

# Postgraduate Certificate Environmental Systems Modeling





## Postgraduate Certificate Environmental Systems Modeling

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

Website: [www.techtute.com/in/engineering/postgraduate-certificate/environmental-systems-modeling](http://www.techtute.com/in/engineering/postgraduate-certificate/environmental-systems-modeling)

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# 01

# Introduction

Thanks to the advances of new technology, mathematical models have become fantastic tools to simulate the environment in which a project will be carried out, and the possible environmental impacts it may have. This has made it possible to improve sustainability and enhance the respect that people and companies have for the environment. In this modern context, it's essential for engineering professionals to have an advanced understanding of modeling. That is why TECH has designed this 100% online program, which offers the graduate the most relevant and current information on the main types of systems analysis in Environmental Sciences, to process simulations using software or applications of iterations. In addition, students will have multimedia resources that can be easily accessed 24 hours a day, from any computer with Internet connection.





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*With this Postgraduate Certificate in Environmental Systems Modeling, you can perfect engineering projects and reach the success you've been looking for”*

The effectiveness and usefulness of mathematical models in environmental sciences has made it possible to delimit the area of influence of a project, improve technical decision-making or comply more accurately with current environmental protection regulations. The information extracted from this modeling is therefore of particular relevance for both private and public companies wishing to carry out any project, infrastructure or construction.

In this context, any engineering professional who wishes to progress adequately in their sector must have a solid knowledge of Environmental Systems Modeling, with which they will be able to achieve success in any project they get involved with. This is the reason why TECH has created this Postgraduate Certificate, where students will be able to delve into the different types of modeling, their technical applications, validation and sensitivity analysis over 6 weeks.

For this purpose, students will be provided with video summaries, videos in detail, essential readings or case studies with which they will learn from a theoretical-practical view of modeling and simulation of environmental processes. In addition, thanks to the *Relearning* system, based on the repetition of content, the professional will be able to advance through the syllabus in a much more natural way and even reduce the hours of study that are so frequent in other teaching methods.

The engineer is thus in front of a Postgraduate Certificate that will allow them to take firm steps in their professional career, thanks to a degree that they can study comfortably, whenever and wherever they want. All you need is an electronic device with an internet connection to access the syllabus that is hosted on the virtual campus. In addition, you have the freedom to distribute your course load according to your needs, allowing you to easily combine a university program with even the most demanding responsibilities.

This **Postgraduate Certificate in Environmental Systems Modeling** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ The development of case studies presented by experts of Environmental Engineering
- ◆ The graphic, schematic and practical contents of the book provide technical and practical information on those 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



*This is a university degree, with multimedia resources that place it at the academic forefront. Enroll now”*

“

*This academic option will lead you to master both continuous and discontinuous, homogeneous and heterogeneous models"*

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

Its 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 an immersive education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. For this purpose, students will be assisted by an innovative interactive video system developed by renowned experts.

*Video summaries, in-depth videos or specialized readings will be available to you 24 hours a day.*

*With this university education you will be able to provide innovative solutions to a range of environmental situations. Enroll now.*



# 02 Objectives

The study plan of this Postgraduate Certificate has been designed with the main aim of providing the professional the most advanced knowledge on Environmental Systems Modeling. Thus, at the end of the 150 hours of this program you will be able to apply discrete and continuous, homogeneous and heterogeneous models and confidently use the software necessary for this purpose. The specialized teaching team that is part of this program will accompany the students so that they can successfully achieve these objectives.







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*Enroll in a 100% online program that will allow you to solve different environmental problems through modeling"*



## General Objectives

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- ♦ Analyze some classical environmental models in detail
- ♦ Study the mathematical expression of some general behaviors
- ♦ Know how to verify and validate a model by comparison with experimental data
- ♦ Study the use of mathematical models in Environmental Sciences





## Specific Objectives

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- ◆ Describe The Model Concept
- ◆ Understand the difference between discrete and continuous models
- ◆ Distinguish between spatially homogeneous and heterogeneous models
- ◆ Explain potential problems in building and validating models and sensitivity analyses



*This program has case studies, detailing methodologies that you will be able to integrate into your daily practice in the field of engineering"*

# 03

# Structure and Content

The Diploma has been developed to provide the most relevant information on Environmental Systems Modeling and how it can be directly used by engineering professionals. Thanks to the theoretical-practical approach and the multimedia resources developed by teaching specialists in this field, students will achieve a better understanding of the mathematical concepts in modeling and their importance when executing projects. In addition, thanks to the Relearning system, you to ensure in a much more natural way through this intensive learning.



