National University – Sudan, under the academic oversight of the Faculty of Graduate Studies. Both programs are designed to cultivate competent, ethical, and independent scientists who are capable of generating original knowledge and translating laboratory-based discoveries into tangible improvements in patient care and public health.

Candidates are guided by qualified supervisors as they undertake advanced training in biomedical investigation, diagnostic science, laboratory quality management, and scientific communication. Each candidate completes a supervised, independent research project culminating in a dissertation doctoral thesis that addresses a research question of national, regional, or global health relevance and that meets the standard required for dissemination in peer-reviewed scientific journals.

2. Vision

To be recognized as a leading postgraduate program in medical laboratory sciences within Sudan and the wider region — distinguished by the excellence of its biomedical research, its contribution to diagnostic innovation and laboratory quality, and the scientific leadership of its graduates — and, in doing so, to contribute meaningfully to improved healthcare and sustainable national development.

3. Mission

To prepare highly qualified and ethical medical laboratory scientists and biomedical researchers through rigorous, mentored research training, interdisciplinary collaboration, innovation, and evidence-based practice. In pursuing this mission, the Faculty is committed to strengthening national diagnostic capacity, supporting public health decision-making, and developing future leaders for academia, clinical healthcare, research institutions, industry, and regulatory bodies.

4. Goals

- Advance the field of medical laboratory sciences through high-quality, methodologically sound, and clinically relevant research.
- Develop innovative, evidence-based solutions to diagnostic, biomedical, and public-health challenges facing Sudan and the wider region.
- Strengthen laboratory research capacity, infrastructure, and quality-management systems, both nationally and internationally.
- Promote interdisciplinary collaboration among laboratory sciences, medicine, pharmacy, public health, and allied disciplines.

- Foster a culture of ethical research conduct, biosafety compliance, scientific integrity, and responsible data management.
- Generate evidence that informs national and global health priorities and policy.

5. Objectives

By the end of the program, graduates are expected to be able to:

- Design, conduct, and critically evaluate independent research, applying advanced theoretical knowledge, technical proficiency, and analytical rigor.
- Produce original, valid, and clinically or scientifically meaningful research findings suitable for peer-reviewed publication.
- Apply and, where appropriate, develop innovative approaches in laboratory diagnostics, molecular medicine, biotechnology, and laboratory management.
- Demonstrate competence in research methodology, biostatistics, bioinformatics, quality assurance, and scientific writing.
- Apply research findings to support evidence-based diagnosis, disease prevention, treatment monitoring, and public-health decision-making.
- Communicate research effectively to scientific and non-scientific audiences, and contribute to scientific leadership, collaborative networks, and knowledge translation.

6. Research Areas

Candidates may undertake their research within any of the following core disciplines, subject to the availability of qualified supervision:

- Molecular epidemiology
- Antimalarial resistance Molecular markers associated with drug resistance
- Host–parasite interactions
- Parasite genomics: Whole-genome sequencing and genetic variation
- Malaria immunopathology : Cytokines and inflammatory biomarkers
- Molecular diagnostics Development of sensitive molecular diagnostic assays
- Leishmaniasis immunology Immune regulation and disease progression
- Toxoplasma molecular genetics Genetic diversity and strain characterization
- Parasite–host genetics Host genetic polymorphisms affecting susceptibility
- Vector biology Genetic mechanisms

7. Admission Requirements

- A master's degree in medical laboratory sciences, biomedical sciences, or a related discipline from a recognized university.
- A satisfactory academic record and evidence of research competence.

- English language proficiency, in accordance with University requirements.
- An approved preliminary doctoral research proposal demonstrating originality, feasibility, and potential contribution to knowledge.
- Two academic references, preferably including evidence of research or publication experience.
- Fulfilment of the Faculty of Graduate Studies admission requirements.

8. Study Period

Item	Detail
PhD by Research	Minimum duration 3 years; maximum duration 5 years.
Mode of study	Full-time, subject to University regulations.
Language of instruction / thesis	English.

9. General Direction for the Degree

PHD degree is awarded primarily on the basis of independent, supervised research rather than taught coursework. Throughout candidature, students are required to demonstrate satisfactory progress through periodic evaluations conducted by the Faculty, to submit a dissertation or thesis that satisfies the Faculty's regulations on structure, originality, and academic integrity, and to successfully defend their work before an approved examination committee. PhD candidates are expected to demonstrate a substantial and original contribution to knowledge in their chosen field

Progress is typically monitored through an initial approval of the research proposal, at least one annual progress review, and a pre-submission seminar, in accordance with the policies of the Faculty of Graduate Studies. Candidates are expected to adhere to the University's research-ethics and biosafety requirements throughout their period of study, including approval by the relevant institutional ethics or biosafety committee prior to the commencement of data or sample collection.

10. Award of the Degree

The PhD by Research is awarded to candidates who successfully complete an original research project that makes a demonstrable contribution to knowledge, submit a thesis satisfying the Faculty's regulations, successfully defend the thesis in a Viva Voce examination before an approved committee, and fulfil all other University requirements.

11. Supervision and Quality Assurance

Each candidate is assigned at least one qualified supervisor with relevant research expertise in the candidate's chosen area; PhD candidates are typically assigned a main supervisor and at least one co-supervisor. Supervisory panels, examination committees, and research

proposals are reviewed and approved by the Faculty of Graduate Studies to ensure that all research meets institutional standards of scientific rigour, ethical conduct, and relevance to national and regional health priorities.

