Postgraduate Certificate
Reverse Engineering in Cybersecurity

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Postgraduate Certificate
Reverse Engineering in Cybersecurity

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

Website: www.techtitute.com/in/information-technology/postgraduate-certificate/reverse-engineering-cybersecurity

Index

01 Introduction p. 4

02 Objectives p. 8

03 Course Management p. 12

04 Structure and Content p. 18

05 Methodology p. 22

06 Certificate p. 30

01

Introduction

In the IT environment, there are different motivations that lead us to apply different Reverse Engineering Techniques to understand and know enough about a software, a communication protocol or an algorithm. This in-depth insight is the foundation that will allow the professional to develop programs tailored to these processes that will enable the implementation of targeted protection of higher quality and greater responsiveness to cyber-attacks. This program will allow you to acquire these competencies with the security and endorsement of TECH, in a highly educational, intensive and rapid course.

Learn in a few weeks how and in which context to apply the different techniques of Reverse Engineering in Cybersecurity"

Reverse Engineering Techniques, such as static code analysis and dynamic analysis for the decryption of communication protocols, lead to a sufficient understanding of the protocol, which allows us to develop our own programs that show us how to use the protocol.

It is common to perform audits of the software being developed to detect vulnerabilities: Sometimes the vulnerability is not found in the source code, but is introduced by the compiler that generates the machine code.

Knowledge in reverse engineering and, therefore, in how we obtain the machine code will allow us to detect such vulnerabilities.

One of the best known applications of reverse engineering is malware analysis which, through different techniques such as sandboxing, will provide an understanding and knowledge of the malicious software under study and, thereby, allow the development of software capable of detecting and counteracting it, as in the case of antivirus software that works on the basis of signatures.

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

- The development of case studies presented by cybersecurity experts
- The graphic, schematic, and 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

Learn how to examine x86 processor architecture and ARM processor architecture with precision and accuracy”

Analyze Reverse Engineering techniques in a professional growth process that will allow you to increase the security levels of your codes"

A high education process created to be affordable and flexible, with the most interesting methodology of online teaching.

Study through a practice-focused Postgraduate Certificate to boost your skills to the level of a specialist.

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.

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 This will be done with the help of an innovative system of interactive videos made by renowned experts.

02

Objectives

This Postgraduate Certificate provides a quick and easy way to boost the student's ability to work in this field. With realistic and highly relevant objectives, this course of study is designed to progressively lead students to the acquisition of the theoretical and practical knowledge necessary to intervene with excellence and to develop transversal competencies that will allow them to face complex situations by developing appropriate and precise responses.

Compete with quality in a field of work full of job possibilities through a process of exceptional quality"

General Objectives

- Analyze Reverse Engineering and its different techniques
- Examine different architectures and how they impact reverse engineering
- Determine under which conditions to use the different reverse engineering techniques
- Apply reverse engineering to the cybersecurity environment

The most comfortable and efficient study support systems available in a program of exceptional quality"

Specific Objectives

- Analyze the phases of a compiler
- Examining x86 processor architecture and ARM processor architecture
- Determine the different types of analysis
- Apply Sandboxing in different environments
- Develop different Malware analysis techniques
- Establish tools oriented to Malware analysis

03

Course Management

The program's professors have been selected for their expertise in this field. They combine technical and practical experience with teaching experience, offering students first-class support in achieving their goals. Through them, the Postgraduate Certificate offers the most direct and immediate vision of the real characteristics of the intervention in this field, achieving a contextual vision of maximum interest.

Postgraduate Diploma in Reverse Engineering in Cybersecurity experts will accompany you in each phase of the study and will give you the most realistic view of this work"

International Guest Director

Frederic Lemieux, Ph.D. is internationally recognized as an innovative expert and inspirational leader in the fields of **Intelligence, Homeland Security, Homeland Security, Cybersecurity** and **Disruptive Technologies.** His constant dedication and relevant contributions in research and education position him as a key figure in the promotion of security and understanding of today's emerging technologies. During his professional career, he has conceptualized and directed cutting-edge academic programs at several renowned institutions, such as **the University of Montreal, George Washington University** and **Georgetown University**.

