



## Postgraduate Diploma

Ventilatory Techniques and Parameters in NIMV for Nursing

» Modality: online

» Duration: 6 months

» Certificate: TECH Technological University

» Dedication: 16h/week

» Schedule: at your own pace

» Exams: online

Website: www.techtitute.com/pk/nursing/postgraduate-diploma/postgraduate-diploma-ventilatory-techniques-parameters-nimv-nursing

# Index

> 06 Certificate

> > p. 30

# 01 Introduction

Alarma prioridad alta Recent scientific advances have led to the development of techniques to implement Non-Invasive Mechanical Ventilation in patients, as well as strategies to adjust their ventilatory parameters. In this way, a greater adaptation of respiratory support to the cuencia needs of each individual is achieved, favoring their well-being and significantly speeding up their recovery. Therefore, an in-depth knowledge of these improved methods is Fuga Pac. Activ. Pac. crucial for the nurse who wishes to optimize their professional update. Therefore, TITTOT TECH has created this program, with which the student will delve into the cutting-edge procedures for adjusting pressure, volume or flow and the updated indications of BiPAP Alarmas Desconectar línea de presión and CPAP. All this, in a online way and without the need to stick to tight schedules. Nxígeno no disponible 🛕 Presión suministro O2 baja 100% 02 Subida En espera Menú Modos sinstes



## tech 06 | Introduction

Non-Invasive Mechanical Ventilation is a respiratory support modality that is becoming increasingly relevant to contribute to the treatment of a wide range of pneumological diseases. Given this popularization, both the techniques for its application and the parameters for its adjustment have undergone a notorious evolution, seeking to optimize the results of NIMV and increase the patient's quality of life during their hospital stay. As a result, identifying recent advances in this field is essential for nurses who wish to provide state-of-the-art care to patients.

In view of this situation, TECH has focused its efforts on designing this program, which provides the professional with an excellent update on respiratory support techniques and the adjustment of ventilatory parameters applied in NIMV. During 6 intensive months of teaching, you will learn the strategies for selecting the interfaces that best suit the requirements of each patient, as well as the methods for adjusting the ventilatory parameters of Non-Invasive Mechanical Ventilation. You will also delve into the state-of-the-art procedures for monitoring and managing CPAP and BiPAP complications.

Thanks to the fact that this Postgraduate Diploma is taught in a 100% online mode, the nurse will be able to update in this branch of NIMV without the need to make daily trips to an academic center. In addition, didactic resources such as readings, explanatory videos and evaluative exercises are available. In this way, you will study in a dynamic and resolute way, thus consolidating the acquisition of new knowledge.

This Postgraduate Diploma in Ventilatory Techniques and Parameters in NIMV for Nursing contains the most complete and up-to-date scientific program on the market. The most important features include:

- The development of case studies presented by experts in Non-Invasive Mechanical Ventilation
- The graphic, schematic, and practical content 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



Delve into the most relevant aspects of this Postgraduate Diploma at your own pace of study thanks to the Relearning method offered by TECH"



This Postgraduate Diploma will allow you to investigate the selection of the interfaces that best suit the patient's needs, according to the latest scientific criteria"

The program's teaching staff includes professionals from the field who contribute their work experience to this educational 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 education programmed to learn 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 students will be assisted by an innovative interactive video system created by renowned and experienced experts.

Get up to date on Ventilatory
Techniques and Parameters in NIMV for
Nursing from specialists with extensive
health care experience behind them.

Through this Postgraduate Diploma, you will delve into the state-of-the-art methods for monitoring and managing CPAP and BiPAP complications.







## tech 10 | Objectives



## **General Objectives**

- Understand the importance and role of Non Invasive Mechanical Ventilation in the treatment of acute and chronic respiratory pathologies
- Know the updated indications and contraindications for the use of Non-Invasive Mechanical Ventilation, as well as the different types of devices and modes of ventilation
- Acquire skills and competences in the monitoring of the patient with Non Invasive Mechanical Ventilation, including the interpretation of the data obtained and the detection and prevention of complications
- Investigate the state-of-the-art technologies used in the telemonitoring of patients with Non Invasive Mechanical Ventilation and the ethical and legal aspects related to their use
- Delve into the main differences in Non-Invasive Mechanical Ventilation in Pediatrics
- Delve into the ethical aspects related to the management of patients requiring NIV





