AOU Medical Laboratory Science — Lecturer Handbook (Part I)

B.MLS · MLSCN pathway · OBE, schemes of work, course-file & CLO–HPO mapping

AKPAKIP ORO UNIVERSITY (AU)

Oro Nation, Akwa Ibom State, Nigeria

FACULTY OF MEDICAL SCIENCES

DEPARTMENT OF MEDICAL LABORATORY SCIENCE

LECTURER HANDBOOK

PART I

B.MLS Medical Laboratory Science

Leading to Eligibility for Licensure with the Medical Laboratory Science Council of Nigeria (MLSCN)

Teaching Schedule, Scheme of Work, Course-File and Outcome-Mapping Requirements

Curriculum Framework: NUC CCMAS + AU Institutional Curriculum, aligned to International Federation of Biomedical Laboratory Science (IFBLS) standards | Quality Framework: Outcome-Based Education (OBE)

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A. Quality Framework, Programme Educational Objectives and Programme Outcomes

A.1 Accreditation and Quality Framework

This handbook is prepared to meet the Nigerian Universities Commission (NUC) Core Curriculum and Minimum Academic Standards (CCMAS), and is additionally structured to prepare graduates for registration with the Medical Laboratory Science Council of Nigeria (MLSCN) and alignment with International Federation of Biomedical Laboratory Science (IFBLS) standards.

Delivery follows Outcome-Based Education (OBE): every course, weekly topic and assessment you set must be traceable to stated Course Learning Outcomes (CLOs) and, in aggregate, to the Programme Outcomes (HPO1-HPO12) listed below. You are responsible for demonstrating this traceability in your course file (Section E).

A.2 Programme Educational Objectives (PEOs)

Within three to five years of graduation, graduates of the Department are expected to:

PEO1: Apply diagnostic laboratory science across haematology, microbiology, chemical pathology and histopathology to support accurate clinical diagnosis and patient management.

PEO2: Attain licensure with the Medical Laboratory Science Council of Nigeria (MLSCN) and progress into laboratory practice, laboratory management, or postgraduate study.

PEO3: Practise medical laboratory science with integrity, precision and ethical judgement grounded in African cultural values of dignity, empathy, inclusion and justice.

PEO4: Deliver reliable, quality-assured diagnostic services responsive to the disease patterns of Niger Delta and Gulf of Guinea populations.

PEO5: Engage in continuous, life-long learning and the responsible application of molecular diagnostics and emerging laboratory technologies throughout a professional career.

A.3 Programme Outcomes (HPO1-HPO12)

Your teaching, assessment design and CLOs must collectively build toward the following twelve outcomes:

No.

Outcome

Description

HPO1

Scientific and Clinical Knowledge

Apply the foundational biomedical, behavioural and clinical sciences relevant to the profession to safe, competent practice.

HPO2

Clinical/Professional Skills and Procedures

Perform the clinical, technical or professional procedures expected of a competent entry-level practitioner.

HPO3

Patient/Client-Centred Communication

Communicate effectively and compassionately with patients, clients, families and communities, respecting their autonomy and dignity.

HPO4

Professionalism and Ethics

Practise with integrity, accountability and adherence to professional codes of ethics and regulatory requirements.

HPO5

Population, Public and Community Health

Apply knowledge of population health, epidemiology and preventive practice to community and public health challenges.

HPO6

Evidence-Based Practice and Research

Critically appraise and apply research evidence to inform practice, and conduct basic research under supervision.

HPO7

Interprofessional Collaboration and Teamwork

Function effectively as a member of multidisciplinary healthcare and research teams.

HPO8

Health Systems, Management and Leadership

Understand the organisation, financing and management of health systems, including resource-limited settings.

HPO9

Cultural Competence and Health Equity

Practise with cultural sensitivity and attention to health equity, particularly within Niger Delta and Gulf of Guinea communities.

HPO10

Health Informatics and Digital Technology

Use health information systems and digital/AI-enabled tools responsibly to support practice and decision-making.