Throughout his extensive background, he has published multiple books of great relevance, all of them related to **criminal intelligence, policing, cyber threats, and cyber threats and international security.** He has also contributed significantly to the field of Cybersecurity with the publication of numerous articles in academic journals, which examine crime control during major disasters, the fight against terrorism, intelligence agencies and police cooperation. In addition, he has been a panelist and keynote speaker at various national and international conferences, establishing himself as a reference in the academic and professional arena.

Dr. Lemieux has held editorial and evaluative roles in different academic, private and governmental organizations, reflecting his influence and commitment to excellence in his field of expertise. In this way, his prestigious academic career has led him to serve as Professor of Practice and Faculty Director of the MPS programs in **Applied Intelligence, Cybersecurity Risk Management, Technology Management and Information Technology Management** at **Georgetown University.**

Dr. Lemieux, Frederic

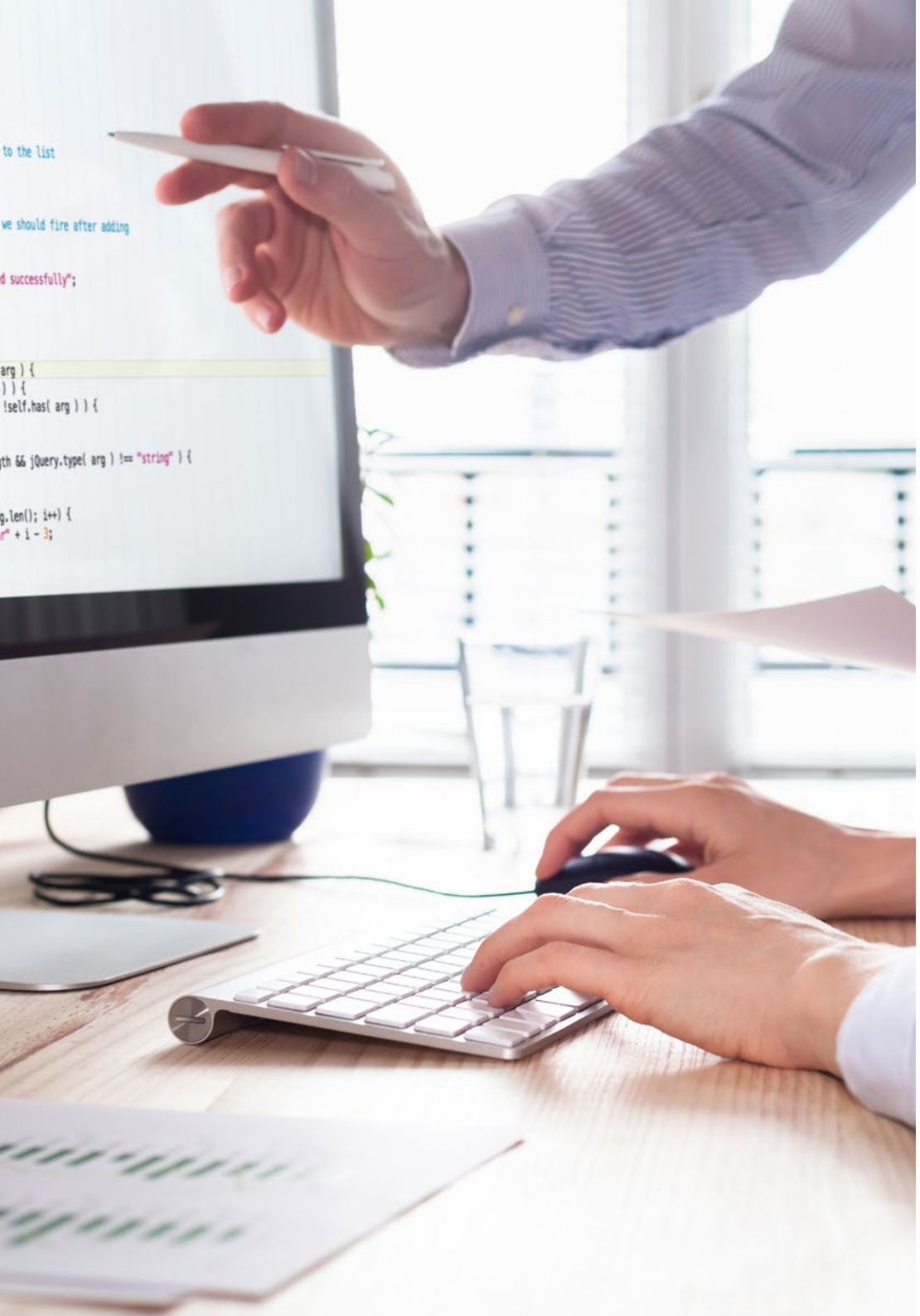
- Researcher in Intelligence, Cybersecurity and Disruptive Technologies at Georgetown University.
- Director of the Master's Program in Information Technology Management at Georgetown University
- Director of the Master in Technology Management at Georgetown University.
- Director of the Master in Cybersecurity Risk Management at Georgetown University
- Director of the Master's Program in Applied Intelligence at Georgetown University.
- Professor of Internship at Georgetown University
- PhD in Criminology from the School of Criminology, University of Montreal.
- B.A. in Sociology, Minor Degree in Psychology, University of Laval, France
- Member of: New Program Roundtable Committee, by Georgetown University

