

Postgraduate Certificate Tissue Engineering and Regenerative Medicine



Postgraduate Certificate

Tissue Engineering and Regenerative Medicine

Course Modality: **Online**

Duration: **6 weeks**

Certificate: **TECH Technological University**

6 ECTS Credits

Teaching Hours: **150 hours.**

Website: www.techitute.com/us/medicine/postgraduate-certificate/tissue-engineering-regenerative-medicine

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01

Introduction

Regenerative and tissue medicine has undergone a major development in recent years with the creation of new biomaterials and its results are increasingly promising for patients. Within this context, specialists in this field are working in a field that is not only very broad, but will continue to grow over the years. In order to offer you a course with which you can keep abreast of the latest developments, this program was developed on the basis of the most modern research and postulates and following the strictest scientific criteria and quality. This is a 100% online program, with the best content, real clinical cases and designed by specialists in the world of biomedicine.



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Tissue regeneration is the present and future of medicine in different specialties This Postgraduate Certificate includes the most modern and effective advances to date”

The advances that have been made as a result of the evolution of tissue engineering and regenerative medicine are enormous. Although today many of the procedures are experimental and very expensive, this engineering, in collaboration with medical judgment, has exponentially improved the lives of millions of patients. The possibilities arising from skin and cartilage grafts, cardiac therapies or, to a lesser extent, the implementation of organs as supplementary bladders, are growing and becoming more effective.

This engineering is applicable in different branches of medicine, from oncology, dermatology or ophthalmology, among others, to surgery itself. For this reason, it is becoming increasingly common to find medical professionals interested in this subject, since based on these techniques it is possible to improve the quality of life of a patient and even save their life.

That is why this Postgraduate Certificate was created, based on the most modern research and advances. Led by a group of biomedical professionals, this program includes the most important aspects of tissue engineering and regenerative medicine, from histology, through tissue regeneration and the potential of stem and embryonic cells to gene therapy, corneal regeneration and skin grafts for major burns. In addition, it will delve into the different biomedical applications of tissue engineered products.

All this through a 100% online methodology based on the most innovative pedagogical techniques. The graduate will have the best and most updated content, as well as complementary material that will help them contextualize the concepts. All this tutored by professionals in the sector who will be at your disposal to resolve any doubts that may arise during the course.

This **Postgraduate Certificate in Tissue Engineering and Regenerative Medicine** contains the most complete and up-to-date Educational program on the market. The most important features include:

- ♦ Practical cases presented by experts in Biomedicine
- ♦ The graphic, schematic, and eminently practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice.
- ♦ Practical exercises where self-assessment can be used to improve learning.
- ♦ Its special emphasis on innovative methodologies
- ♦ 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



A program that delves into the methods of tissue and cartilage procurement, therapies, bone replacement and grafting"

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Increase your chances of success in treating conditions where biomedicine offers you proven alternatives that are more effective than traditional techniques”

We provide you with the best content, but you set the schedule

Differentiate yourself from the rest with this Postgraduate Certificate and add professionalism and prestige to your professional resume

The program's teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

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 during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.



02 Objectives

Taking into account the value it is gaining in the different branches of medicine, TECH has set out, with this Postgraduate Certificate, the objective that the specialist knows the key aspects that allow him to start in the world of biomedicine, and those who already have a solid foundation can continue to expand their knowledge with the best content and with a lot of supplementary material. A unique opportunity to update concepts and to keep abreast of the future of medicine.



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Biomedicine treatments are the future of many specialties Why not start now to strengthen and expand your knowledge with the best online university in the world?"



