

# Postgraduate Certificate Oocyte and Embryo Manipulation





## Postgraduate Certificate Oocyte and Embryo Manipulation

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/veterinary-medicine/postgraduate-certificate/oocyte-embryo-manipulation](http://www.techtute.com/us/veterinary-medicine/postgraduate-certificate/oocyte-embryo-manipulation)

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# 01

# Introduction

Reproductive technologies are actively evolving, but they are all used in selection programs for the genetic improvement of mammals. Normally, all the techniques used so far have not led to overlapping one with the other, but complement each other in breeding programs, MOET, BLUP and Genomics.

This program develops a study of epigenetic disorders that affect animal reproduction and how reproduction techniques can cause alterations in the genetic *imprinting* of animals. The latest technology that, in the not too distant future, may be introduced in genetic selection programs is CRISPR/CAS, which has garnered particular interest in mammalian research in early clinical trials.

Specialize in Oocyte and Embryo Manipulation with this high level program, taught by experts with extensive experience in the field.







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*This program is the best option you can find to specialize in Oocyte and Embryo Manipulation and make more accurate diagnoses"*

From the earliest data on animal reproduction in Egyptian hieroglyphs, through the ancient veterinarians to the present day, humankind has always been interested in the study of animal reproduction to increase populations and obtain better yields.

Animal reproduction has evolved exponentially in recent decades and its current development means that technologies implemented a few years ago are now obsolete. Technique, science and human genius combine and bring, as a consequence, results identical to natural reproduction.

The objective of this program focuses on the mastery and control of all physiological, pathological and biotechnological aspects that affect the reproductive organ function of domestic animals. The species studied in this Postgraduate Certificate are: bovids, equidae, swine, sheep, goats and canids; a selection made based on the importance and development of assisted reproduction at present.

This Postgraduate Certificate is developed to deepen the current knowledge of the specialization in the different techniques of Oocyte and Embryo Manipulation.

The group of professors teaching the Postgraduate Certificate is made up of specialists in animal reproduction with more than 30 years of work experience, not only in the field of teaching, but also with practical activity, research and directly in livestock farms and animal reproduction centers. In addition, the teaching team is actively developing the latest techniques in assisted reproduction biotechnologies, making the genetic material of different species of international zootechnical interest available to the market.

The specialization will be based on the theoretical and scientific aspects, combining them with the practical and applicable professionalism of each of the units covered in this program. Continuing education after completing undergraduate studies is sometimes complicated and difficult to balance with professional and personal activities, so with this Postgraduate Certificate, TECH gives students the opportunity to continue specializing online with a large amount of practical audiovisual support that will allow the student to advance in reproductive techniques in their work environment.

This **Postgraduate Certificate in Oocyte and Embryo Manipulation** contains the most complete and up to date educational program on the market. The most important features of the program include:

- » Practical cases presented by experts in Oocyte and Embryo Manipulation
- » The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional development
- » New developments in Oocyte and Embryo Manipulation
- » Practical exercises where self assessment can be used to improve learning
- » Special emphasis on innovative methodologies in Oocyte and Embryo Manipulation
- » Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- » Content that is accessible from any fixed or portable device with an Internet connection



*Don't miss the opportunity to take this Postgraduate Certificate in Oocyte and Embryo Manipulation with us. It's the perfect opportunity to advance your career"*

