



Jordan University of Science and Technology
Faculty of Applied Medical Sciences
Allied Medical Sciences Department

LM781 Advanced Diagnostic Molecular Biology - JNQF Level: 7

Second Semester 2025-2026

Course Catalog

3 Credit Hours. This course provides advanced theoretical knowledge of molecular biology principles and their application in clinical molecular diagnostics. It focuses on nucleic acid structure and function, gene expression, and regulatory mechanisms as the foundation for modern diagnostic technologies. Emphasis is placed on advanced molecular diagnostic techniques used in clinical laboratories for disease detection, prognosis, and therapeutic monitoring, including nucleic acid-based assays, genomic technologies, and biomarker analysis. The course also covers quality assurance, analytical workflows, and clinical interpretation of molecular test results in oncology, infectious diseases, and genetic disorders. Through integration of foundational concepts with clinical applications, the course enhances critical thinking and prepares graduate students in Medical Laboratory Sciences to understand, evaluate, and apply advanced molecular diagnostic methodologies in contemporary laboratory practice.

Teaching Method: On Campus

Text Book

| | |
|--------------------------|-------------------------------|
| Title | Molecular biology of the cell |
| Author(s) | Alberts |
| Edition | 5th Edition |
| Short Name | 1 |
| Other Information | |

Course References

| Short name | Book name | Author(s) | Edition | Other Information |
|------------|--------------------------|-----------|-------------|-------------------|
| 2 | Human molecular genetics | Reed | 5th Edition | |

Instructor

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|-----------------|-------------------|
| Name | Dr. MARYA OBEIDAT |
| Office Location | - |

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|--------------|--|
| Office Hours | Mon : 10:00 - 12:00 Tue : 10:30 - 11:30 Wed : 10:00 - 12:00 Thu : 10:30 - 11:30 |
| Email | mmobeidat82@just.edu.jo |

| Class Schedule & Room |
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| Section 1: Lecture Time: Wed : 13:30 - 16:30 Room: M1306 |

| Tentative List of Topics Covered | | |
|----------------------------------|--|-------------------|
| Weeks | Topic | References |
| Week 1 | DNA and RNA Review | From 1, From 2 |
| Weeks 2, 3 | DNA Manipulation part 1 (Amplification based assays) | From 1, From 2 |
| Weeks 4, 5 | PCR applications in Diagnostics and Forensics | From 1, From 2 |
| Weeks 6, 7 | DNA Manipulation Part 2 (Hybridization based assays) | From 1, From 2 |
| Week 8 | Midterm Exam | From 1, From 2 |
| Week 9 | Sequencing Technologies in Clinical Diagnostics | From 1, From 2 |
| Week 10 | Gene expression and its Regulation | From 1, From 2 |
| Weeks 11, 12 | Gene expression Diagnostics (RNA and Protein) | From 1, From 2 |
| Weeks 13, 14 | Molecular Diagnostics Applications | From 1, From 2 |
| Week 15 | Pre-Analytical and Analytical Considerations | From 2 |
| Week 16 | Students Presentations | |

| Mapping of Course Outcomes to Program Outcomes and NQF Outcomes | Course Outcome Weight (Out of 100%) | Assessment method |
|--|-------------------------------------|-------------------|
| Understand the mechanisms that regulate DNA, RNA and protein synthesis. [1L7K1] | 10% | |

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|---|-----|--|
| Describe the various mechanisms of gene expression regulation and its contribution to the field of epigenetics. [1L7K1] | 10% | |
| Understand the different molecular methods used in molecular diagnosis. [1L7K1] | 20% | |
| Conduct critical analysis of molecular biology research [1L7S2] | 20% | |
| Develop skills of scientific synthesis required to conduct molecular biology research [1L7S1] | 10% | |
| Choose proper strategies to manipulate and study the changes in DNA, RNA and proteins to understand their roles in disease development. [1L7C4] | 15% | |
| Apply proper diagnostic techniques in different clinical setups. [1L7C4] | 15% | |

| Relationship to NQF Outcomes (Out of 100%) | | | |
|--|------|------|------|
| L7K1 | L7S1 | L7S2 | L7C4 |
| 40 | 10 | 20 | 30 |

| Evaluation | |
|-----------------|--------|
| Assessment Tool | Weight |
| Midterm | 30% |
| Presentation | 20% |
| Final | 50% |

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