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*Thanks to the knowledge acquired on modeling you will be able to adapt and improve the technical decisions involved in your projects"*

## Module 1. Modeling Environmental Systems

- 1.1. Models, Computation and Environment
  - 1.1.1. Introduction to Scale and Complexity Problems
  - 1.1.2. Presenting Alternatives to Computer Modeling and Environmental Simulation Processes
- 1.2. Introduction to R
  - 1.2.1. Program R
  - 1.2.2. R Applications in Modeling
- 1.3. Systems and Systems Analysis
  - 1.3.1. Main Types of Systems Analysis in Environmental Sciences
- 1.4. Models and Modeling
  - 1.4.1. Types of Models
  - 1.4.2. Components
  - 1.4.3. Modeling Phases
- 1.5. Parameter Estimation, Model Validation and Sensitivity Analysis
  - 1.5.1. Estimate
  - 1.5.2. Validation
  - 1.5.3. Sensitivity Analysis
- 1.6. Algorithm and Programming
  - 1.6.1. Flowcharts and Language
  - 1.6.2. Forrester Diagrams
- 1.7. Applications
  - 1.7.1. Formulating and Implementing Simple Models: Surface Radiation
  - 1.7.2. Generalized Linear Models in the Environment
  - 1.7.3. DaisyWorld: Work Method





- 1.8. Mathematical Concepts in Modeling
  - 1.8.1. Random Variables
  - 1.8.2. Probability Models
  - 1.8.3. Regression Models
  - 1.8.4. Models in Differential Equations
- 1.9. Conditions, Iterations and Repeatability
  - 1.9.1. Definition of Concepts
  - 1.9.2. Applying Iterations and Repeatability to Environmental Models
- 1.10. Functions and Recursion
  - 1.10.1. Function Construction to Obtain Reusable Modular Codes
  - 1.10.2. Introducing Recursion as a Programming Technique



*Advance your professional career  
with a Diploma that will show you the  
different phases used in Environmental  
Systems Modeling"*

04

# 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.







*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"*

## Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

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*At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world”*



*You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*



*The student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“*Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

## Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

*In 2019, we obtained the best learning results of all online universities in the world.*

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



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.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong 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.*

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.



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.



### 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.



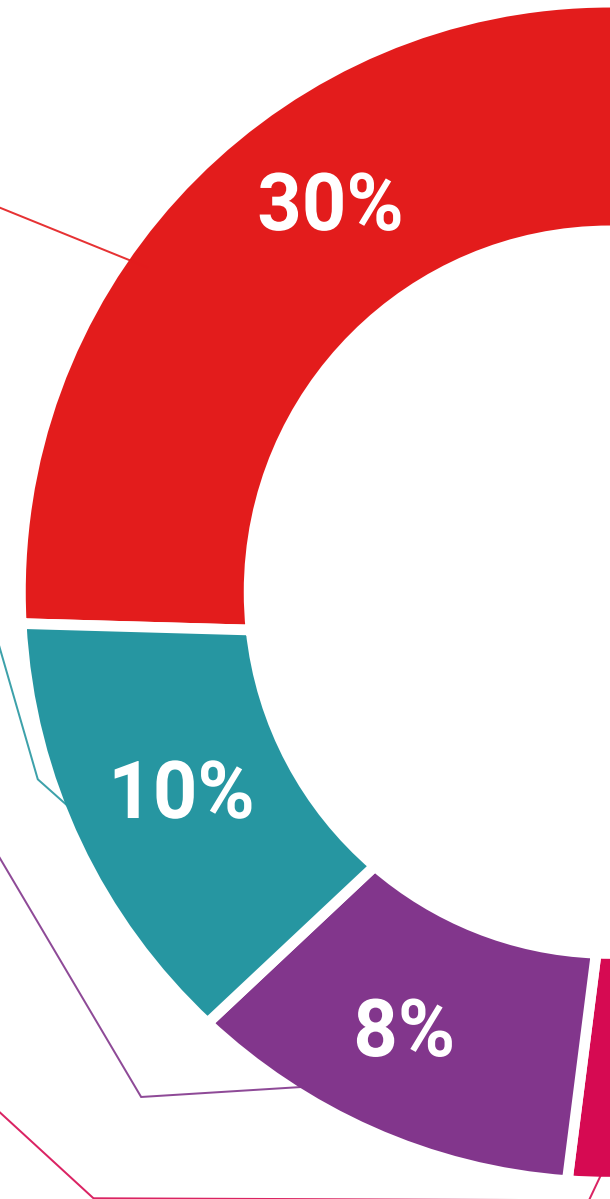
### Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.





**Case Studies**

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.



**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".



**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.



05

# Certificate

The Postgraduate Certificate in Environmental Systems Modeling guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 Environmental Systems Modeling** contains the most complete and up-to-date 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 certificate 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 Environmental Systems Modeling**

Official N° of hours: **150 h.**



\*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.

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



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