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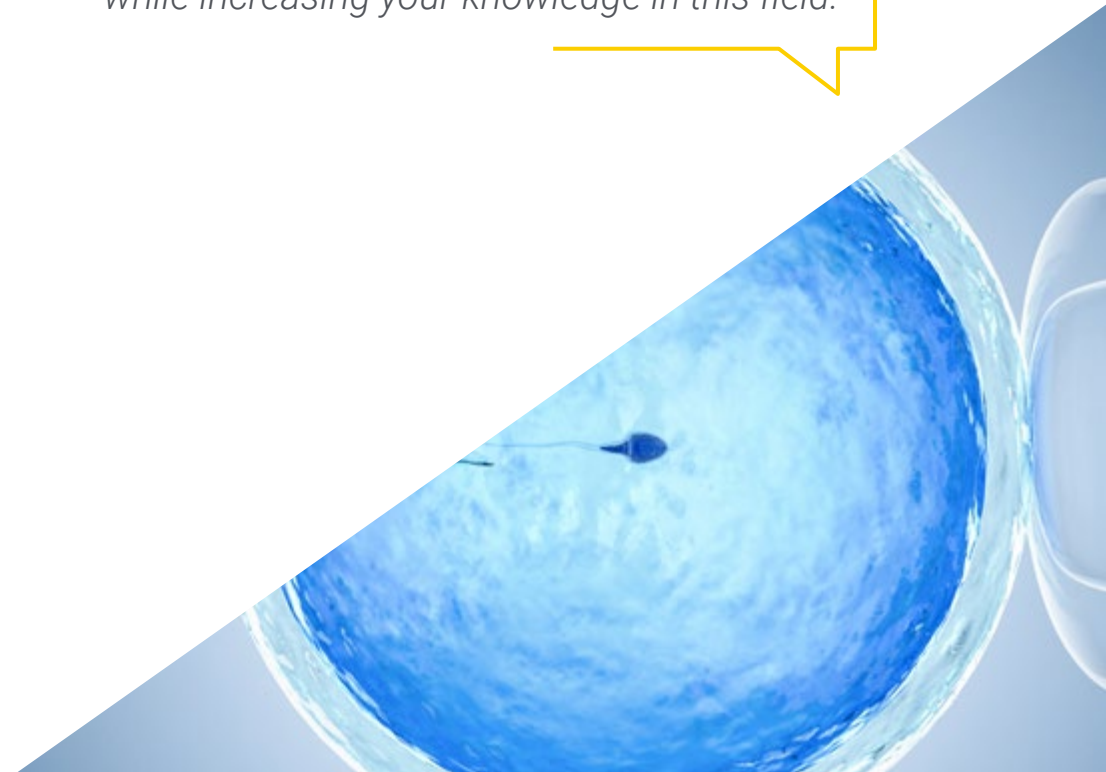
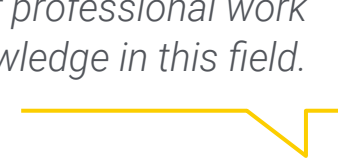
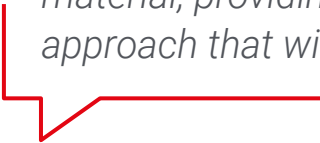
*This Postgraduate Certificate is the best investment you can make when choosing a refresher program to update your existing knowledge in Oocyte and Embryo Manipulation"*

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive training programmed to train in real situations.

This program is designed around Problem Based Learning, whereby the professional must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will have the help of an innovative interactive video system made by recognized experts in Oocyte and Embryo Manipulation with great experience in the field.

*This program comes with the best educational material, providing you with a contextual approach that will facilitate your learning.*

*This 100% online program will allow you to combine your studies with your professional work while increasing your knowledge in this field.*



# 02 Objectives

The program in Oocyte and Embryo Manipulation is oriented to facilitate the performance of the veterinary professional with the latest advances and most innovative treatments in the sector.







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*This is the best option to learn  
about the latest advances in  
Oocyte and Embryo Manipulation”*



## General Objectives

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- » Examine artificial insemination methods and programs in different species of domestic mammals
- » Identify the importance of embryo transfer as a methodology for germplasm banking and genetic improvement
- » Examine the development of follicular puncture (OPU), in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) as application techniques in embryo implantation and genetic improvement programs
- » Analyze the use of the latest reproductive technologies in genetic selection programs
- » Develop a comprehensive study of new reproductive technologies and their effectiveness in their technical application
- » Specify the epigenetic alterations in animal reproduction and the bioethical aspects of their application in animals