#### **Specific Objectives**

#### Module 1. Ventilatory Mechanics

- Learn in depth the mechanisms of respiratory control and blood pH regulation, as well as the ventilatory responses in situations of Hypoxia, Hypercapnia and Acidosis, and the interaction between the respiratory system and the central nervous system
- Delve into the forces that act on the lungs during ventilation and the relationship between respiratory mechanics and respiratory muscle effort
- Investigate the different lung volumes and capacities, their alterations in respiratory diseases and the interpretation of spirometric values and their limitations
- Understand the concept of *compliance* and resistance of the respiratory system, including the measurement and the factors that influence it, as well as the alterations in respiratory diseases
- Delve into the ventilation-perfusion relationship, state-of-the-art methods to detect alterations in respiratory diseases and therapeutic strategies to improve this relationship

## Module 2. Non-Invasive Mechanical Ventilation and Ventilatory Parameter Settings in Non-Invasive Mechanical Ventilation

- $\bullet\,$  Define and clarify the terminology and basic concepts of NIMV
- Describe the different ventilatory modes used in NIMV, including spontaneous, assisted and controlled mode
- · Identify the different types of interfaces used in NIMV, explaining their selection and setting
- Delve into the different alarms and patient safety measures in NIMV
- Detect patients suitable for NIMV and explain the strategies for initiation and parameter according to evolution

#### Module 3. Noninvasive Respiratory Support Techniques

- Understand the principles and mechanics of continuous positive airway pressure, positive airway pressure, pressure support ventilation, volume controlled ventilation and high-flow nasal cannula (HFNC)
- Identify the indications for the use of each of these ventilatory modalities and know how to adjust the necessary parameters
- Compare the different ventilatory modalities to choose the most appropriate one for each patient
- Know in depth the usefulness of high frequency ventilation and other new ventilatory modes







## tech 14 | Course Management

#### Management



#### Dr. Landete Rodríguez, Pedro

- Head of the Intermediate Respiratory Care Unit of the Hospital Emergencias Nurse Isabel Zendal
- Co-coordinator of the Basic Ventilation Unit of the Hospital Universitario de La Princesa
- Pulmonologist at the Hospital Universitario de La Princesa
- Pulmonologist at Blue Healthcare
- Researcher in several research groups
- Professor in undergraduate and postgraduate university studies
- Author of scientific numerous publications International journals and participation in book chapters
- Speaker at international medical congresses
- Doctorate Cum Laude by the Autonomous University of Madric

#### **Professors**

#### Dr. Rodríguez Jerez, Francisco

- Pulmonologist at HUCSC
- Intermediate Respiratory Care Unit Coordinator, San Cecilio University Clinical Hospital
- Head of the Non-Invasive Mechanical Ventilation Unit at the Central University Hospital of Asturias
- FEA of the Pulmonology Department at San Cecilio University Clinical Hospital
- Lecturer in undergraduate university studies related to Health Sciences
- Coordinator of the NIMV and IRCU skills course at the San Cecilio University Clinical Hospital
- Member of the Tuberculosis and Respiratory Infections Area (TIR) in the Spanish Society of Pulmonology and Thoracic Surgery
- Reviewer for the journals Respiratory Care and BRNreview

#### Dr. Corral Blanco, Marta

- Pulmonology Specialist and researcher
- Pulmonologist at 12 de Octubre University Hospital
- Author of numerous scientific articles and book chapters
- Speaker at numerous Pulmonology Congresses
- Course on Integral Care of Chronic Obstructive Pulmonary Disease from the Complutense University of Madrid

#### Dr. Ferrer Espinos, Santos

- Pulmonologist
- Adjunct of the Pulmonology Service at the Respiratory Care Unit of the Hospital Clínico Universitario de Valencia
- Member of the Emerging Group of Noninvasive Mechanical Ventilation and Respiratory Care of SEPAR
- Master's Degree in Biomedical Research at the University of Valencia



Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"