Thanks to TECH you will be able to learn with the best professionals in the world"

Management

Ms. Fernández Sapena, Sonia

- Computer Security and Ethical Hacking Trainer. Getafe National Reference Center for Informatics and Telecommunications. Madrid
- Certified E-Council instructor. Madrid
- Trainer in the following certifications: EXIN Ethical Hacking Foundation y EXIN Cyber & IT Security Foundation. Madrid
- Accredited expert trainer by the CAM of the following certificates of professionalism: Computer Security (IFCT0190), Voice and Data Network Management (IFCM0310), Departmental Network Administration (IFCT0410), Alarm Management in Telecommunications Networks (IFCM0410), Voice and Data Network Operator (IFCM0110), and Internet Services Administration (IFCT0509)
- Colaboradora externa CSO/SSA (Chief Security Officer/Senior Security Architect). University of the Balearic Islands
- Computer Engineer. Alcalá de Henares University. Madrid
- Master's Degree in DevOps: Docker and Kubernetes. Cas Training. Madrid
- Microsoft Azure Security Technologies. E-Council. Madrid



Professors

Mr. Redondo, Jesús Serrano

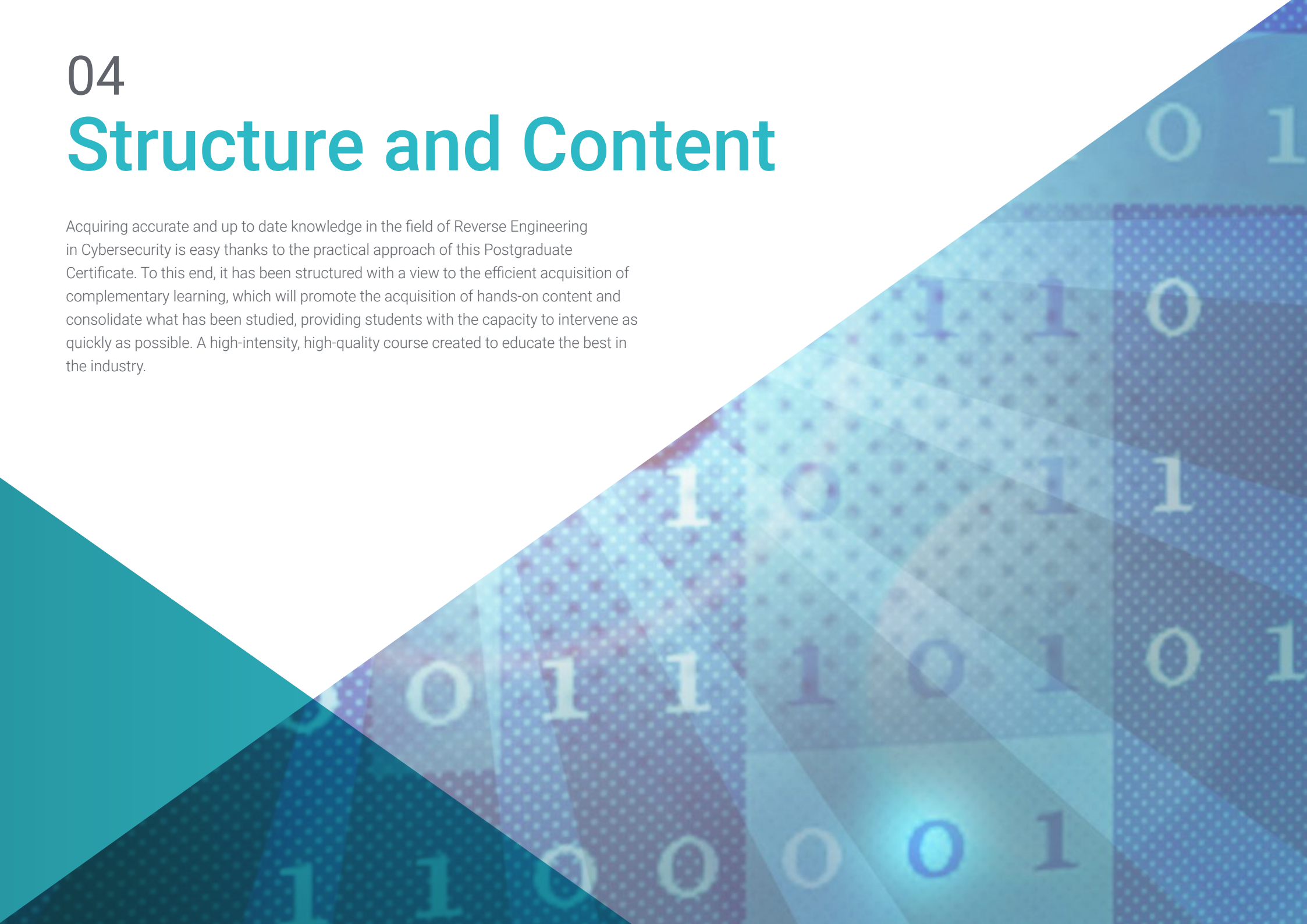
- Web Developer and Cybersecurity Technician
- Web Developer in Roams, Palencia, Spain
- FrontEnd Developer at Telefónica, Madrid
- FrontEnd Developer at Best Pro Consulting SL, Madrid
- Telecommunications Equipment and Service Installer at Grupo Zener, Castilla y León
- Telecommunications Equipment and Services Installer at Lican Comunicaciones SL, Castilla y León
- Certificate in Computer Security by CFTIC Getafe, Madrid
- Superior Technician in Telecommunication and Computer Systems by IES Trinidad Arroyo, Palencia
- Superior Technician in MV and LV Electrotechnical Installations by IES Trinidad Arroyo, Palencia
- Training in Reverse Engineering, Stenography and Encryption by the Hacker Academy Incibe

A stimulating journey of professional growth designed to keep you interested and motivated throughout the entire program"

04

Structure and Content

Acquiring accurate and up to date knowledge in the field of Reverse Engineering in Cybersecurity is easy thanks to the practical approach of this Postgraduate Certificate. To this end, it has been structured with a view to the efficient acquisition of complementary learning, which will promote the acquisition of hands-on content and consolidate what has been studied, providing students with the capacity to intervene as quickly as possible. A high-intensity, high-quality course created to educate the best in the industry.



