National University

الجامعة الوطنية - السودان

National University - Sudan

Postgraduate Diploma

Medical Laboratories Management

Introduction

HealthCare system faces significant challenges in laboratory services, including inadequate infrastructure, a shortage of skilled personnel, and inconsistent adherence to quality standards. These limitations hinder accurate disease diagnosis, effective outbreak response, and overall patient care. To address these gaps, there is an urgent need for specialized training in Clinical Laboratory Management, a field that combines medical laboratory science with leadership, quality assurance, and operational efficiency. Many laboratories in Sudan operate with outdated protocols, insufficient equipment, and weak quality control systems. This program will train professionals in modern laboratory techniques, biosafety, and accreditation standards, ensuring more reliable test results.

General objective

Qualify Laboratory managers to acquire knowledge, skills and attitude in clinical laboratory management through implementation of quality control systems and strategic operational plans.

Specific objectives

The program qualifies the candidates to:

- Apply healthcare administration terminology and principles in laboratory management contexts.
- Demonstrate competent management of clinical laboratories through implementation of quality control systems.
- Develop and execute strategic operational plans for clinical laboratories that comply with national and international standards and ensure patient safety.
- Exhibit professional attitudes by advocating for ethical laboratory practices.

Learning outcomes

Upon successful completion of the program, the graduate shall be able to:

- Apply laboratory quality management principles to ensure compliance with international standards.
- Analyze laboratory workflows to optimize efficiency, cost-effectiveness, and diagnostic accuracy.
- Implement biosafety and biosecurity protocols to minimize risks in laboratory operations.
- Evaluate laboratory data using health informatics tools to improve reporting and decision-making.
- Design corrective action plans to address non-conformities in laboratory testing processes.
- Demonstrate leadership and teamwork to foster a culture of continuous improvement in laboratory settings.
- Advocate for ethical practices and patient safety to uphold professional integrity in laboratory management.
- Adapt to emerging laboratory technologies and global best practices to enhance service delivery in Sudan's healthcare system.

Admission requirements

- Applicants must satisfy the general regulations set by the faculty of graduate studies of the National University- Sudan for registration for postgraduate diploma degree.
- Eligible candidates are B.Sc. (Honors) in Medical Laboratory Sciences from the National University or from an equivalent University or a college. With either of the following grades :
    - Bachelor (General or Honors) with grade Good at least

- Bachelor (General or Honors) with grade Pass plus qualifying courses during one semester, equivalent to 12 credit hours.

Study program

Semester One

Code	Course	Credit hours	Contact hours/Week	
			Theory	Practical
MLM-511	Lab Management and Quality	3 (2+1)	2	2
MLM-512	Strategic Planning in Medical labs	2 (2+0)	2	0
MLM-513	Lab Regulations and Design	2 (2+0)	2	0
MLM-514	Biosafety in Medical Labs	3 (2+1)	2	2
MLM-515	Medical Ethics and Professionalism	2 (2+0)	2	0
MLM-516	Effective Communication in Medical Labs	2 (2+0)	2	0
Total		14 (12+2)	12	4

Semester Two

Code	Course	Credit hours	Contact hours/Week	
			Theory	Practical
MLM-521	Laboratories Business and Marketing	2 (2+0)	2	0
MLM-522	Human Resources Management	2 (2+0)	2	0
MLM-523	Equipment and Methods Evaluation	3 (2+1)	2	2
MLM-524	Accreditation of Medical Laboratories	3 (2+1)	2	2
MLM-525	Laboratory Information System	2 (1+1)	1	2
Total		12 (9+3)	9	6

Courses contents

MLM-511 Lab Management and Quality

Principles of Management; Management Functions; Relative Business and Economic Concepts; Foundation of Leadership; Leadership vs. Management; Quality Management Systems (QMS); Total Quality Management (TQM) & Continuous Improvement. Practical: Internal Auditing Workshop; Corrective Actions; Statistical Process Control (SPC) in the Lab; Method Verification & Validation Exercises; interpretation of control charts.

MLM-512 Strategic Planning in Medical labs

Definition of Strategy; The Need for Strategy in Healthcare; Levels of Strategy; The Strategic Planning Process; Strategy Formulation; Strategy Implementation; Strategy Evaluation and Control; Specific Strategic Challenges in Medical Laboratories; Change Management Theory.

MLM-513 Lab Regulations and Design

Financial Stability within the Diagnostic Laboratories; Impact of Regulatory Requirements; Rules and Regulations of Reimbursement.