## tech 18 | Structure and Content

#### Module 1. Ventilatory Mechanics

- 1.1. Anatomy and Physiology of the Respiratory System
  - 1.1.1. Structure and Function of the Lungs and their Relation to the Ribcage
  - 1.1.2. Mechanics of Pulmonary Ventilation
  - 1.1.3. Gas Exchange at the Alveolar Level
- 1.2. Ventilation Control and Ph Regulation
  - 1.2.1. Mechanisms of Respiratory Control (Chemoreceptors, Baroreceptors, etc.)
  - 1.2.2. Regulation of Blood pH and its Relation to Ventilation
  - 1.2.3. Ventilatory Responses in Situations of Hypoxia, Hypercapnia, and Acidosis
  - 1.2.4. Interaction between the Respiratory System and the Central Nervous System
- 1.3. Transpulmonary Pressure and Respiratory Mechanics
  - 1.3.1. Forces Acting on the Lungs during Ventilation (Atmospheric Pressure, Intrapleural Pressure, etc.)
  - 1.3.2. Mechanisms of Protection of the Lungs against Overdistension and Collapse
  - 1.3.3. Mechanics of Respiration in Pathological Situations (Emphysema, Pulmonary Fibrosis, etc.)
  - 1.3.4. Relationship between Respiratory Mechanics and Respiratory Muscular Effort
- 1.4. Flow Volume, Minute Volume and Vital Capacity
  - 1.4.1. Definition and Measurement of Different Lung Volumes and Capacities
  - 1.4.2. Alterations of Lung Volumes and Capacities in Respiratory Diseases
  - 1.4.3. Interpretation of Spirometric Values and their Limitations
- 1.5. Compliance and Resistance of the Respiratory System
  - 1.5.1. Concept
  - 1.5.2. Measurement
  - 1.5.3. Influencing Factors
  - 1.5.4. Abnormalities in Respiratory Diseases
- 1.6. Types of Breathing (Spontaneous, Assisted and Controlled)
  - 1.6.1. Definition and Characteristics of the Different Types of Breathing
  - 1.6.2. Evaluation of the Patient's Response to Mechanical Ventilation

- 1.7. Ventilation-perfusion ratio
  - 1.7.1. Definition and Physiology of the Ventilation-Perfusion Ratio
  - 1.7.2. Alterations of the Ventilation-Perfusion Ratio in Respiratory Diseases
  - 1.7.3. Evaluation Methods of the Ventilation-Perfusion Ratio
  - 1.7.4. Therapeutic Strategies to Improve the Ventilation-Perfusion Ratio
- 1.8. Oxygenation and Gas Transport
  - 1.8.1. Alterations in Oxygenation and Gas Transport in Respiratory Diseases
  - 1.8.2. Assessment of Oxygenation and Gas Transport in Clinical Practice
  - 1.8.3. Treatment of Hypoxemia and Hypercapnia in Respiratory Patients
  - 1.8.4. Complications of Hypoxemia and Hypercapnia Treatment
- 1.9. Effects of Mechanical Ventilation on Respiratory Physiology
  - 1.9.1. Physiology of Mechanical Ventilation
- 1.10. Changes in Ventilatory Mechanics during Non-Invasive Mechanical Ventilation
  - 1.10.1. Pulmonary Lesions Associated with Mechanical Ventilation
  - 1.10.2. Optimization of Mechanical Ventilation to Improve Respiratory Physiology

## **Module 2.** Non-Invasive Mechanical Ventilation and Ventilatory Parameter Settings in Non-Invasive Mechanical Ventilation

- 2.1. NIMV
  - 2.1.1. Terminology in NIMV
  - 2.1.2. What Does Each Parameter Used in NIMV Measure?
- 2.2. Indications and Contraindications
  - 2.2.1. Indications in Acute Hypoxemic Respiratory Failure
  - 2.2.2. Indications in Acute Global/Hypercapnic Respiratory Failure
  - 2.2.3. Indications in Chronic Respiratory Failure
  - 2.2.4. Other Indications for NIMV
  - 2.2.5. Contraindications for NIMV
- 2.3. Ventilatory Modes
  - 2.3.1. Spontaneous Mode
  - 2.3.2. Assisted Mode
  - 2.3.3. Controlled Mode