Learn in just a few weeks how the application of Reverse Engineering provides invaluable data for cybersecurity intervention"

Module 1. Inverse Engineering

1.1. Compilers
- 1.1.1. Types of Codes
- 1.1.2. Phases of a Compiler
- 1.1.3. Table of Symbols
- 1.1.4. Error Manager
- 1.1.5. GCC Compiler

1.2. Types of Analysis in Compilers
- 1.2.1. Lexical Analysis
  - 1.2.1.1. Terminology
  - 1.2.1.2. Lexical Components
  - 1.2.1.3. LEX Lexical Analyzer
- 1.2.2. Parsing
  - 1.2.2.1. Context-free Grammars
  - 1.2.2.2. Types of Parsing
    - 1.2.2.2.1. Top-down Analysis
    - 1.2.2.2.2. Bottom-up Analysis
  - 1.2.2.3. Syntactic Trees and Derivations
  - 1.2.2.4. Types of Parsers
    - 1.2.2.4.1. LR Analyzers (Left to Right)
    - 1.2.2.4.2. LALR Analyzers
- 1.2.3. Semantic Analysis
  - 1.2.3.1. Attribute Grammars
  - 1.2.3.2. S-attributes
  - 1.2.3.3. L-attributes

1.3. Data Structures in Assembler
- 1.3.1. Variables
- 1.3.2. Arrays
- 1.3.3. Pointers
- 1.3.4. Structures
- 1.3.5. Objects

1.4. Assembler Code Structures
- 1.4.1. Selection Structures
  - 1.4.1.1. If, else if, Else
  - 1.4.1.2. Switch
- 1.4.2. Iteration Structures
  - 1.4.2.1. For
  - 1.4.2.2. While
  - 1.4.2.3. Use of Break
- 1.4.3. Functions

1.5. X86 Architecture Hardware
- 1.5.1. x86 Processor Architecture
- 1.5.2. x86 Data Structures
- 1.5.3. x86 Code Structures
- 1.5.4. x86 Code Structures

1.6. ARM Architecture Hardware
- 1.6.1. ARM Processor Architecture
- 1.6.2. ARM Data Structures
- 1.6.3. ARM Code Structures

1.7. Static Code Analysis
- 1.7.1. Disassemblers
- 1.7.2. IDA
- 1.7.3. Code Rebuilders

1.8. Dynamic Code Analysis
- 1.8.1. Behavioral Analysis
  - 1.8.1.1. Communication
  - 1.8.1.2. Monitoring
- 1.8.2. Linux Code Debuggers
- 1.8.3. Windows Code Debuggers

1.9. Sandbox
- 1.9.1. Sandbox Architecture
- 1.9.2. Sandbox Evasion
- 1.9.3. Detection Techniques
- 1.9.4. Avoidance Techniques
- 1.9.5. Countermeasures
- 1.9.6. Sandbox and Linux
- 1.9.7. Sandbox and Windows
- 1.9.8. Sandbox on MacOS
- 1.9.9. Sandbox on android

1.10. Malware Analysis
- 1.10.1. Malware Analysis Methods
- 1.10.2. Malware Obfuscation Techniques
  - 1.10.2.1. Executable Obfuscation
  - 1.10.2.2. Restriction of Execution Environments
- 1.10.3. Malware Analysis Tools

A process of maximum interest for the professional working in cybersecurity, which will bring you up to date and propel you into the job market"

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.

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.

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 has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. 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 course, students 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

