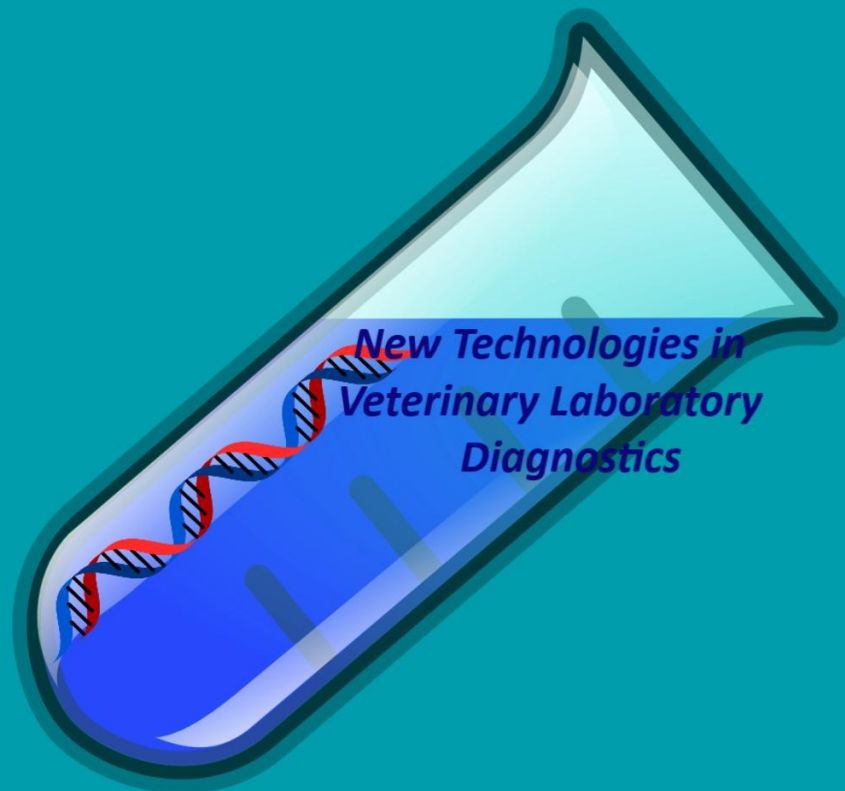


# ***New Technologies in Veterinary Laboratory Diagnostics***

***Informational Guide to Studies  
2021-2022***



## 1. Introduction

The Center of Continuing Education and Lifelong Learning (CCELL) of the Agricultural University of Athens (AUA) welcomes you to the Training Programme titled "**New Technologies in Veterinary Laboratory Diagnostics**". The duration of the course is **100 hours**, and it is provided **exclusively remotely** (online, asynchronous education), **in English**.

Scientific Coordinator of the training program is **John Ikonomopoulos** (Professor of Veterinary Microbiology, AUA)

## 2. Purpose

- **Disseminate the knowledge** necessary to understand the possibilities and limitations of the new technologies applied in microbiology laboratory diagnostics, with a view to broadening **their routine application**, towards improving the protection of public and animal health.
- The creation of the infrastructure that can promote **technical expertise** and **know-how** among **students and professionals** in the field of Animal Science.

## 3. Program necessity

During the last two decades, the progress recorded in the field of microbiology laboratory diagnostics has been remarkable! This was achieved thanks to technical innovations that resolved limitations of conventional methodologies, expanding our know-how and capacity for in-depth investigation of the causation, and spread of infectious diseases. However, the integration of this technological progress into practice proved a major challenge, since the level of training required for its reliable application is high, and the scientific knowledge necessary for its understanding, wide. In consequence, the transfer of this technology to practice, or in other words, **its translational potential**, is low. This **knowledge gap** is addressed by the training program titled "New Technologies in Veterinary Laboratory Diagnostics", which **aims to** the dissemination of the knowledge required to reliably apply this technology routinely, towards improving the protection of public and animal health.

## 4. Learning objectives

### A. Knowledge

- The in-depth understanding of the principles of use, methodology, and specifications of the state-of-the-art methods currently incorporated to veterinary microbiology laboratory diagnostics.
- Become familiar with the digital technologies required to support the application of state-of-the-art veterinary microbiology laboratory diagnostics in practice: digital repositories of molecular data analysis and free access software for the design of oligonucleotide probes and primers.
- Become familiar with the use of open access online records and scientific literature on the spread of infectious diseases of animals and the application of innovative methods of microbiology laboratory diagnostics.
- Become familiar with the software and user interface of hardware laboratory diagnostics (PCR, real time PCR, RT-PCR, MALDI-TOF, IMAGE ANALYSIS, ELISA).

### B. Skills

- Strengthen the ability to independently investigate and organize, towards promoting self-improvement and technical expertise.
- Improvement of critical, combinatorial, and inductive ability.