## Structure and Content | 19 tech

- 2.4. Interfaces: Types, Selection and Setting
  - 2.4.1. Face Mask
  - 2.4.2. Nasal Mask
  - 2.4.3. Mouth Interface
  - 2.4.4. Oronasal Interface
  - 2.4.5. Helmet
- 2.5. Ventilatory Parameters: Pressure, Volume, Flow and Ti/Ttot
  - 2.5.1. Inspiratory and Expiratory Pressure Setting
  - 2.5.2. Adjustment of the Respiratory Frequency
  - 2.5.3. Adjustment of Ti/Ttot
  - 2.5.4. PEEP Setting
  - 2.5.5. FiO2 Setting
- 2.6. Breathing Cycles and Trigger
  - 2.6.1. Trigger Setting and Ventilator Sensitivity
  - 2.6.2. Current Volume and Inspiratory Time Setting
  - 2.6.3. Inspiratory and Expiratory Flow Setting
- 2.7. Patient-Ventilator Synchronization
  - 2.7.1. Delayed Triggering
  - 2.7.2. Self-trigger
  - 2.7.3. Ineffective Inspiratory Efforts
  - 2.7.4. Mismatch in Inspiratory Time between the Patient and the Ventilator
  - 2.7.5. Double Triggering
- 2.8. Alarms and Patient Safety
  - 2.8.1. Types of Alarms
  - 2.8.2. Handling Alarms
  - 2.8.3. Patient Security
  - 2.8.4. Evaluation of the Effectiveness of NIMV
- 2.9. Patient Selection and Initiation Strategies
  - 2.9.1. Patient Profile
  - 2.9.2. NIMV Initiation Parameters in Acute Patients
  - 2.9.3. Initiation Parameters in Chronic Patients
  - 2.9.4. Adjustment of Parameters according to Evolution

- 2.10. Evaluation of the Patient's tolerance and Adaptation to Non-Invasive Mechanical Ventilation
  - 2.10.1. Criteria for Good Clinical Response
  - 2.10.2. Criteria for Bad Clinical Response
  - 2.10.3. Adjustments for Tolerance Improvement
  - 2.10.4. Tips to Improve Adaptation

#### Module 3. Noninvasive Respiratory Support Techniques

- 3.1. Evaluation of the Level of Ventilatory Support Needed
  - 3.1.1. Evaluation of the Clinical Indications
  - 3.1.2. Interpretation of Arterial Blood Gas Analysis
  - 3.1.3. Evaluation of Respiratory Mechanics
  - 3.1.4. Determination of the Level of Ventilatory Support Needed
  - 3.1.5. Change of Ventilatory Modality
- 3.2. Continuous Positive Airway Pressure (CPAP)
  - 3.2.1. Principles and Mechanicsof CPAP
  - 3.2.2. Indications for the Use of CPAP
  - 3.2.3. Adjustment of CPAP Parameters
  - 3.2.4. Monitoring and Management of CPAP Complications
  - 3.2.5. Comparison of CPAP with Other Ventilatory Modalities
- 3.3. Positive Airway Pressure (BiPAP)
  - 3.3.1. Principles and Mechanics of BIPAP
  - 3.3.2. Indications for the Use of BIPAP
  - 3.3.3. Adjustment of BIPAP Parameters
  - 3.3.4. Monitoring and Management of BIPAP Complications
  - 3.3.5. Comparison of BIPAP with Other Ventilatory Modalities
- 3.4. Pressure Supporting Ventilation
  - 3.4.1. Conventional (PSV)
  - 3.4.2. Proportional (PPSV)
  - 3.4.3. Adaptive (ASV)
  - 3.4.4. Intelligent Adaptive (iVAPS)