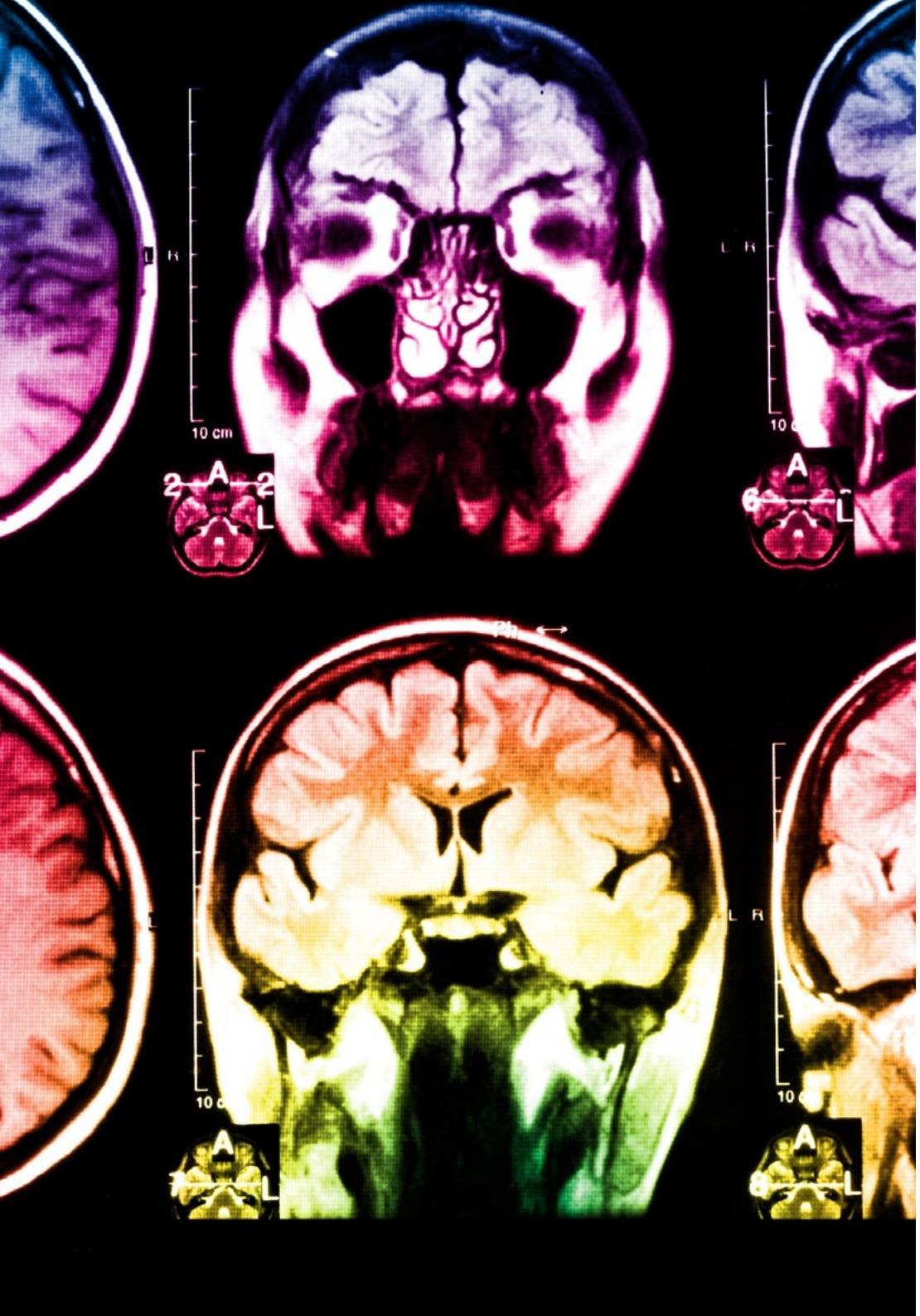
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