*A path to achieve training and professional growth that will propel you towards a greater level of competitiveness in the employment market"*







## Specific Objectives

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### Module 1. Reproductive Biotechnologies in Females

- » Analyze synchronization protocols for fixed time artificial insemination (FTAI)
- » Substantiate the effects of hormones in the IATF programs
- » Evaluate the issues involved in an embryo transfer program
- » Present superovulation and synchronization protocols in embryo donors
- » Establish systems for handling and valuation of embryos at commercial level
- » Compile the different methods of embryo and oocyte preservation
- » Develop OPU programs as an alternative methodology to embryo transfer
- » Analyze the assessment criteria for embryo implantation in recipients

### Module 2. Latest Advances in Reproductive Technologies

- » Examine MOET, BLUP and Genomics methods for their implementation in selection programs
- » Establish the technique of oocyte collection in impuberant females and its effective application as a shortening of the generation interval
- » Determine the methods of animal cloning and their technical application
- » Propose the different embryo biopsy techniques for preimplantational genetic diagnosis
- » Establish the characteristics of transgenic animals
- » Application of primordial embryonic cells in animal production
- » Substantiate the mechanism of action in the application of the CRISPR technique

03

# Course Management

The program includes in its teaching staff leading experts in Oocyte and Embryo Manipulation who bring to this training the experience of their work. They are world renowned doctors from different countries with proven theoretical and practical professional experience.





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*Our teaching team, experts in Oocyte and Embryo Manipulation, will help you achieve success in your profession"*

## Management



### Dr. Gomez Peinado, Antonio

- ◆ Coordinator of Obstetrics and Reproduction at Alfonso X El Sabio University, Faculty of Veterinary Medicine
- ◆ Degree in Veterinary Medicine
- ◆ Doctorate in Alfonso X El Sabio University Faculty of Veterinary Medicine - Professor of Animal Production



### Dr. Gómez Rodríguez, Elisa

- ◆ Professor of Veterinary Medicine at the Alfonso X El Sabio University
- ◆ Work development of assisted reproduction techniques at the " Spanish Institute of Animal Genetics and Reproduction" (IEGRA) in Talavera de la Reina, Toledo
- ◆ Degree in Veterinary Medicine, Complutense University Madrid
- ◆ Postgraduate course "Assisted Reproduction in Cattle Taught by IEGRA, UAX and HUMECO, Talavera de la Reina
- ◆ Course on "Bovine Reproductive Ultrasound" Taught by Dr. Giovanni Gnemmi (HUMECO), Talavera de la Reina

## Professors

### Mr. Pinto González, Agustín

- » Veterinarian of the Spanish Institute of Animal Genetics and Reproduction
- » Sani Lidia's Veterinarian
- » Degree in Veterinary Medicine
- » Specialization in Animal Reproduction at IEGRA
- » IEGRA's Diploma in Artificial Insemination in Cattle



*Update your knowledge through  
the Postgraduate Certificate in  
Oocyte and Embryo Manipulation”*