HPO11

Patient Safety and Quality Improvement

Apply patient/client safety principles and participate in continuous quality improvement.

HPO12

Life-Long Learning and Professional Development

Engage in continuous, reflective, life-long learning and professional development.

A.4 How to Use This Handbook

Use the semester scheme in Part B as the minimum teaching framework for every course you teach, and develop a full course file per Section E.

A.5 Credit Unit and Grading Convention

One (1) credit unit is equivalent to one hour of lecture/tutorial contact per week, or two-to-three hours of laboratory/clinical contact per week, over a fifteen-week semester. Your indicative total load across the ten-semester programme is approximately 180-195 credit units. Clinical attachments and internship postings are compulsory, logged, and assessed Pass/Fail where indicated. Continuous assessment typically makes up 30-50% of your grade depending on the course, with the balance from end-of-semester or professional examinations.

B.MLS Medical Laboratory Science

Delivered by the Department of Medical Laboratory Science, Faculty of Medical Sciences, leading to eligibility for licensure with the Medical Laboratory Science Council of Nigeria (MLSCN), with specialisation pathways in Haematology & Blood Transfusion, Medical Microbiology, Chemical Pathology, and Histopathology & Cytology.

Programme Emphasis

The programme trains medical laboratory scientists competent in diagnostic testing across haematology, microbiology, chemical pathology and histopathology, meeting MLSCN requirements and aligned with international clinical laboratory standards (e.g. IFBLS), with particular attention to the diagnostic needs of the Niger Delta and Gulf of Guinea.

Curriculum Structure — Semester-by-Semester Summary

Semester

Level

Academic Theme

Semester 1

100 Level, First Semester

Foundations of Medical Laboratory Science I

Semester 2

100 Level, Second Semester

Foundations of Medical Laboratory Science II

Semester 3

200 Level, First Semester

Core Laboratory Sciences I

Semester 4

200 Level, Second Semester

Core Laboratory Sciences II

Semester 5

300 Level, First Semester

Specialty Diagnostic Sciences I

Semester 6

300 Level, Second Semester

Specialty Diagnostic Sciences II

Semester 7

400 Level, First Semester

Specialised Laboratory Practice

Semester 8

400 Level, Second Semester

Research and Internship I

Semester 9

500 Level, First Semester

Research and Internship II

Semester 10

500 Level, Second Semester

Integrated Professional Readiness

Semester 1 — 100 Level, First Semester

Academic Theme: Foundations of Medical Laboratory Science I

Registered Courses

Code

Course Title

Units

Status

Prerequisite

GST 101

Communication in English I

2

C

None

GST 103

Nigerian Peoples and Culture

2

C

None

BIO 101

General Biology I

3

C

None

CHM 101

General Chemistry I

3

C

None

PHY 101

General Physics I

3

C

None

STA 101

Introductory Biostatistics I

2

C

None

MLS 101

Introduction to Medical Laboratory Science

2

C

None

Total Units This Semester

17

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Foundational biology, chemistry, physics and biostatistics; orientation to the medical laboratory science profession.

Coursework Requirements

Science problem sets and practicals

Biostatistics exercises

Career reflection essay

Semester 2 — 100 Level, Second Semester

Academic Theme: Foundations of Medical Laboratory Science II

Registered Courses

Code

Course Title

Units

Status

Prerequisite

GST 102

Communication in English II

2

C

GST 101

GST 104

Use of Library, Study Skills and ICT

1

C

None

BIO 102

General Biology II

3

C

BIO 101

CHM 102

General Chemistry II

3

C

CHM 101

PHY 102

General Physics II

2

C

PHY 101

MLS 102

Medical Laboratory Safety and Quality Assurance I

2

C

None

MLS 104

Introductory Human Anatomy and Physiology

3

C

BIO 101

Total Units This Semester

16

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Chemistry and physics continuation; laboratory safety and quality assurance principles; introductory anatomy and physiology.

