

Postgraduate Diploma Health Research Tools





Postgraduate Diploma Health Research Tools

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

Website: www.techtute.com/us/nutrition/postgraduate-diploma/postgraduate-diploma-health-research-tools

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01 Introduction

Today's research, especially in the field of nutrition, has reached an unprecedented level of complexity. Access to almost unlimited information banks, advanced computer programs or the possibility of creating transnational multidisciplinary teams means that researchers must have perfectly developed skills in the field. An important part of this development is, precisely, access to research tools, since the success of the project depends on their proper use. This is the focus of this academic program, in which the nutritionist will review the latest developments in graphical representations of data, statistics in R and generation of research projects. All of this is supported by a teaching team that is well versed in the subject, with 100% online teaching content without the usual restrictions of face-to-face classes or fixed schedules



ta Analysis Report



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Discover the latest trends in statistics in R such as Data Mining techniques or biomedical research with a nutritional perspective by enrolling in this Postgraduate Diploma"

The topics covered by scientific research in the nutritional area are extensive. From the effect of certain diets on different people to the interaction between a group of foods and diseases such as cancer, the researcher must have an excellent knowledge not only in the scientific postulates and current material, but also in the essential statistical tools to carry out the project.

From its very genesis, the research team must define the objectives and scientific methodology to be used, as well as the ethics that the project must follow. This program, created by a team of expert researchers with years of experience, compiles both the necessary scientific basis and the most useful tools to undertake a research project in Nutrition with all the guarantees.

Therefore, it includes extensive topics on expectations, hypotheses, biostatistics, multivariate analysis, types of graphs and many other essential issues for researchers who wish to be at the forefront of their field. All the teaching material is reinforced by a large number of simulated and real cases, which help to adequately contextualize each topic covered. Thus, theory and practice are complemented with detailed videos, interactive summaries and more content created by the best professionals in the field.

The 100% online Postgraduate Diploma makes it possible to combine it with all kinds of activities and responsibilities, both professional and personal. The student is completely free to distribute the teaching load according to their own interests, being able to download the entire syllabus from any electronic device with internet connection.

This **Postgraduate Diploma in Health Research Tools** contains the most complete and up-to-date scientific program on the market. The most important features include:

- Case studies presented by experts in Health Sciences Research
- The graphic, schematic, and practical contents with which they are created, provide medical 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



Position yourself at the forefront of dietary research with the best tools, precepts and practical guidelines that TECH puts at your disposal in this program"

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Delve into how Data Mining and massive data analysis can be a key point in Health and Nutrition Research”

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 professionals with situated and contextual learning, i.e., a simulated environment that will provide an 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 throughout the program. This will be done with the help of an innovative system of interactive videos made by renowned experts.

Use a 100% online format without any kind of restriction for you, with the freedom you need to complete it in just 6 months.

You will have access to a complete reference guide that you can download to continue using even after you finish your program.



02 Objectives

The main objective of this Postgraduate Diploma is to provide nutrition specialists and researchers in the area with the most relevant scientific and technological tools, in order to promote their own projects in a reliable way. The most complex theory on biostatistics, massive data processing and project structuring as well as real and simulated cases on each of these aspects are reviewed throughout the syllabus.



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Apply immediately in your daily practice the advanced methods of health research that you will acquire in this Postgraduate Diploma"



General Objectives

- Learn how to adequately formulate a question or issue to be solved
- Asses the state of the art of the problem through literature search
- Assess the feasibility of the potential project
- Draft projects in accordance with the different calls for proposals
- Seek financing
- Master the necessary data analysis tools
- Write scientific articles (papers) for the daily magazines
- Generate posters
- Look for dissemination tools to the non-specialized public
- Protect data
- Transfer knowledge generated to industry or the clinic
- Use of artificial intelligence and massive data analysis
- Interact with examples of successful projects



Project your professional career towards the field of Nutrition Research, a booming field in which you will need the best tools at your disposal"





Specific Objectives

Module 1. Generation of Research Projects

- ◆ Learn how to assess the feasibility of the potential project
- ◆ Know in depth the essential milestones for writing a research project
- ◆ Delve into the criteria for exclusion/inclusion in projects
- ◆ Learn how to set up the specific team for each project

