Advanced Master's Degree

Computer Science, Cybersecurity and Data Analytics

tech global university

tech global university

Advanced Master's Degree
Computer Science, Cybersecurity and Data Analytics

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Global University**
- Accreditation: **120 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/us/information-technology/advanced-master-degree/advanced-master-degree-computer-science-cybersecurity-data-analytics

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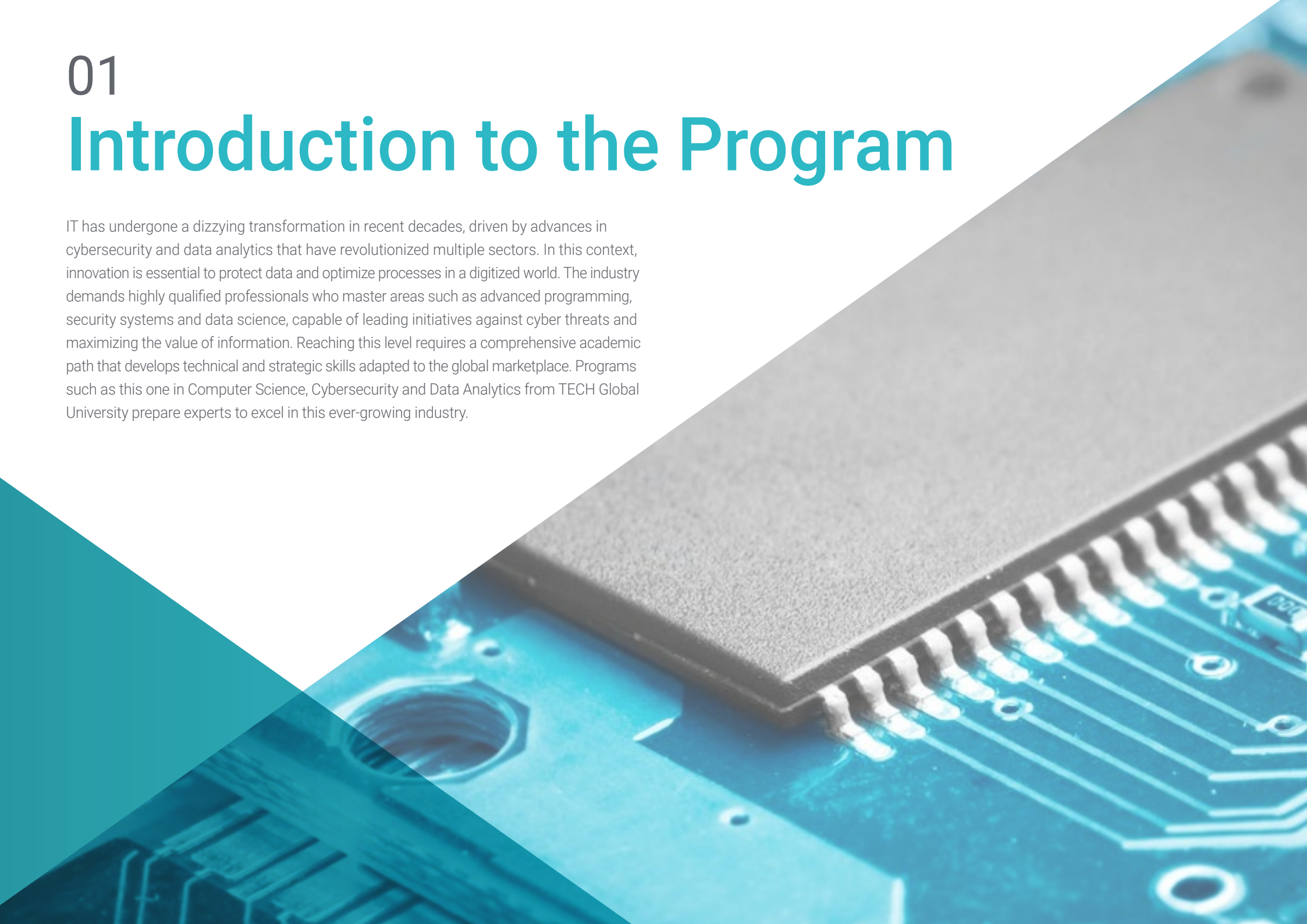
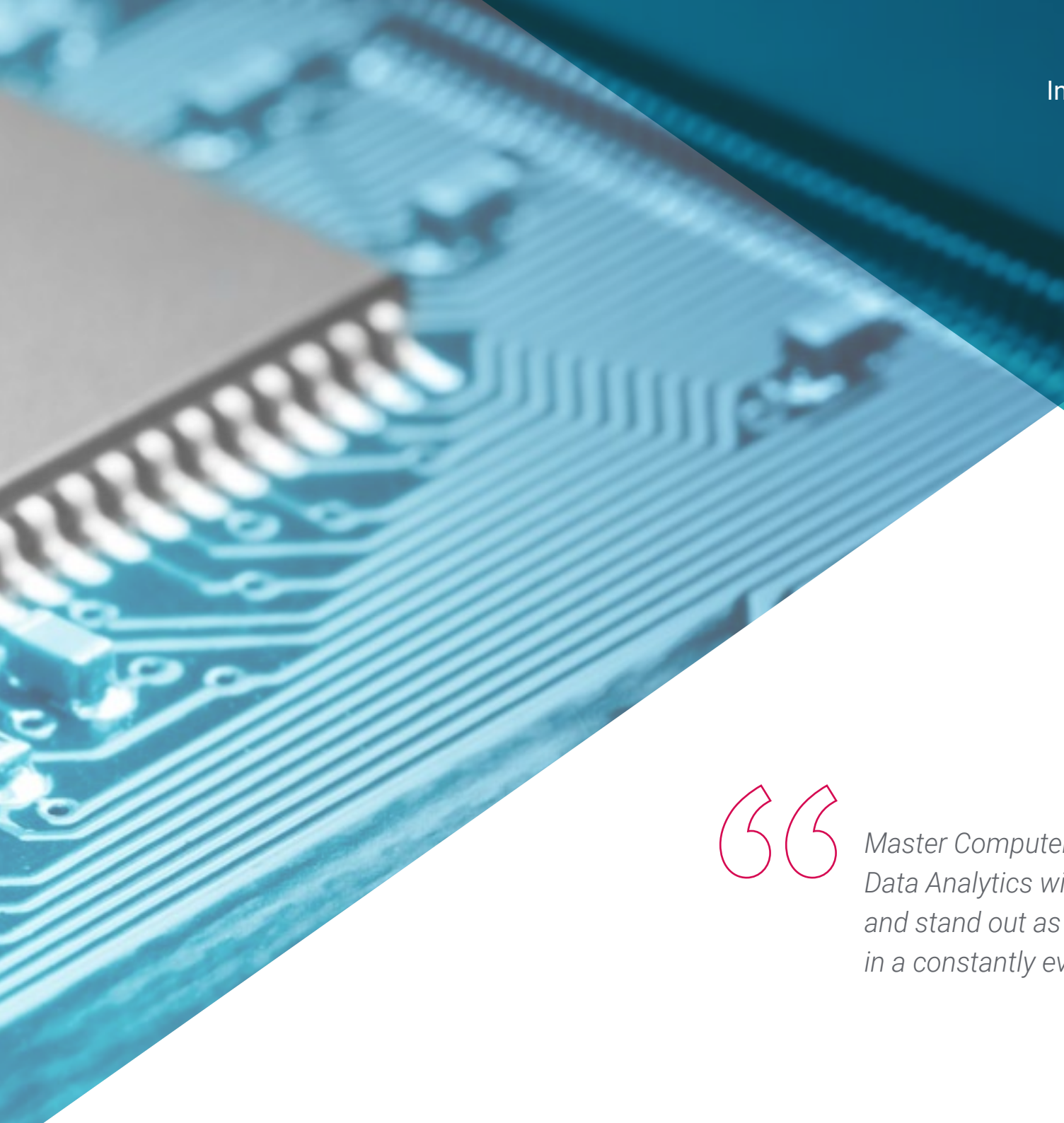
Introduction to the Program

