



**Jordan University of Science and Technology**  
**Faculty of Veterinary Medicine**  
**Veterinary Medicine And Surgery Department**

VM725 Concepts And Methods Of Antimicrobial Resistance

Second Semester 2024-2025

**Course Catalog**

3 Credit Hours. This course explores the fundamental and advanced concepts of antimicrobial resistance (AMR), its drivers, and global impact. Students will learn how bacteria develop and transmit resistance, study key mechanisms (enzymatic inactivation, efflux pumps, target modification), and train in phenotypic and molecular laboratory detection methods. Practical sessions emphasize antimicrobial susceptibility testing (AST) and resistance mechanism detection using conventional microbiology. The course also introduces bioinformatics tools for whole genome sequencing (WGS) analysis to detect resistance genes in silico, focusing on simple and accessible platforms.

**Teaching Method:** On Campus

**Text Book**

|                          |   |
|--------------------------|---|
| <b>Title</b>             | Antimicrobial Resistance in Bacteria from Livestock and Companion Animals |
| <b>Author(s)</b>         | Schwarz, S., Cavaco, L. M., & Shen, J.                                    |
| <b>Edition</b>           | 1st Edition   |
| <b>Short Name</b>        | 1   |
| <b>Other Information</b> | 2018  |

**Instructor**

|                 |                                 |
|-----------------|---------------------------------|
| Name            | <b>Prof. Mohammad Gharaibeh</b> |
| Office Location | G1 L-1                          |
| Office Hours    |                                 |
| Email           | mhgharaibeh@just.edu.jo         |

**Class Schedule & Room**

**Section 1:**

Lecture Time: Mon : 14:00 - 16:00

Room: LAB

**Tentative List of Topics Covered**

| <b>Weeks</b> | <b>Topic</b>  | <b>References</b> |
|--------------|---|-------------------|
| Week 1       | Introduction to AMR: definitions, history, and global burden                                | From 1            |
| Week 2       | Mechanisms of resistance: enzymatic inactivation, efflux, target modification               | From 1            |
| Week 3       | Genetic basis of resistance: plasmids, transposons, integrons, horizontal gene transfer     | From 1            |
| Week 4       | Antimicrobial susceptibility testing: principles, CLS/EUCAST standards                      | From 1            |
| Week 5       | Laboratory methods: disk diffusion, MIC determination, E-test                               | From 1            |
| Week 6       | Detection of specific resistance mechanisms: ESBL, carbapenemase, MRSA, colistin resistance | From 1            |
| Week 7       | Molecular and rapid diagnostic methods  | From 1            |
| Week 8       | Quality control in AST and resistance detection   | From 1            |
| Week 9       | Introduction to WGS and bioinformatics  | From 1            |
| Week 10      | Hands-on: ResFinder, CARD, AMRFinderPlus  | From 1            |
| Week 11      | One Health perspectives on AMR (animals, humans, environment)                               | From 1            |
| Week 12      | National and international AMR surveillance systems (WOAH, WHO, FAO)                        | From 1            |
| Week 13      | Case studies: interpreting lab results and applying to clinical/veterinary practice         | From 1            |
| Week 14      | Student presentations and discussion of emerging AMR challenges                             | From 1            |
| Week 15      | Course review and preparation for final assessment 1  |                   |
| Week 16      | Course review and preparation for final assessment 2  |                   |

**Policy**

|                    |  |
|--------------------|--|
| Attendance         | 80% minimum for theory and practical sessions. |
| Academic Integrity | Plagiarism and data fabrication not tolerated. |

Date Printed: 2025-09-02