Coursework Requirements

Chemistry/physics practicals

Laboratory safety checklist

Anatomy/physiology assignment

Semester 3 — 200 Level, First Semester

Academic Theme: Core Laboratory Sciences I

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 201

Human Anatomy and Physiology II

3

C

MLS 104

MLS 203

Medical Biochemistry I

3

C

CHM 102

MLS 205

General Microbiology

3

C

BIO 102

MLS 207

Haematology I

3

C

MLS 104

MLS 209

Immunology and Serology I

2

C

MLS 104

GST 201

Entrepreneurship Studies I

2

C

None

MLS 291

Clinical Attachment I

0

C

Pass/Fail, logged

Total Units This Semester

16

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Anatomy/physiology continuation; biochemistry fundamentals; general microbiology; introductory haematology; immunology/serology; supervised clinical attachment begins.

Coursework Requirements

Biochemistry practicals

Microbiology lab reports

Haematology practicals

Clinical attachment logbook

SIWES

Students begin supervised clinical/laboratory attachment, in accordance with the approved placement arrangement.

Semester 4 — 200 Level, Second Semester

Academic Theme: Core Laboratory Sciences II

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 202

Medical Biochemistry II

3

C

MLS 203

MLS 204

Medical Microbiology I (Bacteriology)

3

C

MLS 205

MLS 206

Haematology II

3

C

MLS 207

MLS 208

Histopathology Techniques I

2

C

None

MLS 210

Immunology and Serology II

2

C

MLS 209

GST 202

Entrepreneurship Studies II

2

C

GST 201

Total Units This Semester

15

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Biochemistry continuation; bacteriology; advanced haematology; histopathology technique fundamentals; immunology/serology continuation.

Coursework Requirements

Biochemistry practicals

Bacteriology lab reports

Haematology practicals

Histology slide preparation exercise

Semester 5 — 300 Level, First Semester

Academic Theme: Specialty Diagnostic Sciences I

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 301

Chemical Pathology I

3

C

MLS 202

MLS 303

Medical Microbiology II (Virology and Mycology)

3

C

MLS 204

MLS 305

Haematology III (Blood Transfusion Science)

3

C

MLS 206

MLS 307

Histopathology Techniques II

2

C

MLS 208

MLS 309

Medical Parasitology

3

C

MLS 205

MLS 391

Clinical Attachment II

0

C

Pass/Fail, logged

Total Units This Semester

14

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Clinical chemistry fundamentals; virology and mycology; blood transfusion science; advanced histopathology technique; parasitology relevant to the region.

Coursework Requirements

Chemical pathology practicals

Virology/mycology lab reports

Blood transfusion practicals

Parasitology practicals

Semester 6 — 300 Level, Second Semester

Academic Theme: Specialty Diagnostic Sciences II

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 302

Chemical Pathology II

3

C

MLS 301

MLS 304

Cytopathology

2

C

MLS 307

MLS 306

Clinical Microbiology

3

C

MLS 303

MLS 308

Molecular Diagnostics and Biotechnology

3

C

MLS 202

MLS-E1

Specialisation Elective (choose one; see options below)

3

E

Varies

Total Units This Semester

14

Specialisation / Pathway Options

Code

Option Title

MLT-A01

Haematology and Blood Transfusion Fundamentals

MLT-B01

Medical Microbiology Fundamentals

MLT-C01

Chemical Pathology Fundamentals

MLT-D01

Histopathology and Cytology Fundamentals

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Advanced chemical pathology; cytopathology; clinical microbiology correlation; molecular diagnostics and PCR-based techniques.

Coursework Requirements

Chemical pathology practicals

Cytology slide review

Clinical microbiology case study

Molecular diagnostics lab report

Semester 7 — 400 Level, First Semester

Academic Theme: Specialised Laboratory Practice

Students formally declare one specialisation pathway at the start of Semester 7, carried through Semester 8: (A) Haematology and Blood Transfusion Science, (B) Medical Microbiology, (C) Chemical Pathology, or (D) Histopathology and Cytology.