## tech 20 | Structure and Content

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- 3.5.1. Principles and Mechanics of Volume Controlled NIV
- 3.5.2. Indications for the Use of NIV by Volume
- 3.5.3. How to Adjust the Volume Parameters
- 3.5.4. Monitoring and Management of Complications in Volume Mode
- 3.5.5. Comparison of Volume Mode with Other Ventilatory Modalities
- 3.6. High-flow Nasal Cannula (HFNC)
  - 3.6.1. Principles and Mechanics of HFNCs
  - 3.6.2. Indications for the Use of HFNCs
  - 3.6.3. Adjustment of HFNC Parameters
  - 3.6.4. Monitoring and Management of HFNC Complications
  - 3.6.5. Comparison of HFNC with Other Ventilatory Modalities
- 3.7. Combined Ventilation (Positive Pressure (CPAP/BiPAP) + HFNC)
  - 3.7.1. Principles and Mechanics of Combination Therapy
  - 3.7.2. Indications for the Use of Combined Therapies
  - 3.7.3. How to Initiate Combination Therapy, at the Same Time or in a Staggered Manner
  - 3.7.4. Adjustment of Combined Therapies Parameters
  - 3.7.5. Monitoring and Management of Combined Therapies Complications
  - 3.7.6. Comparison of Combined Therapies with Other Ventilatory Modalities
- 3.8. High Frequency Ventilation
  - 3.8.1. Indications for the Use of NIV with High Frequency
  - 3.8.2. Parameter Adjustment
  - 3.8.3. Usefulness in the Acute Patient
  - 3.8.4. Usefulness in the Chronic Patient
  - 3.8.5. Monitoring and Management of Complications
  - 3.8.6. Comparison with Other Ventilatory Modalities
- 3.9. Other Ventilatory Modes
  - 3.9.1. Pressure Support Ventilation with Mandatory Flow Control (MFC)
  - 3.9.2. High Velocity Ventilation with Nasal Cannula
  - 3.9.3. Other Innovative Ventilatory Modes





### Structure and Content | 21 tech

- 3.10. Humidification and Temperature Adjustment in NIV
  - 3.10.1. Importance of Adequate Humidification and Temperature in NIV
  - 3.10.2. Types of NIV Humidification Systems
  - 3.10.3. Indications for Adding Humidifier in Acutely III Patients
  - 3.10.4. Indications for Humidifier in Chronic Patients
  - 3.10.5. Methods of NIV Humidification Monitoring
  - 3.10.6. Temperature Adjustment in NIV
  - 3.10.7. Monitoring and Management of Complications Related to Humidity and Temperature in NIMV