IT has undergone a dizzying transformation in recent decades, driven by advances in cybersecurity and data analytics that have revolutionized multiple sectors. In this context, innovation is essential to protect data and optimize processes in a digitized world. The industry demands highly qualified professionals who master areas such as advanced programming, security systems and data science, capable of leading initiatives against cyber threats and maximizing the value of information. Reaching this level requires a comprehensive academic path that develops technical and strategic skills adapted to the global marketplace. Programs such as this one in Computer Science, Cybersecurity and Data Analytics from TECH Global University prepare experts to excel in this ever-growing industry.





Master Computer Science, Cybersecurity and Data Analytics with this innovative program and stand out as a recognized professional in a constantly evolving industry"

The computer science industry is critical in an increasingly digitized world, marking a significant impact on society and global economies. In this context, the field of cybersecurity and data analysis takes on special relevance, as it allows managing large volumes of information and protecting systems against increasingly sophisticated threats. High specialization in these areas is configured as a key factor to lead companies towards success and innovation.

The program in Computer Science, Cybersecurity and Data Analytics at TECH Global University addresses the essential concepts of these disciplines, taking the participant from the fundamentals to the most advanced applications. It covers aspects such as advanced programming, information security management systems, data science and architectures for intensive data handling, as well as including the latest trends in risk analysis and innovative technologies such as Blockchain and artificial intelligence.

One of the main advantages of this program is its 100% online modality, which allows students to organize their learning pace according to their needs, facilitating the reconciliation with other responsibilities. This methodology offers a comprehensive experience, designed to boost professional performance and respond to the demands of a sector in constant growth.