General Objectives

- ♦ Generate specialized knowledge on the main types of biomedical signals and their uses
- ♦ Develop the physical and mathematical knowledge underlying biomedical signals
- ♦ Fundamentals of the principles governing signal analysis and processing systems
- ♦ Analyze the main applications, trends and lines of research and development in the field of biomedical signals
- ♦ Develop expertise in classical mechanics and fluid mechanics
- ♦ Analyze the general functioning of the motor system and its biological mechanisms
- ♦ Develop models and techniques for the design and prototyping of interfaces based on design methodologies and their evaluation
- ♦ Provide the student with critical skills and tools for interface assessment
- ♦ Explore the interfaces used in pioneering technology in the biomedical sector
- ♦ Analyze the fundamentals of medical imaging acquisition, inferring its social impact
- ♦ Develop specialized knowledge about the operation of the different imaging techniques, understanding the physics behind each modality
- ♦ Identify the usefulness of each method in relation to its characteristic clinical applications
- ♦ Investigate post-processing and management of acquired images
- ♦ Use and design biomedical information management systems
- ♦ Analyze current digital health applications and design biomedical applications in a hospital setting or clinical center



Specific Objectives

- Generate specialized knowledge on histology and functioning of the cellular environment
- Review the current status of tissue engineering and regenerative medicine
- Address the main challenges facing tissue engineering
- Present the most promising techniques and the future of tissue engineering
- Develop the main trends of the future of regenerative medicine
- Analyze the regulation of tissue engineered products
- Examine the interaction of biomaterials with the cellular environment and the complexity of this process

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You will find, in this six-week Postgraduate Certificate, a broad summary of the generic concepts derived from biomedicine and complete and deep topics dedicated to the most relevant aspects”

03

Course Management

For this Postgraduate Certificate, TECH has selected a teaching staff specialized in engineering biology with extensive professional experience, highlighting their active participation in research projects. A group of experts in the field who will make their time available to the graduate to resolve doubts or to discuss issues arising from the syllabus. In addition, they will provide the program with real case studies that will allow the application of the knowledge acquired on the most important biomedical advances.



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A syllabus designed and created by experts in the sector, who bring their professional commitment and experience to ensure the best results after the course”

Management



Ruiz Díez, Carlos

- ♦ Researcher at the National Microelectronics Center of the CSIC.
- ♦ Researcher. Composting Research Group of the Department of Chemical, Biological and Environmental Engineering of the UAB.
- ♦ Founder and product development at NoTime Ecobrand, a fashion and recycling brand.
- ♦ Development cooperation project manager for the NGO Future Child Africa in Zimbabwe.
- ♦ Graduate in Industrial Technologies Engineering from Universidad Pontificia de Comillas ICAI.
- ♦ Master's Degree in Biological and Environmental Engineering from the Autonomous University of Barcelona.
- ♦ Master's Degree in Environmental Management from the Universidad Española a Distancia (Spanish Open University)

Professors

Rubio Rey, Javier

- ♦ Research Trainee in the Parkinson's disease project: Investigating the cofilin-1 and alpha-synuclein protein interaction under the direction of Dr. Richard Parsons at Kings College London
- ♦ Degree in Pharmacy from CEU San Pablo University.
- ♦ Degree in Biotechnology from CEU San Pablo University.
- ♦ Double Degree in Pharmacy and Biotechnology.



04

Structure and Content

In order to offer the best academic experience, TECH offers the specialist the possibility of taking this Postgraduate Certificate from wherever they want without having to give up the best content. With a 100% online program, the graduate will be able to distribute the teaching load according to their own schedule, thus allowing them to continue with their daily activity in the practice. In addition, the relearning methodology with which this university develops its programs will favor the results, facilitating the acquisition of concepts without the need to memorize and allowing you to save time.





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You will have at your disposal a variety of complementary material that will allow you to broaden the concepts as much as you wish”