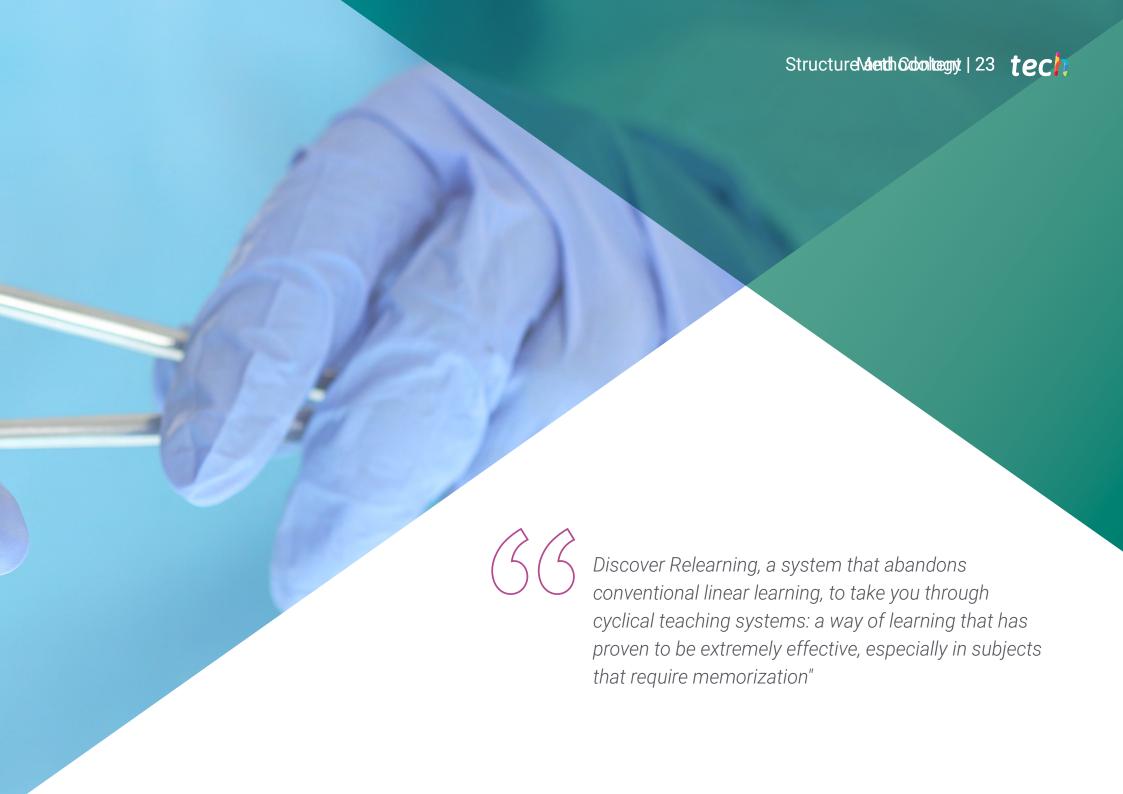


Take this Postgraduate Diploma and get the possibility to update your knowledge online without neglecting your daily obligations"



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.

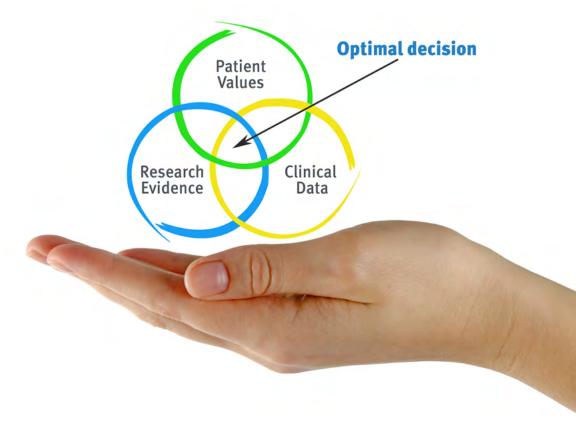


## tech 24 | Methodology

#### At TECH Nursing School we use the Case Method

In a given situation, what should a professional do? 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. Nurses learn better, faster, and more sustainably over time.

With TECH, nurses can experience a learning methodology 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 real conditions in professional nursing practice.



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. Nurses who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
- 2. The learning process has a clear focus on practical skills that allow the nursing professional to better integrate knowledge acquisition into the hospital setting or primary care.
- **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.





#### 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 case studies with a 100% online learning system based on repetition combining a minimum of 8 different elements in each lesson, which is a real revolution compared to the simple study and analysis of cases.

The nurse will learn through real cases and by solving complex situations in simulated learning environments.

These simulations are developed using state-of-the-art software to facilitate immersive learning.



### Methodology | 27 tech

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 we have trained more than 175,000 nurses with unprecedented success in all specialities regardless of practical workload. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

Relearning 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.



#### **Nursing Techniques and Procedures on Video**

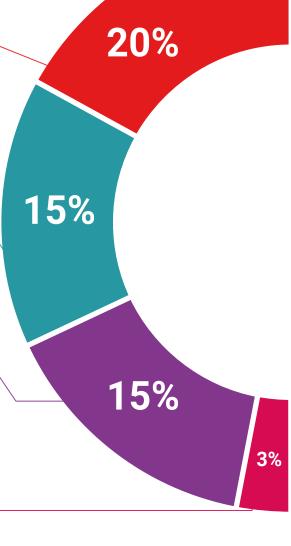
We introduce you to the latest techniques, to the latest educational advances, to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch them as many times as you want.



#### **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

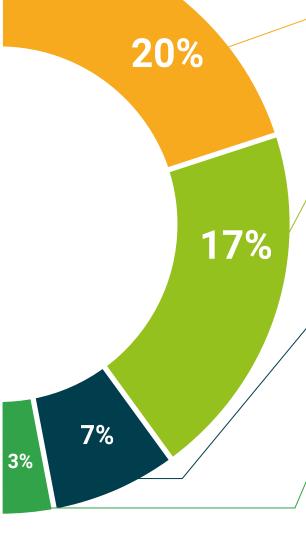
There is scientific evidence suggesting that observing third-party experts can be useful.

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.







## tech 32 | Certificate

This Postgraduate Diploma in Ventilatory Techniques and Parameters in NIMV for Nursing contains the most complete and up-to-date scientific on the market.

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

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

Title: Postgraduate Diploma in Ventilatory Techniques and Parameters in NIMV for Nursing

Official No of Hours: 450 h.



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

health confidence people
leducation information tutors
guarantee accreditation teaching
institutions technology learning



## Postgraduate Diploma

Ventilatory Techniques and Parameters in NIMV for Nursing

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