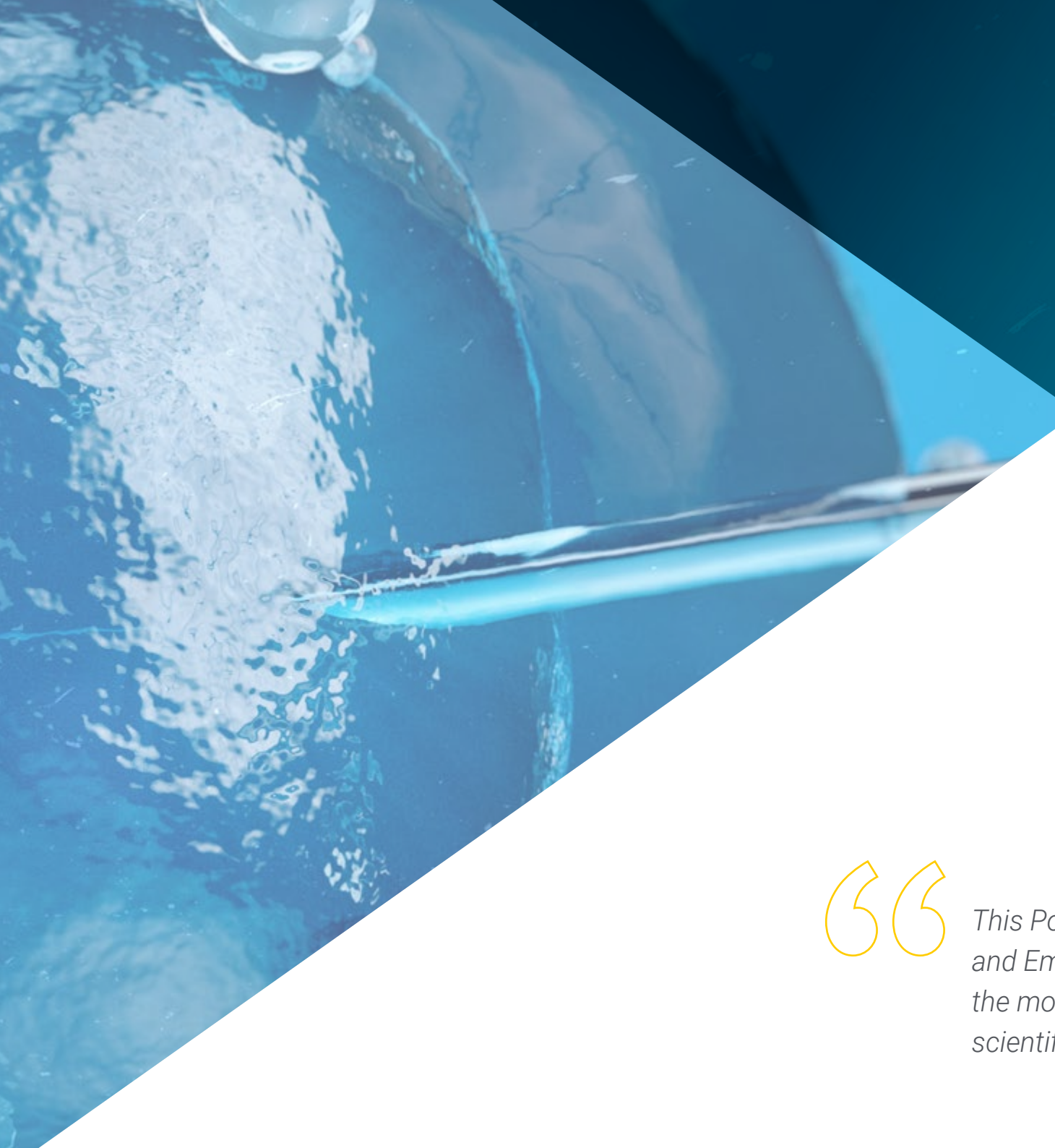
# 04

# Structure and Content

The structure of the contents has been designed by the best professionals in the field of Artificial Insemination in Domestic Females, with extensive experience and recognized prestige in the profession, backed by the volume of cases reviewed, studied and diagnosed, and with extensive knowledge of new technologies applied to veterinary medicine.







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*This Postgraduate Certificate in Oocyte and Embryo Manipulation contains the most complete and up to date scientific program on the market”*