Faculty of Graduate Studies

Faculty of Medical Laboratory Sciences

(M.Sc.) by Research in Parasitology

1. Introduction (Background)

The Master of Science (MSc) by Research in Medical Laboratory Sciences are one of research-intensive postgraduate programs offered by the Faculty of Medical Laboratory Sciences, National University – Sudan, under the academic oversight of the Faculty of Graduate Studies. program is designed to cultivate competent, ethical, and independent scientists who are capable of generating original knowledge and translating laboratory-based discoveries into tangible improvements in patient care and public health.

Candidates are guided by qualified supervisors as they undertake advanced training in biomedical investigation, diagnostic science, laboratory quality management, and scientific communication. Each candidate completes a supervised, independent research project culminating in a dissertation (MSc) that addresses a research question of national, regional, or global health relevance and that meets the standard required for dissemination in peer-reviewed scientific journals.

2. Vision

To be recognized as a leading postgraduate program in medical laboratory sciences within Sudan and the wider region — distinguished by the excellence of its biomedical research, its contribution to diagnostic innovation and laboratory quality, and the scientific leadership of its graduates — and, in doing so, to contribute meaningfully to improved healthcare and sustainable national development.

3. Mission

To prepare highly qualified and ethical medical laboratory scientists and biomedical researchers through rigorous, mentored research training, interdisciplinary collaboration, innovation, and evidence-based practice. In pursuing this mission, the Faculty is committed to strengthening national diagnostic capacity, supporting public health decision-making, and developing future leaders for academia, clinical healthcare, research institutions, industry, and regulatory bodies.

4. Goals

- Advance the field of medical laboratory sciences through high-quality, methodologically sound, and clinically relevant research.
- Develop innovative, evidence-based solutions to diagnostic, biomedical, and public-health challenges facing Sudan and the wider region.
- Strengthen laboratory research capacity, infrastructure, and quality-management systems, both nationally and internationally.
- Promote interdisciplinary collaboration among laboratory sciences, medicine, pharmacy, public health, and allied disciplines.

- Foster a culture of ethical research conduct, biosafety compliance, scientific integrity, and responsible data management.
- Generate evidence that informs national and global health priorities and policy.

5. Objectives

By the end of the program, graduates are expected to be able to:

- Design, conduct, and critically evaluate independent research, applying advanced theoretical knowledge, technical proficiency, and analytical rigor.
- Produce original, valid, and clinically or scientifically meaningful research findings suitable for peer-reviewed publication.
- Apply and, where appropriate, develop innovative approaches in laboratory diagnostics, molecular medicine, biotechnology, and laboratory management.
- Demonstrate competence in research methodology, biostatistics, bioinformatics, quality assurance, and scientific writing.
- Apply research findings to support evidence-based diagnosis, disease prevention, treatment monitoring, and public-health decision-making.
- Communicate research effectively to scientific and non-scientific audiences, and contribute to scientific leadership, collaborative networks, and knowledge translation.

6. Research Areas

Candidates may undertake their research within any of the following core disciplines, subject to the availability of qualified supervision:

- Molecular epidemiology
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- Molecular diagnostics Development of sensitive molecular diagnostic assays
- Leishmaniasis immunology Immune regulation and disease progression
- Toxoplasma molecular genetics Genetic diversity and strain characterization
- Parasite–host genetics Host genetic polymorphisms affecting susceptibility
- Vector biology Genetic mechanisms

7. Admission Requirements

- A bachelor's degree in medical laboratory sciences, biomedical sciences, or a related discipline from a recognized university.
- A satisfactory academic record and evidence of relevant scientific preparation.

- English language proficiency, in accordance with University requirements.
- An approved preliminary research proposal or a research concept aligned with available supervision.
- Two academic or professional references.
- Fulfilment of the Faculty of Graduate Studies admission requirements.

8. Study Period

Item	Detail
MSc by Research	Minimum duration 2 years; maximum duration 4 years.
Mode of study	Full-time, subject to University regulations.
Language of instruction / thesis	English.

9. General Direction for the Degree

MSc degree is awarded primarily on the basis of independent, supervised research rather than taught coursework. Throughout candidature, students are required to demonstrate satisfactory progress through periodic evaluations conducted by the Faculty, to submit a dissertation or thesis that satisfies the Faculty's regulations on structure, originality, and academic integrity, and to successfully defend their work before an approved examination committee. MSc candidates are expected to demonstrate competence in designing and conducting rigorous research and in critically interpreting laboratory-science findings.

Progress is typically monitored through an initial approval of the research proposal, at least one annual progress review, and a pre-submission seminar, in accordance with the policies of the Faculty of Graduate Studies. Candidates are expected to adhere to the University's research-ethics and biosafety requirements throughout their period of study, including approval by the relevant institutional ethics or biosafety committee prior to the commencement of data or sample collection.

10. Award of the Degree

The MSc by Research is awarded to candidates who successfully complete a supervised research project of appropriate scope and rigour, submit a dissertation satisfying the Faculty's regulations, successfully defend the dissertation before an approved examination committee, and fulfil all other University requirements.

11. Supervision and Quality Assurance

Each candidate is assigned at least one qualified supervisor with relevant research expertise in the candidate's chosen area; Supervisory panels, examination committees, and research proposals are reviewed and approved by the Faculty of Graduate Studies to ensure that all research meets institutional standards of scientific rigour, ethical conduct, and relevance to national and regional health priorities.