Module 2. Statistics and R in Health Research

- ◆ Describe the main concepts of biostatistics
- ◆ Learn how to use the R program
- ◆ Define and understand the regression method and multivariate analysis with R
- ◆ Recognize the concepts of statistics applied to research
- ◆ Describe the statistical techniques of Data Mining
- ◆ Provide knowledge of the most commonly used statistical techniques in biomedical research

Module 3. Graphical Representations of Data in Health Research and Other Advanced Analysis

- ◆ Master the tools of computational statistics
- ◆ Learn to generate graphs for the visual interpretation of data obtained in research project
- ◆ Obtain in-depth knowledge of dimensionality reduction methods
- ◆ Delve into the comparison of methods
- ◆ Delve into the comparison of methods



03

Course Management

All the teachers chosen by TECH for the creation of this program have years of experience in the research sector. This makes it possible to create a teaching material that covers both the theoretical foundations of the projects and tools in the area, as well as the highest level of research practice itself. Thus, the student will learn, from expert researchers who have been in charge of teams and know the reality of field work, contributing their own expertise and vision to all the contents.





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Follow practical advice from top data analytics experts and researchers, acquiring effective, reality-focused knowledge”

Management



Dr. López-Collazo, Eduardo

- ♦ Scientific Deputy Director in the Health Research Institute of La Paz University Hospital
- ♦ Head of the Department of Immune Response and Infectious Diseases at IdiPAZ
- ♦ Head of the Department of Immune Response, Tumors and Immunology at IdiPAZ
- ♦ President of the IdiPAZ Research Commission
- ♦ Sponsor of the External Scientific Committee of the Murcian Institute of Health Research
- ♦ Member of the Scientific Commission of FIDE
- ♦ Editor of the international scientific journal *Mediators of Inflammation*
- ♦ Editor of the international scientific journal *Frontiers of Immunology*
- ♦ Coordinator of IdiPAZ Platforms
- ♦ Coordinator of Health Research Funds in the areas of Cancer, Infectious Diseases and HIV Ph.D. in Nuclear Physics from the University of Havana
- ♦ PhD in Pharmacy from the Complutense University of Madrid

Professors

Dr. Pascual Iglesias, Alejandro

- ♦ Bioinformatics Platform Coordinator, La Paz Hospital
- ♦ Advisor to the COVID-19 Expert Committee of Extremadura
- ♦ Researcher in Eduardo López-Collazo's innate immune response research group, Instituto de Investigación Sanitarias University Hospital La Paz
- ♦ Researcher in the coronavirus research group of Luis Enjuanes, National Center of Biotechnology CNB-CSIC
- ♦ Coordinator of Continuing Education in Bioinformatics, Health Research Institute of the University Hospital La Paz
- ♦ Cum Laude PhD in Molecular Biosciences from the Autonomous University of Madrid
- ♦ Degree in Biology Molecular from the University of Salamanca
- ♦ Professional Master's Degree in Cellular and Molecular Physiopathology and Pharmacology from the Universidad of Salamanca

Dr. Avendaño Ortiz, José

- ♦ Sara Borrell Researcher Foundation for Biomedical Research of the Ramón y Cajal University Hospital (FIBioHRC/IRyCIS)
- ♦ Researcher Foundation for Biomedical Research of La Paz University Hospital (FIBHULP/ IdiPAZ)
- ♦ Researcher HM Hospitals Foundation (FiHM)
- ♦ Graduate in Biomedical Sciences from the University of Lleida
- ♦ Master's Degree in pharmacological research from the Autonomous University of Madrid
- ♦ PhD in Pharmacology and Physiology from the Autonomous University of Madrid

Mr. Arnedo Abade, Luis

- ♦ Data Scientist & Analyst Manager in Industrias Arnedo
- ♦ Data & Analyst Manager in Boustique Perfumes
- ♦ Data Scientist & Analyst Manager in Darecod
- ♦ Postgraduate Certificate in Statistics
- ♦ Psychology Graduate



The leading professionals in the field have come together to offer you the most comprehensive knowledge in this field, so that you can develop with total guarantees of success"

04

Structure and Content

In order to facilitate the student's work, TECH has incorporated the Relearning methodology in all the contents of this program. This means that the key concepts in Health Research Tools are reiterated naturally and progressively throughout the entire Postgraduate Diploma. This saves numerous hours of study time, which in turn can be invested in the large amount of supplementary material provided for each knowledge module.





