

## Molecular Biology (2<sup>nd</sup> year)

**No. of credits** 4

**Subject structure (weekly assigned hours)**

Semester	Lecture	Seminar	Practical session	Project
III	2	-	1	-

### Subject status

Compulsory

### Person in charge

Lecturer Anița Dragoș Constantin DVM PhD

### Subject objectives (lectures and applications)

- Accumulation of general notions of molecular biology, emphasizing the importance of molecular biology investigation in the diagnosis, the emergence and reemergence of infectious and parasitic diseases, ways of prevention.
- Learning specific techniques DNA, RNA (DNA, RNA extraction, electrophoresis, PCR)
- Participation in specific techniques of protein (protein extraction, electrophoresis) used in veterinary medicine.
- Laboratory and computer- based tools that can be used to study gene and genome identity and function (“molecular tools”),
- To introduce students in performing and interpreting laboratory results and their correlation with clinical cases

### Subject content (syllabus)

**Lectures: 28 hours**

Lectures	No hours
Introduction. Organization of cells and cellular compartments. The various definitions and history of the gene. The discovery of DNA	2
DNA: the support of hereditary information. Structure of DNA. Topology of DNA	2
Molecular mechanism of DNA replication	2
RNA : Transcription, Types/Structures, RNA Polymerases.	2
Protein structure and function	2
Genes and the genetic code	2
Techniques of Molecular Biology - Nucleic Acids: Isolation, Purification, Detection, and Hybridization.	2
Recombinant DNA Technology	2
Techniques of Molecular Biology - Fundamentals of the Polymerase Chain Reaction.	2
Specific types of Polymerase Chain Reaction	2
DNA Sequencing—General Principle	2
Bioinformatics and Computer Analysis. Tools	2
Bioinformatics and Computer Analysis. Analysis and interpretations	2
Proteomics: The Global Analysis of Proteins	2

Practical work/seminar/project: **14 hours**

Practical session	Nr. ore
<b>First semester</b>	
Safety rules applicable during the practical works. The molecular biology laboratory - The laboratory set-up.	2
Performance of assay - Sample preparation	2
Performance of assay - DNA and RNA extraction	2
Classical PCR and Real Time PCR set-up	2
Agarose gel electrophoresis, Electrophoretic conditions, Visualising the DNA	2
Interpretation of PCR results, General PCR problems. Theoretical examination.	2
Bioinformatics- Principles of bioinformatics and sequence analysis	2

## **Bibliography**

### COMPULSORY BIBLIOGRAPHY:

1. Electronic course and practical work support – PPT presentations
2. Aniță Dragoș Constantin. Molecular biology, 2020, Ion Ionescu de la Brad Ed. Iași, ISBN 978-973-147-361-1

### OPTIONAL BIBLIOGRAPHY:

1. Molecular Diagnostic PCR Handbook 2005, Authors: Gerrit J. Viljoen, Louis H. Nel, John R. Crowther
2. Molecular Biology of the Gene, 7th Edition 2014, Authors: James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick

## **Subject content knowledge (Final evaluation)**

Evaluation type	Evaluation methods	Percentage from final
Exam	MCQ test	60%
Lecture attendance	Presence	20%
Laboratory assessment	Theoretical examination	20%

## **Contact person**

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