Module 1. Tissue Engineering

- 1.1. Histology
 - 1.1.1. Cellular Organization in Higher Structures: Tissues and Organs
 - 1.1.2. Cellular Cycle Tissue Regeneration
 - 1.1.3. Regulation: Interaction With the Extracellular Matrix
 - 1.1.4. Importance of Histology in Tissue Engineering
- 1.2. Tissue Engineering
 - 1.2.1. Tissue Engineering
 - 1.2.2. Scaffolding
 - 1.2.2.1. Properties
 - 1.2.2.2. The Ideal Scaffolding
 - 1.2.3. Biomaterials for Tissue Engineering
 - 1.2.4. Bioactive Materials
 - 1.2.5. Cells
- 1.3. Stem Cells
 - 1.3.1. Stem Cells
 - 1.3.1.1. Potentiality
 - 1.3.1.2. Tests to Evaluate Potentiality
 - 1.3.2. Regulation: Niche
 - 1.3.3. Types of Stem Cells
 - 1.3.3.1. Embryonic
 - 1.3.3.2. IPS
 - 1.3.3.3. Adult Stem Cells
- 1.4. Nanoparticles
 - 1.4.1. Nanomedicine Nanoparticles
 - 1.4.2. Types of Nanoparticles
 - 1.4.3. Methods of Obtaining
 - 1.4.4. Bionanomaterials in Tissue Engineering
- 1.5. Genetic Therapy
 - 1.5.1. Genetic Therapy
 - 1.5.2. Uses: Gene Supplementation, Cell Replacement, Cellular Reprogramming
 - 1.5.3. Vectors for the Introduction of Genetic Material
 - 1.5.3.1. Viral Vectors
- 1.6. Biomedical Applications of Tissue Engineering Products Regeneration, Grafts and Replacements
 - 1.6.1. *Cell Sheet Engineering*
 - 1.6.2. Cartilage Regeneration: Joint Repair
 - 1.6.3. Corneal Regeneration
 - 1.6.4. Skin Grafting for Major Burn Injuries
 - 1.6.5. Oncology
 - 1.6.6. Bone Replacement
- 1.7. Biomedical Applications of Tissue Engineering Products Circulatory, Respiratory and Reproductive System
 - 1.7.1. Cardiac Tissue Engineering
 - 1.7.2. Hepatic Tissue Engineering
 - 1.7.3. Lung Tissue Engineering
 - 1.7.4. Reproductive Organs and Tissue Engineering



- 1.8. Quality Control and Biosecurity
 - 1.8.1. NCF Applied to Advanced Therapy Drugs
 - 1.8.2. Quality Control
 - 1.8.3. Aseptic Process: Viral and Microbiological Safety
 - 1.8.4. Cell Production Unit: Characteristics and Design
- 1.9. Legislation and Regulation
 - 1.9.1. Current Legislation
 - 1.9.2. Authorization
 - 1.9.3. Regulation of Advanced Therapies
- 1.10. Future Perspectives
 - 1.10.1. Current Status of Tissue Engineering
 - 1.10.2. Clinical Needs
 - 1.10.3. Main Challenges at Present
 - 1.10.4. Focus and Future Challenges

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Take advantage of this opportunity and invest in improving your professional future in medicine, your patients will thank you for it”

05

Methodology

This training program provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

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 Re-learning, 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, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately 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. Gervas, 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, trying to recreate the real conditions in the physician'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. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
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. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



Re-learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

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.



Professionals 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 Re-learning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best Spanish-speaking online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years old.

Re-learning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to 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 really 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.



Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical 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 multimedia content presentation training Exclusive system 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 & Re-Testing

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 your goals.



Classes

There is scientific evidence on the usefulness of learning by observing experts: The system termed Learning from an Expert strengthens knowledge and recall capacity, and generates confidence in the face of difficult decisions in the future.



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 Tissue Engineering and Regenerative Medicine guarantees you, in addition to the most rigorous and updated training, access to a Postgraduate Certificate issued by TECH Technological University.



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Successfully complete this training program and receive your university certificate without travel or laborious paperwork”

This **Postgraduate Certificate in Tissue Engineering and Regenerative Medicine** contains the most complete and up-to-date scientific program on the market.

After passing the evaluation, the student will receive by mail * with acknowledgment of receipt the corresponding **Postgraduate Certificate** issued by **TECH Technological University**.

This degree contributes to the academic development of the professional and adds a high university curricular value to their training. It is 100% valid in all competitive examinations, labour exchanges and professional career evaluation committees.

Title: **Postgraduate Certificate in Tissue Engineering and Regenerative Medicine**

ECTS: **6**

Official Number of Hours: **150 hours**.



*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 quality
development languages
virtual classroom



Postgraduate Certificate
Tissue Engineering and
Regenerative Medicine

Course Modality: Online

Duration: 6 weeks

Certificate: TECH Technological University

6 ECTS Credits

Teaching Hours: 150 hours.

Postgraduate Certificate Tissue Engineering and Regenerative Medicine