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You will have 24-hour access to a library of high-quality multimedia content, which you can download and play later on your favorite electronic device”

Module 1. Generation of Research Projects

- 1.1. General Structure of a Project
- 1.2. Presentation of Background and Preliminary Data
- 1.3. Definition of the Hypothesis
- 1.4. Definition of General and Specific Objectives
- 1.5. Definition of the Type of Sample, Number and Variables to be Measured
- 1.6. Establishment of the Scientific Methodology
- 1.7. Exclusion/Inclusion Criteria in Projects with Human Samples
- 1.8. Establishment of the Specific Team: Balance and *Expertise*
- 1.9. Ethical aspects and Expectations: an Important Element that we Forget
- 1.10. Budget Generation: a fine Tuning Between the Needs and the Reality of the Call

Module 2. Statistics and R in Health Research

- 2.1. Biostatistics
 - 2.1.1. Introduction to The Scientific Method
 - 2.1.2. Population and Sample. Sampling Measures of Centralization
 - 2.1.3. Discrete Distributions and Continuous Distributions
 - 2.1.4. General Outline of Statistical Inference. Inference about a Normal Population Mean. Inference about a General Population Mean
 - 2.1.5. Introduction to Nonparametric Inference
- 2.2. Introduction to R
 - 2.2.1. Basic Features of the Program
 - 2.2.2. Main Object Types
 - 2.2.3. Simple Examples of Simulation and Statistical Inference
 - 2.2.4. Graphs
 - 2.2.5. Introduction to R Programming
- 2.3. Regression Methods with R
 - 2.3.1. Regression Models
 - 2.3.2. Variable Selection
 - 2.3.3. Model Diagnosis
 - 2.3.4. Treatment of Outliers
 - 2.3.5. Regression Analysis
- 2.4. Multivariate Analysis with R
 - 2.4.1. Description of Multivariate Data
 - 2.4.2. Multivariate Distributions
 - 2.4.3. Dimension Reduction
 - 2.4.4. Unsupervised Classification: Cluster Analysis
 - 2.4.5. Supervised Classification: Discriminant Analysis
- 2.5. Regression Methods for Research with R
 - 2.5.1. Generalized Linear Models (GLM): Poisson Regression and Negative Binomial Regression
 - 2.5.2. Generalized Linear Models (GLM): Logistic and Binomial Regressions
 - 2.5.3. Poisson and Negative Binomial Regression Inflated by Zeros
 - 2.5.4. Local Fits and Generalized Additive Models (GAMs)
 - 2.5.5. Generalized Mixed Models (GLMM) and Generalized Additive Mixed Models (GAMM)
- 2.6. Statistics Applied to Biomedical Research with R I
 - 2.6.1. Basic Notions of R. Variables and Objects in R. Data handling Files Graphs
 - 2.6.2. Descriptive Statistics and Probability Functions
 - 2.6.3. Programming and Functions in R
 - 2.6.4. Contingency Table Analysis
 - 2.6.5. Basic Inference with Continuous Variables
- 2.7. Statistics Applied to Biomedical Research with R II
 - 2.7.1. Analysis of Variance
 - 2.7.2. Correlation Analysis
 - 2.7.3. Simple Linear Regression
 - 2.7.4. Multiple Linear Regression
 - 2.7.5. Logistic Regression
- 2.8. Statistics Applied to Biomedical Research with R III
 - 2.8.1. Confounding Variables and Interactions
 - 2.8.2. Construction of a Logistic Regression Model
 - 2.8.3. Survival Analysis
 - 2.8.4. Cox Regression
 - 2.8.5. Predictive Models. ROC Curve Analysis