## Module 1. Reproductive Biotechnologies in Females

- 1.1. Artificial Insemination in Ruminant Females
  - 1.1.1. Evolution of Artificial Insemination Methodologies in Females
  - 1.1.2. Heat Detection Methods
  - 1.1.3. Artificial Insemination in Cows
  - 1.1.4. Artificial Insemination in Sheep
  - 1.1.5. Artificial Insemination in Goats
- 1.2. Artificial Insemination in Mare, Sows and Female Dogs
  - 1.2.1. Artificial Insemination in Mares
  - 1.2.2. Artificial Insemination in Sows
  - 1.2.3. Artificial Insemination in Female Dogs
- 1.3. Fixed-Time Artificial Insemination Programs (FTAI)
  - 1.3.1. Functions, Advantages and Disadvantages of FTAI
  - 1.3.2. FTAI Methods
  - 1.3.3. Prostaglandin in Estrus Synchronization
  - 1.3.4. Ovsynch, Cosynch and Presynch
  - 1.3.5. Double-Ovsynch, G6G, Ovsynch-PMSG, and Resynchronization
  - 1.3.6. Effect of Estrogens for Synchronization
  - 1.3.7. Study of Progesterone in Synchronization Programs
- 1.4. Embryo Transfer Donor and Recipient Selection and Management
  - 1.4.1. Importance of Embryo Transfer in Different Species of Domestic Mammals
  - 1.4.2. Reproductive Interest Criteria for Donor Selection
  - 1.4.3. Criteria for the Selection of Recipients
  - 1.4.4. Preparation and Handling of Donors and Recipients
- 1.5. Embryo Transfer Superovulation and Embryo Collection Techniques
  - 1.5.1. Superovulatory Treatments in Different Species of Domestic Mammals
  - 1.5.2. Artificial Insemination During the Development of an E.T
  - 1.5.3. Preparation of the Donor for E.T
  - 1.5.4. Embryo Recovery Techniques in Different Species of Domestic Mammals
- 1.6. Handling and Commercial Evaluation of Embryos
  - 1.6.1. Isolation of Embryos
  - 1.6.2. Embryo Search and Handling Means Used
  - 1.6.3. Embryo Classification
  - 1.6.4. Embryo Washing
  - 1.6.5. Straw Preparation for Transfer or Transport
  - 1.6.6. Physicochemical Conditions for Embryo Maintenance
  - 1.6.7. Basic Equipment and Materials Used
- 1.7. Follicular Puncture (OPU)
  - 1.7.1. Principles of the Technique
  - 1.7.2. Preparation of OPU Females for OPU: Stimulation or Nonstimulation
  - 1.7.3. Methodology of the OPU Technique
- 1.8. In Vitro Fertilization and Intracytoplasmic Sperm Injection
  - 1.8.1. Procurement and Selection of COCS
  - 1.8.2. In Vitro Maturation (IVM)
  - 1.8.3. Conventional in Vitro Fertilization (IVF)
  - 1.8.4. Intracytoplasmic Sperm Injection (ICSI)
  - 1.8.5. In Vitro Culture (IVC)
- 1.9. Embryo Implantation in Recipients
  - 1.9.1. Receiver Synchronization Protocols
  - 1.9.2. Recipient Assessment Criteria Following Synchronization Protocols
  - 1.9.3. Embryo Implantation Technique and Equipment Required
- 1.10. Oocyte and Embryo Cryopreservation
  - 1.10.1. Introduction
  - 1.10.2. Embryo and Oocyte Preservation Methods
  - 1.10.3. Cryopreservation Techniques
  - 1.10.4. Comparison of Embryos Produced In Vitro and In Vivo Embryo Assessment for Freezing and Techniques of Choice