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 401

Laboratory Management and Quality Systems

2

C

MLS 102

MLS 403

Research Methods in Medical Laboratory Science

2

C

None

MLS 405

Professional Ethics and Jurisprudence (MLSCN)

1

C

None

MLS 407

Advanced Clinical Chemistry

3

C

MLS 302

MLS 409

Public Health Microbiology

2

C

MLS 306

MLS 411

Laboratory Information Systems

2

C

None

MLS-P1

Pathway Course (choose track A, B, C or D)

3

E

Declared pathway

Total Units This Semester

15

Specialisation / Pathway Options

Code

Option Title

A - MLS 413

Advanced Blood Transfusion Science

B - MLS 415

Advanced Clinical Microbiology

C - MLS 417

Advanced Chemical Pathology

D - MLS 419

Advanced Histopathology and Cytology

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Fieldwork

At least one supervised laboratory/field exercise relevant to the declared pathway shall be undertaken.

Coursework Requirements

Quality systems audit exercise

Research proposal

Advanced clinical chemistry practicals

Pathway case study report

Semester 8 — 400 Level, Second Semester

Academic Theme: Research and Internship I

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 402

Research Project I

3

C

MLS 403

MLS 404

Internship/Clinical Posting I

4

C

None

MLS 406

Laboratory Safety and Biorisk Management

2

C

MLS 102

MLS-P2

Pathway Course (continuation of declared track)

3

E

Declared pathway

MLS 408

Seminar in Medical Laboratory Science

1

C

None

Total Units This Semester

13

Specialisation / Pathway Options

Code

Option Title

A - MLS 412

Transfusion Medicine Practicum

B - MLS 414

Clinical Microbiology Practicum

C - MLS 416

Clinical Chemistry Practicum

D - MLS 418

Anatomic Pathology Practicum

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Output

Research project data collection begins; supervised internship/clinical posting in an accredited laboratory; biorisk management training.

Coursework Requirements

Research project proposal defence

Internship logbook

Pathway practicum logbook

Semester 9 — 500 Level, First Semester

Academic Theme: Research and Internship II

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 501

Research Project II

3

C

MLS 402

MLS 503

Internship/Clinical Posting II

4

C

MLS 404

MLS 505

Advanced Molecular Diagnostics

2

C

MLS 308

MLS 507

Health Laboratory Policy and Regulation

2

C

MLS 401

MLS 509

Point-of-Care Testing and Emerging Technologies

2

C

None

Total Units This Semester

13

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Focus

Research project data analysis; continued internship; advanced molecular diagnostics; laboratory policy and regulation; point-of-care testing technologies.

Coursework Requirements

Research project interim report

Internship logbook

Molecular diagnostics case study

Semester 10 — 500 Level, Second Semester

Academic Theme: Integrated Professional Readiness

Registered Courses

Code

Course Title

Units

Status

Prerequisite

MLS 502

Research Project III (Final Report and Defence)

3

C

MLS 501

MLS 504

Internship/Clinical Posting III

4

C

MLS 503

MLS 506

Professional Practice and Licensure Preparation (MLSCN)

2

C

MLS 405

MLS 508

Seminar in Medical Laboratory Science II

1

C

MLS 408

MLS 599

Final Qualifying Examination

0

C

Pass/Fail

Total Units This Semester

10

Weekly Teaching Scheme of Work

Weeks

Topics / Learning Activities

Requirements

Complete and defend the research project; complete final internship/clinical posting; prepare for MLSCN licensure examination.

Graduation Portfolio Requirements

Transcript

Clinical attachment and internship logbooks

Research project report

MLSCN licensure examination readiness record

Professional development portfolio

D. Common Teaching and Assessment Schedule

A normal fifteen-week teaching semester shall generally follow:

Week(s)	What Happens
Week 1	Orientation / course introduction.
Weeks 2-5	Core theory and guided tutorials.
Week 6	Continuous assessment / test.
Weeks 7-10	Advanced theory plus laboratory/clinical/practical activities.
Week 11	Practical/coursework assessment.
Weeks 12-13	Integrated case-based/problem-based learning.
Week 14	Revision and case presentations.
Week 15	Final revision / course completion.
Examination period	As separately published by the University.