- 2.9. Statistical Data Mining Techniques with R I
 - 2.9.1. Introduction. Data Mining. Supervised and Unsupervised Learning. Predictive Models Classification and Regression
 - 2.9.2. Descriptive Analysis Data Pre-Processing
 - 2.9.3. Principal Component Analysis (PCA)
 - 2.9.4. Cluster Analysis. Hierarchical Methods. K-Means
- 2.10. Statistical Data Mining Techniques with R II
 - 2.10.1. Model Assessment Measures. Predictive Ability Measures ROC Curves
 - 2.10.2. Models Assessment Techniques. Cross-Validation. Bootstrap Samples
 - 2.10.3. Tree-Based Methods (CART)
 - 2.10.4. Support Vector Machines (SVM)
 - 2.10.5. *Random Forest* (RF) and Neural Networks (NN)

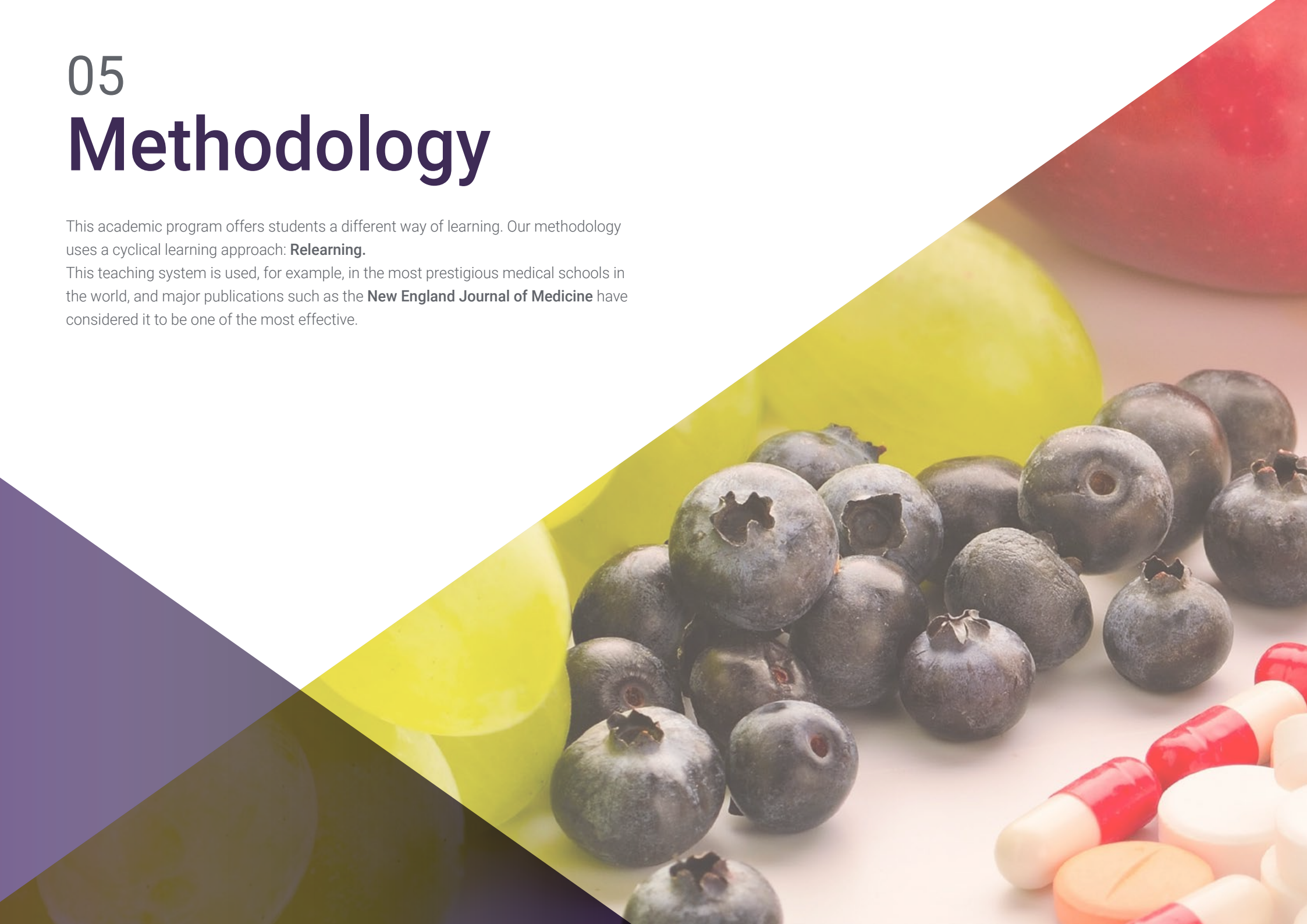
Module 3. Graphical Representations of Data in Health Research and Other Advanced Analysis

