Odesa I. I. Mechnikov National University

Faculty of Biology

Department of Microbiology, Virology and Biotechnology

COURSE SYLLABUS

Course title: Applied Problems of Virology

Workload	Credits – 3, Hours – 90, Content Modules – 2
Semester, Years of Study	Full-time program: Year – 1, Semester – 1 (Autumn)
Days, Time, Location	According to the schedule
Workplace	Faculty of Biology, Department of Microbiology, Virology and Biotechnology
Consultations	The consultation schedule is provided by the instructor during the first lecture

COMMUNICATION

Communication in the classroom is conducted according to the schedule. Outside class hours, students may ask questions during consultations (the schedule is provided by the instructor during the first class).

Other forms of communication include offline and online Zoom consultations.

COURSE ANNOTATION

Subject of study: applied problems in virology.

Prerequisites: effective learning in "Applied Problems of Virology" is enhanced if students have previously completed courses in Virology, Microbiology, Genetics, Molecular Biology and Biotechnology.

Postrequisites: knowledge acquired in this course may be useful for research internships and preparation of the Master's thesis.

Purpose of the course "Applied Problems of Virology". Purpose: to provide theoretical foundations of modern molecular-genetic and molecular-biological research methods used to address applied problems in virology and to diagnose viral diseases of humans, animals and plants. Medical, veterinary and plant virology are considered as key areas of applied virology.

Objectives of the discipline:

- Introduce current problems in applied virology.
- Introduce methods for detecting plant, human and animal pathogens.
- Introduce targeted virology approaches.
- Explain contemporary advantages and limitations of phage therapy.

- Present the theoretical foundations of practical methods used in laboratory virus diagnostics.
- Introduce viral structures as tools in nanotechnology.
- Introduce modern methods in bioengineering, genetic engineering and gene therapy.
- Introduce current plant-cloning methods.
- Explain the optimisation and modification of diagnostic methods for disease detection and studies of viral biodiversity and ecology.

Learning Outcomes

Upon completion, students should be able to apply knowledge and skills to problems in medicine, veterinary medicine, biotechnology and nanobiotechnology; know molecular-genetic and molecular-biological methods used in applied virology; and understand recombinant-DNA construction, indirect expression of genetically engineered products and gene-isolation approaches.

COURSE DESCRIPTION

Forms and Methods of Instruction

Forms and methods of instruction: the course is delivered through lectures (20 hours)*, seminar classes (10 hours)* and independent student study (60 hours)*.

Teaching methods include lectures, explanation, discussion, instruction, problem-based discussion, multimedia presentations, demonstrations, oral questioning and test exercises.

* may vary for Ukrainian and English language classes

COURSE CONTENT

CONTENT MODULE I. MEDICAL, VETERINARY AND PLANT VIROLOGY AS KEY AREAS OF APPLIED VIROLOGY

TOPIC 1. Introduction. Concepts of general and applied virology.

TOPIC 2. Viral ecology as a component of applied virology.

TOPIC 3. Bacteriophagy.

TOPIC 4. Phagolysis.

CONTENT MODULE II. MODERN METHODS OF VIRAL BIOENGINEERING

TOPIC 5. Phage therapy.

TOPIC 6. Nanotechnology.

TOPIC 7. Targeted virology.

TOPIC 8. Plant cloning.

ASSESSMENT

Assessment includes 1) current assessment and 2) periodic assessment. Current assessment includes oral questioning and defence of an individual research-oriented assignment during lectures and seminars. Periodic assessment consists of testing after each content module. Final assessment is an examination. Final certification takes account of all current, periodic and final assessment results.

Score range	Performance descriptor
90–100	Complete, independent and well-argued command of the material; correct application of theoretical knowledge and practical skills; independent conclusions.
75–89	Sufficiently complete command of the material; correct completion of most tasks; minor inaccuracies.
60–74	Reproduction of core material and completion of typical tasks; some substantial difficulties and errors.
35–59	Fragmentary command of the material; substantial errors; tasks completed only partly.
0–34	Material not mastered; tasks not completed or only isolated elements completed.

ECTS grading scale: 90–100 A (Excellent); 85–89 B (Good); 75–84 C (Good); 70–74 D (Satisfactory); 60–69 E (Satisfactory); 35–59 FX (Fail, resit permitted); 0–34 F (Fail, course must be repeated).

COURSE POLICY

Deadlines and resits: students who miss classes for valid reasons must complete relevant work in consultation with the instructor. Academic integrity: plagiarism, fabrication, falsification and other violations are not permitted; sanctions are applied under Ukrainian law and ONU regulations. Artificial intelligence: AI-generated text, images, models, data or other outputs may not be submitted as a student’s own work unless use is expressly authorised and disclosed. AI tools are prohibited during final assessment unless otherwise authorised by the instructor.