D.1 Coursework Principle

Every course should normally contain a balanced combination of individual assignments, group problem-solving, tutorials, laboratory/clinical/practical work, quizzes/tests, case studies, technical reports and presentations. Lecturers shall not rely exclusively on final examinations.

E. Lecturer Course-File Requirement

For every course, you shall compile and maintain a course file containing:

Course specification (aims, CLOs, credit load, contact hours).

Course Learning Outcomes (CLOs), mapped to Programme Outcomes (HPO1-HPO12).

Weekly scheme of work.

Lecture materials.

Tutorial questions.

Practical/clinical/laboratory manual, where applicable.

Assignment questions.

Quiz/test instruments.

Examination paper.

Marking scheme.

Attendance record.

Student feedback.

CLO attainment analysis.

HPO mapping evidence.

Course review report.

F. Student Weekly Study Model (For Lecturer Awareness)

Maintain a personal Clinical Attachment Logbook and Professional Portfolio throughout your five years, consolidating practical reports, attachment evaluations and reflective notes. You will need this evidence for MLSCN licensure examination and registration.

Appendix I: Course Learning Outcome (CLO) to Programme Outcome (HPO) Mapping — Template and Worked Example

Every course specification in your course file (Section E) must include a CLO-HPO mapping matrix of this form. A worked example is provided below.

Worked Example — MLS 407: Advanced Clinical Chemistry

Course Learning Outcome

Mapped Programme Outcome(s)

CLO1: Perform and quality-control standard clinical chemistry assays accurately.

HPO1, HPO2, HPO11

CLO2: Interpret clinical chemistry results in relation to disease states.

HPO1, HPO6

CLO3: Troubleshoot common analytical and pre-analytical errors in the laboratory.

HPO2, HPO11

CLO4: Report clinical chemistry findings clearly to requesting clinicians.

HPO3, HPO7

Appendix II: Course Specification Template

Use this template as the first page of every course file (Section E):

Course Code and Title:

Credit Units / Status (Core or Elective):

Pre-requisite(s):

Level and Semester:

Course Aim(s):

Course Learning Outcomes (CLO1-CLOn):

CLO-to-HPO Mapping Matrix (see Appendix I):

Weekly Topics (15-week scheme):

Teaching Methods (lecture/tutorial/laboratory/clinical ratio):

Assessment Breakdown (continuous assessment % / examination %):

Recommended Textbooks and References:

Required Equipment/Facilities:

Appendix III: Recommended Textbooks and References

This master reading list supports the 'Recommended Textbooks and References' field of the Course Specification Template (Appendix II).

Appendix III.1 — B.MLS Medical Laboratory Science

Haematology and Blood Transfusion Science

Bain, B.J. — Dacie and Lewis Practical Haematology, Elsevier.

Hoffbrand, A.V. and Moss, P.A.H. — Essential Haematology, Wiley-Blackwell.

Mollison, P.L. — Blood Transfusion in Clinical Medicine, Wiley-Blackwell.

Medical Microbiology and Parasitology

Murray, P.R., Rosenthal, K.S. and Pfaller, M.A. — Medical Microbiology, Elsevier.

Cheesbrough, M. — District Laboratory Practice in Tropical Countries, Cambridge University Press.

Chemical Pathology and Clinical Chemistry

Burtis, C.A., Ashwood, E.R. and Bruns, D.E. — Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, Elsevier.

Histopathology and Cytopathology

Bancroft, J.D. and Gamble, M. — Theory and Practice of Histological Techniques, Elsevier.

Bibbo, M. and Wilbur, D. — Comprehensive Cytopathology, Elsevier.

Immunology, Molecular Diagnostics and Biotechnology

Abbas, A.K., Lichtman, A.H. and Pillai, S. — Cellular and Molecular Immunology, Elsevier.

Laboratory Management, Quality and Professional Practice

Medical Laboratory Science Council of Nigeria (MLSCN) — Code of Professional Conduct, current edition.

CLSI — Clinical Laboratory Quality Management guidelines, current edition.