### C. Abilities

- The critical evaluation of technical reports (analysis and evaluation protocols) [KNOWLEDGE, COMPREHENSION].
- The ability to design and combine methods that fall within the scope of the training program [KNOWLEDGE, COMPREHENSION].
- The ability to supervise the application of methods that fall within the scope of the training program and integrate them into a functional plan of quality assurance [ANALYSIS].
- To combine the knowledge and theoretical expertise required for the analysis of the scientific information available for the purpose of evaluating and implementing public health protection measures in animal production [ANALYSIS].

## 5. Target group

- ✓ Professionals engaged in microbiology laboratory diagnostics, particularly detection of diagnostic indicators associated with the presence of microbial pathogens in samples collected from animals and animal products.
- ✓ Graduates and students of postgraduate studies whose subject is similar to the above mentioned.
- ✓ Undergraduate students in higher educational institutions and technical schools that provide training in microbiology laboratory diagnostics.

## 6. Structure of the Training Programme

Module title	Subsection title
<b>1. Challenges in Veterinary Medicine</b>	<b>1.1</b> The One Health concept
	<b>1.2</b> The context of zoonotic diseases today: challenges and threats
	<b>1.3</b> Antimicrobial drug resistance in animals and their impact on public health
	<b>1.4</b> Molecular diagnostics for the assessment of antimicrobial drug resistance: The peculiarities of <i>Mycoplasma</i> spp
<b>2. New technologies in veterinary laboratory diagnostics</b>	<b>2.1</b> The polymerase chain reaction
	<b>2.2</b> The reverse transcriptase polymerase chain reaction
	<b>2.3</b> Real time polymerase chain reaction
	<b>2.4</b> BLAST analysis: An Introduction
	<b>2.5</b> Isothermal amplification techniques
	<b>2.6</b> Assessment of gene activity with real time PCR
	<b>2.7</b> Next generation sequencing
	<b>2.8</b> Bio-informatics
<b>3. Quality control in conventional and molecular diagnostics</b>	<b>3.1</b> Quality Assurance and Standardization in Veterinary Diagnostic Laboratories
	<b>3.2</b> Quality Assurance in PCR-based diagnostics
<b>4. With a view to the future</b>	<b>4.1</b> Nanotechnology advances with a view to Veterinary Medicine
	<b>4.2</b> Interaction between veterinary medicine and nanotechnology; the present and the near future
	<b>4.3</b> Understanding animal welfare in farmed animals – beyond behavioral assessment towards brain functional imaging

## 7. Scientific Team

**Scientific and Academic Coordinator** of the training program is **John Ikonopoulos**, Professor of Veterinary Microbiology, Department of Animal Science, AUA.

The training program is delivered by a team of Professors and Researchers of highly reputed research and academic institutions of Greece, Great Britain, Switzerland, Italy, Portugal, and the U.S.A, with long experience in the subject(s) they have been assigned to.

The training program is provided by the following tutors:

- Antonia Mataragka
- Ariadne Loukia Hager-Theodorides
- Erika Ganda
- Gianvito Lenave
- Gudrun Overesch
- Ilias Tachtsidis
- John Ikonopoulos
- Nicola Decaro
- Nefeli Lagopati
- Patricia Alexandra Curado Quinta Dinis Poeta
- Paola Roncada
- Roberto La Ragione

## 8. Method of implementation

The Training Programme is provided **exclusively in English** in the form of **online asynchronous** learning and lasts **100 hours (4 ECTS units)**.

The program is available **twice a year** in October (**1<sup>st</sup> cycle**) and June (**2<sup>nd</sup> cycle**). Each cycle lasts **5 weeks**.

The candidates must submit their application for registration at least **1 month before the beginning** of the cycle they wish to attend. Approval/rejection of the application is announced before the beginning of the relevant cycle. Successful candidates receive instructions for the payment of the tuition fees, after which they are granted access to the e-learning platform of the Training Program, which remains open to the trainees throughout its duration.

### **Training program implementation schedule – important dates**

	<b>Deadline</b>				
Cycle	Beginning	Submission of application	Outcome of the application – online access	Payment of tuition fees	Final Examination*
2 <sup>nd</sup>	1/6/2021	30/4/2021	20/5/2021	20/5/2021	July

\*Last working day of the 1<sup>st</sup> week of the month.

## 9. Training techniques - Tools - Equipment

The educational material, including self-assessment tests and final examination, is available through the **CCELL e-learning platform (Eclass)**.

Trainees may submit questions to the tutors via e-mail sent to the **Secretariat** of the Training Programme.

The training program does not provide computer or internet access. Trainees are expected to have a digital camera available to accommodate an online video session during the final examination.

## 10. Educational Material - Additional Resources

The educational material is organized into modules, subsections, and lectures. The material corresponding to each lecture consists of **lecture notes, video presentation(s)**, and a **self-assessment test**.

**The lecture notes** corresponding to each module are available in pdf and consist of a table of contents, summary, the body of the lecture, and references for further reading and/or documentation.