**Module 2. Latest Advances in Reproductive Technologies**

- 2.1. Assistance of the Latest Reproductive Technologies in Breeding Programs
  - 2.1.1. Genetic Manipulation Concept and Historical Introduction
  - 2.1.2. Promoters and Gene Expression
  - 2.1.3. Mammalian Cell Transformation Systems
  - 2.1.4. Application Methods in Genetic Improvement: MOET, BLUP and Genomics
- 2.2. Oocyte Collection in Impuberant Females
  - 2.2.1. Donor Selection and Preparation
  - 2.2.2. Ovarian Stimulation Protocols
  - 2.2.3. OPU Technique
  - 2.2.4. Differences between Prepubertal and Adult Females in the Results of Oocyte Retrieval and In Vitro Embryo Production (IVP)
- 2.3. Cloning of Animals of Zootechnical Interest
  - 2.3.1. Introduction and Phases of the Cell Cycle
  - 2.3.2. Methodology of Cloning by Means of Nuclear Transfer
  - 2.3.3. Cloning Application and Effectiveness
- 2.4. Preimplantational Genetic Diagnosis
  - 2.4.1. Introduction
  - 2.4.2. Assisted *Hatching*
  - 2.4.3. Embryo Biopsy
  - 2.4.4. Applications and Methods of Preimplantational Genetic Diagnosis in Domestic Mammals
- 2.5. Applied Genomics and Proteomics in Genetic Programs
  - 2.5.1. Introduction and Application of Genomics and Proteomics in Veterinary Medicine
  - 2.5.2. Genetic Polymorphisms
  - 2.5.3. Construction of Genetic Maps
  - 2.5.4. Genome Projects and Manipulation
- 2.6. Transgenesis
  - 2.6.1. Introduction
  - 2.6.2. Transgenesis Applications in Domestic Mammals
  - 2.6.3. Gene Transfer Techniques
  - 2.6.4. Characteristics of Transgenic Animals
- 2.7. Primordial Embryonic Cells
  - 2.7.1. Introduction
  - 2.7.2. Pluripotent Embryonic Cell Lines
  - 2.7.3. Embryonic Primordial Cells and Genetic Modification
  - 2.7.4. Application of Primordial Embryonic Cells in Animal Production
- 2.8. Epigenetic Alterations in Animal Reproduction
  - 2.8.1. Introduction and Main Types of Epigenetic Information
  - 2.8.2. Genomic Imprinting Disorders and Assisted Reproduction
  - 2.8.3. Epigenetic Alterations
  - 2.8.4. Epigenetics and Its Intergenerational Responses
  - 2.8.5. Alterations in Normal Oocyte Physiology and Etiology of *Imprinting* Alterations in Assisted Reproductive Techniques
- 2.9. CRISPR/CAS
  - 2.9.1. Introduction
  - 2.9.2. Structure and Mechanism of Action
  - 2.9.3. Application of the CRISPR/CAS Technique in Animal and Human Models Clinical Trials
  - 2.9.4. The Present and Future of Gene Editing
- 2.10. Bioethics in Mammalian Reproduction
  - 2.10.1. What Is Bioethics?
  - 2.10.2. Ethical and Moral Aspects in the Manipulation of Animal Embryos
  - 2.10.3. Interferences in Genetic Manipulation and Benefits to the Human Species
  - 2.10.4. Biotechnologies: New Horizons



*This training will allow you to advance in your career comfortably"*

# 05 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.







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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, in an attempt to recreate the actual conditions in a veterinarian's professional practice.



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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Veterinarians who follow this method not only manage to assimilate concepts, but also develop their mental capacity through exercises to evaluate real situations and knowledge application
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. The feeling that the effort invested is effective becomes a very important motivation for veterinarians, which translates into a greater interest in learning and an increase in the time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.



*Veterinarians will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology more than 65,000 veterinarians have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. Our teaching method is developed in a highly demanding environment, where the students have a high socio-economic profile and an average age of 43.5 years.

*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



### Latest Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current and procedures of veterinary techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



#### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.





# 06 Certificate

The Postgraduate Certificate in Oocyte and Embryo Manipulation guarantees students, in addition to the most rigorous and up to date education, access to a qualification issued by TECH Technological University.







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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

This **Postgraduate Certificate in Oocyte and Embryo Manipulation** contains the most complete and up to date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

**Title: Postgraduate Certificate in Oocyte and Embryo Manipulation**

**Official N° of hours: 300 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development language  
classroom



## Postgraduate Certificate Oocyte and Embryo Manipulation

- » Modality: **online**
- » Duration: **6 weeks**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**



# Postgraduate Certificate Oocyte and Embryo Manipulation