- 3.1. Types of Graphs
- 3.2. Survival Analysis
- 3.3. ROC Curves
- 3.4. Multivariate Analysis (Types of Multiple Regression)
- 3.5. Binary Regression Models
- 3.6. Massive Data Analysis
- 3.7. Dimensionality Reduction Methods
- 3.8. Comparison of Methods: PCA, PPCA and KPCA
- 3.9. T-SNE (t-Distributed Stochastic Neighbor Embedding)
- 3.10. UMAP (Uniform Manifold Approximation and Projection)

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

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. Specialists learn better, faster, and more sustainably over time.

With TECH, nutritionists can 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, trying to recreate the real conditions of professional nutritional 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. Nutritionists who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity through exercises to evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the nutritionist to better integrate knowledge into clinical practice.
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 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.

The nutritionist 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.



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 45,000 nutritionists have been trained with unprecedented success in all clinical specialties regardless of the surgical load. 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.

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.



Nutrition Techniques and Procedures on Video

TECH brings students closer to the latest techniques, the latest educational advances and to the forefront of current nutritional counselling techniques and procedures. 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

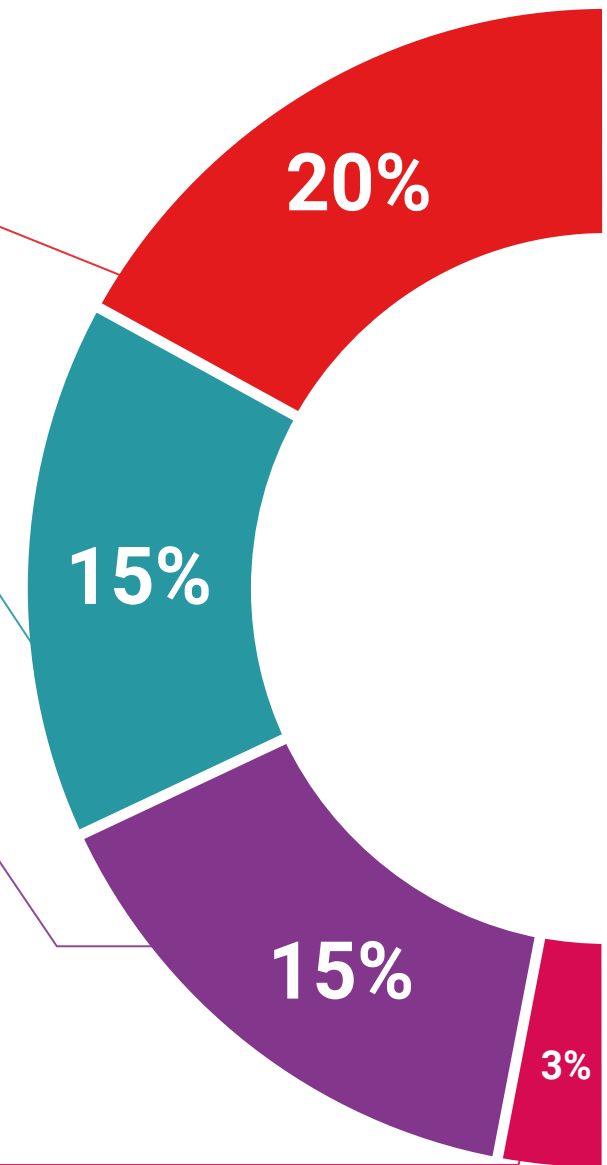
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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 Diploma in Health Research Tools guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Health Research Tools** 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 diploma 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 Health Research Tools**

Official No. of Hours: **450 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 quality

online training

development languages

virtual classroom

tech technological
university

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