**The video presentation** is narrated by the tutor and highlights the **main subjects** of the respective lecture notes, providing **explanatory comments and additional information**. The duration of each video presentation is 20-40 min; some lectures consist of more than one video presentations. Additional training material (videos and interactive content) is available for many of the programme's subsections.

**The self-assessment tests** are available through the E-class platform of the Training Program and consist of a combination of different types of questions (multiple choice, matching type, true or false), corresponding to the relevant lecture (lecture notes and presentation). Trainees can take part in the self-assessment test several times, and are expected to provide answers to **10-20 randomly selected questions** of those available for the relevant lecture (lecture notes and presentation), in **6 -10 min**. At the end of each attempt, each trainee has access to the score of the respective attempt **but not the correct answers**.

A **mock exam** will be available **one week** before the final examination. Within this period, trainees can sit the mock exam several times and are expected to answer **50 questions** within **60min**. The questions of the mock exam are selected randomly from the pool of the self-assessment questions and are similar but not identical to those of the final examination. At the end of each attempt, trainees have access to the respective score and the **correct answers**. The scores of the self-assessment exercises and mock exam are used exclusively as a means of self-assessment and **are not officially registered** in the student's profile.

Depending on the subject of the lecture, trainees receive instructions for the use of open access, online virtual laboratory training platforms. This service **does not constitute integral part of the Training Programme** and is provided based on availability. Trainees are encouraged but not obliged to make use of these resources.

## 11. Evaluation Methodology

### 11.1 Evaluation of trainees

The final examination is conducted online through the E-class platform of the training program and is supervised remotely via a digital camera. The students sitting the examination are expected to provide answers to **50 questions** of different types (multiple choice, matching type, true or false), in **2h**. The questions of the final examination are similar but not identical to those of the self-assessment tests.

Each **correct answer** is scored with 1 point and each false, with zero (0). False answers to questions of key-significance may receive **negative score** (<1 point). Negative score does not apply to questions that remain unanswered; these questions are scored with zero (0).

Trainees may take part in the final examination **twice** (i.e., 100 questions in total, selected randomly from the pool of examination questions). However, **both attempts must be completed within the 2h period** available for the examination. After the end of each attempt, trainees have access to their score, but not the correct answers. The top score of the two attempts is registered as the examination's final score. Time extension is not foreseen for non-completed efforts. In the event of system failure, this is confirmed by the staff of the Training Program (examination supervisor), and the examination is repeated for those trainees that were affected by the malfunction.

During the final exam, trainees are expected to be alone, which will be confirmed through an online video session that will remain active in parallel with the E-class examination until its completion.

### 11.2 Evaluation of Training Programme

The Training Programme is evaluated by the trainees, who are expected to submit an evaluation report composed in the form of a questionnaire. This questionnaire is submitted to the Secretariat of the Training Programme, after its completion.

The conclusions of the evaluation are used for the continuous improvement of the quality of the Training Programme.

## 12. Trainee obligations/Training Certificate

For the successful completion of the Training Programme, trainees must answer correctly to at least 50% of the questions of the final examination (**minimum passing score is 25 out of 50**). In this case, trainees receive a [\*Certificate of Specialized Training\*](#), which is issued by the CCELL of the Agricultural University of Athens.

Participants who successfully completed the training program and **scored 47 or higher**, receive a Certificate of Specialized Training with the indication "**Distinction**".

Trainees who **failed the final examination** but scored at least 20 (examination score 20-24) receive a [\*Certificate of Attendance\*](#). All the trainees who failed the final examination (examination score <25) may participate in the following cycle of the Training Programme, **free of charge**, or in one of the subsequent cycles within a period **not exceeding 2 years** from the deadline of that which they attended, with 50% discount on the **corresponding fees**. Distinction certificates are not awarded to trainees repeating the Training Programme.

### 13. Participation fee/Discount policy

The attendance fee is **300 euros**.

#### Discount policy:

- Undergraduate students of the Agricultural University of Athens: 15%
- Undergraduate students of other Universities or Technological Institutions: 10%
- Residents of the European Board of Veterinary Specialisation: 15%
- Registration before April the 15<sup>th</sup>, 2022 (early registration discount): 20%<sup>1</sup>
- Participants repeating the Training Programme within 2 years after an unsuccessful attempt: 50%

Attendance fees must be deposited **before the beginning of the Training Programme** (the deadline for the submission of the attendance fees is recorded in the acceptance letter addressed to the trainee).

### 14. Applications

Candidates submit their application for participation [via the portal of the CCELL of the AUA](#), where they are expected to upload all the supporting documents.

If the number of participants is lower than the minimum necessary, the CCELL reserves the right to cancel the respective cycle of training.

### 15. Communication

For more information, interested parties can contact

- the Secretariat of the Training Program (e-mail: [vetlabordiagnostics@gmail.com](mailto:vetlabordiagnostics@gmail.com)).
- the Secretariat of the CCELL of the Agricultural University of Athens (e-mail: [kedivim@aua.gr](mailto:kedivim@aua.gr)).

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<sup>1</sup> The early registration discount does not apply in combination with the discounts recorded above.





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