MLM-514 Biosafety Regulations in Medical Laboratories

Safety Management Plan and Responsibilities; Laboratory Hazards; Standard Precautions; Hazard Prevention; Risk Assessment and Exposure Control Plan; Facility Design and Engineering Controls; Emergency Preparedness and Response. Practical: Personal Protective Equipment (PPE) Donning and Doffing; Biological Safety Cabinet (BSC) Practical; Pipetting and Aerosol Management; Safe Centrifugation Practices; Spill Response Drills; Sharps Safety and Handling; Decontamination Practices; Waste Segregation Exercise; Fire Safety.

MLM-515 Medical Ethics and Professionalism

Patient Safety; Malpractice Litigation; CMS Serious Reportable Events; Enterprise Risk Management; Insurance; Patient Confidentiality; Contracts, Specimens, Documentation and Research Liability.

MLM-516 Effective Communication in Medical Labs

Successful Communication; Effective Communication in Medical Laboratories Management; Effective Communication Mechanics.

MLM-521 Laboratories Business and Marketing

Setting of Financial Management; Stages of Financial Management; Strategy Planning; Costs, Budgeting and Financial Decision Making; Financial Decision Making; Determination of Profitability.

MLM-522 Human Resources Management

Employee Needs; Employee Selection; Staffing and Scheduling; Human Resources at Local Level; Performance Management: Appraisals and Competency Assessment.

MLM-523 Equipment and Methods Evaluation

Selection and Implementation of New Equipment and Procedures; Measurement of Method Accuracy; Method Description; Introduce a new method; Validation of Methods. Practical: Precision testing; Linearity assessment; Interference studies; Equipment Performance Checks; Correlation coefficient calculation; Documentation & Reporting.

MLM-524 Accreditation of Medical Laboratories

Accreditation vs. licensure and certification; Benefits of accreditation for a lab; key components and structure of the ISO 15189 standard; The Accreditation Journey: A Step-by-Step Process; Internal Audit. Practical: ISO 15189 requirements; Gap Analysis Exercise; Document Control Challenge; Audit Role-Play; Writing Reports; Assessment Simulation; Internal Audit Simulation; Proficiency Testing (PT) Data Review.

MLM-525 Laboratory Information System

Laboratories Information System (LIS); Laboratories Information Management (LIM); LIS Interfaces; Laboratory Informatics; Data Structure; Data Integrity and Security. Practical: Data entry and order management in open-source LIS; Barcode implementation for specimen tracking; Data Visualization & Reporting; Cybersecurity Labs; Encrypting sensitive patient data; Training basic machine learning models to flag abnormal lab results.

Human resource and facilities

Teaching Staff:

- One Professor
- One Associate professor
- Two Assistant Professors
- Two Lecturers

Facilities:

- Two Lecture Rooms 100 Seats each
- Two Clinical Chemistry Laboratories 100 Seats each
- Two Computer Laboratories 100 Seats each
- One E-Library 50 Seats
- Alragi Hospital Laboratories

Duration of the program: Two semesters (32 Weeks). 26 Credit Hours = 465 Contact Hours (Theory= 315 + Practical= 150).

Teaching Modules

Lectures, small groups discussions, seminars, practicals, residential field training, tutorials and assignments.

Teaching Language: English.

Examinations regulations

- Abide by the examinations rules of the general regulations of the graduate studies of the National University-Sudan.
- A student failing any supplementary examination should repeat the course.
- A student scoring less than 60% in the theoretical and / or the practical components of a specialization subject, should sit for a supplementary examination.
- Each student shall conduct a supervised piece of research.

- Duration of the research shall be 16 weeks. If need be, an extension of 4 weeks is allowed if approved by the program coordinator.
- Exceeding the aforementioned period (four weeks) the student has to settle a one semester extra fees to allow her/him an extension of extra four weeks.
- A student scoring less than 60% in the dissertation oral examination will be allowed only one chance for oral defence. In such case the student should settle one semester fees.
- Expiring the extension periods without completing the dissertation, the student shall be dismissed from the program.
- All students shall sit for oral examination at the end of semester three.
- Having scores of less that 60% in defense (Discussion) will be considered as a failing score. As a result of paragraph 19, students will be obliged to pay semester fees.

Assessment:

Continuous assessment	30%
Final examination	70%

(For courses including practical sessions: continuous assessment (theory + practical) = 20%, Final Exam (Theory) = 60%, Final Practical Exam = 20%).

Grading system: A+ (90-100) A (80-89) B+ (75-79) B (70-74) C+ (65-69) C (60-64) F (<60)

Award of the degree:

The Scientific Council of the National University-Sudan, based on the recommendation of the Board of the Faculty of Graduate Studies, shall award the successful candidate a:

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