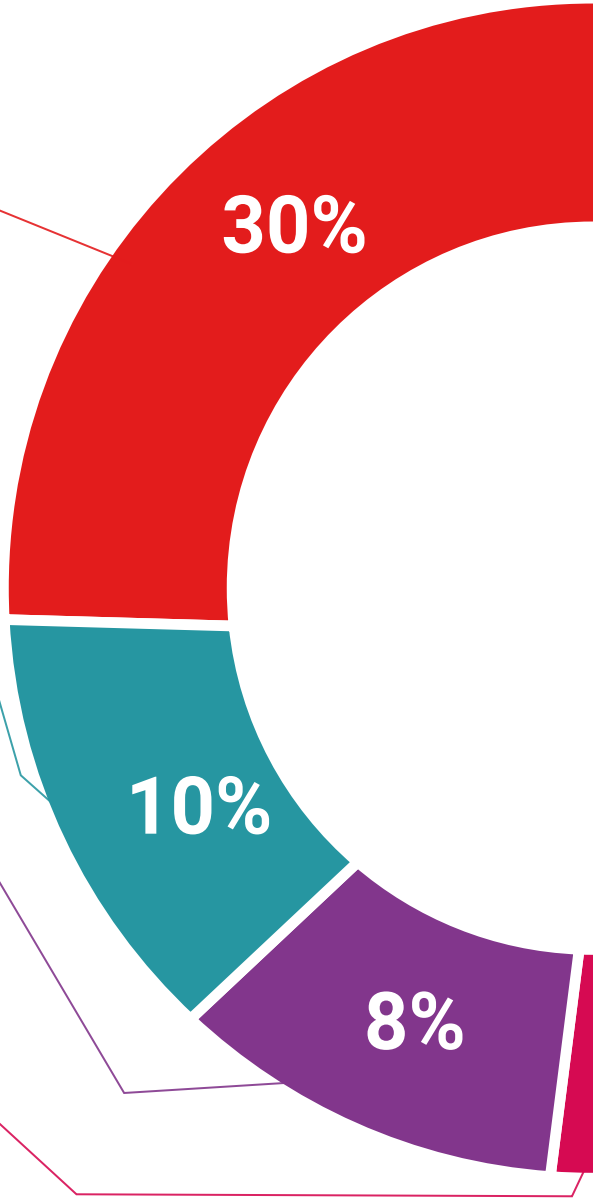
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

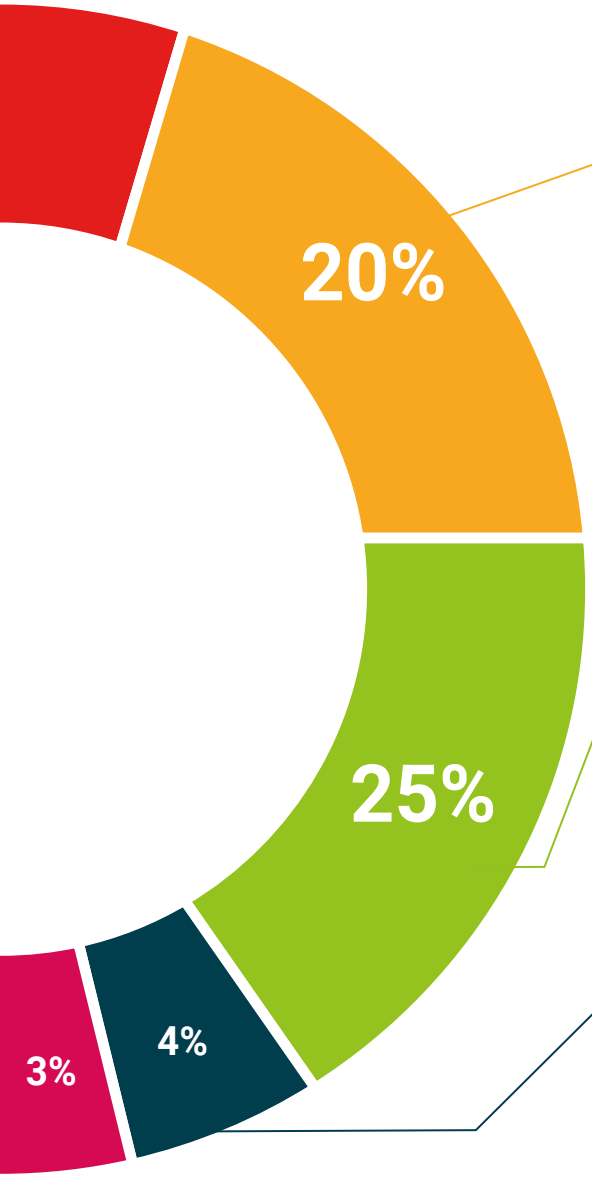
Practising Skills and Abilities

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.

06

Certificate

The Postgraduate Certificate in Reverse Engineering in Cybersecurity guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Reverse Engineering in Cybersecurity** 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 Reverse Engineering in Cybersecurity**

Official Nº of Hours: **150 h.**


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Reverse Engineering in Cybersecurity

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates

*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.

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Postgraduate Certificate
Reverse Engineering in Cybersecurity

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