This **Advanced Master's Degree in Computer Science, Cybersecurity and Data Analytics** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- The development of case studies presented by experts in Computer Science, Cybersecurity and Data Analytics
- 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 the self-assessment process can be carried out to improve learning
- Special emphasis on innovative methodologies in the management of Computer Science, Cybersecurity and Data Analytics Industries
- 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

Strengthen the business fabric by managing cybersecurity strategically and effectively"

Reinforce your theoretical knowledge with a multitude of practical resources included in this program"

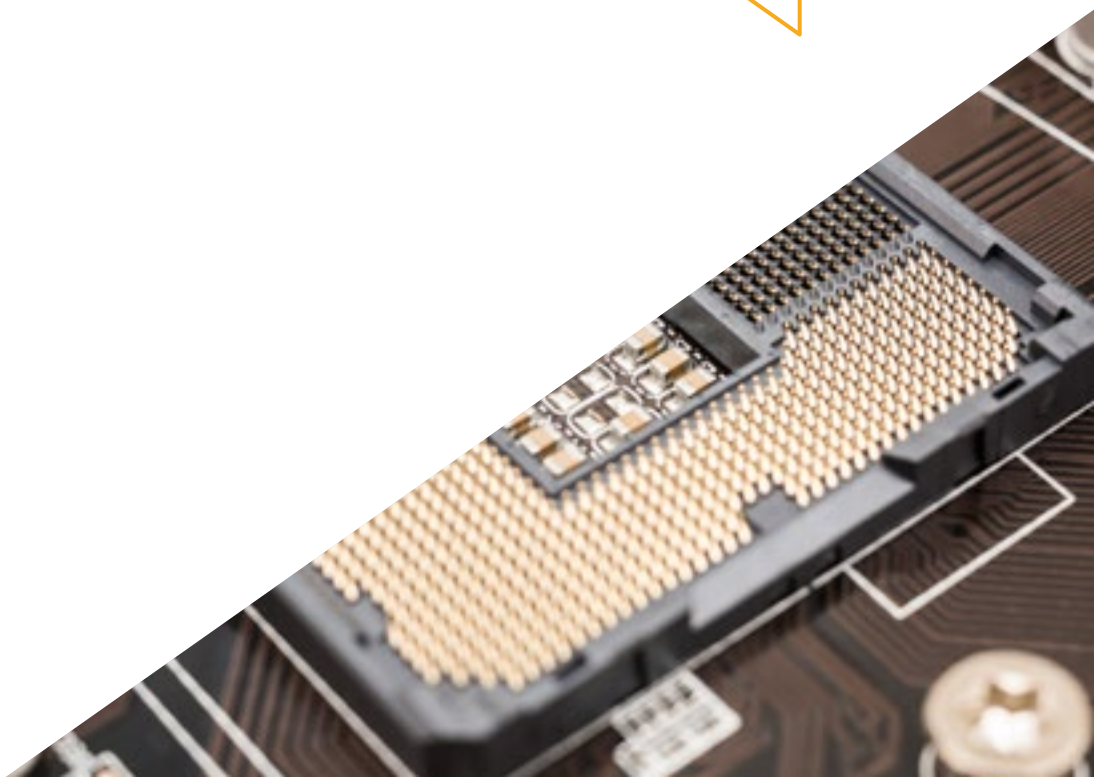
Access the most innovative teaching methodology that TECH offers in today's academic landscape.

Study at your own pace with a 100% online program, available anytime, anywhere in the world.

It includes in its teaching staff professionals belonging to the field of Cybersecurity and Data Analysis, who pour into this program the experience of their work, as well as recognized specialists from reference companies 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 an immersive learning experience designed to prepare for real-life situations.

This program is designed around Problem-Based Learning, whereby the student must try to solve the different professional practice situations that arise throughout the program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.



02

Why Study at TECH?

TECH is the world's largest online university. With an impressive catalog of more than 14,000 university programs, available in 11 languages, it is positioned as a leader in employability, with a 99% job placement rate. In addition, it has a huge faculty of more than 6,000 professors of the highest international prestige.

Study at the largest online university in the world and ensure your professional success. The future begins at TECH”

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future"

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistumba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in eleven different languages, making us the largest educational institution in the world.

The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.

Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.

The top-rated university by its students

Students have positioned TECH as the world's top-rated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.

03

Syllabus

The materials that make up this Advanced Master's Degree have been developed by a team of experts in Technology, Computer Security and Data Science. Thanks to this, the curriculum addresses in depth the current challenges in Cybersecurity, the development of advanced solutions in artificial intelligence and the analysis of large volumes of data. With this, graduates will acquire key skills to identify vulnerabilities, design protection strategies and optimize processes through innovative techniques. In addition, this university program encourages the practical application of knowledge through real projects and cases in the technology sector.

Develop advanced skills in Computer Science, Cybersecurity and Data Analytics to take your potential to the fullest"

Module 1. Programming Fundamentals

1.1. Introduction to Programming
- 1.1.1. Basic Structure of a Computer
- 1.1.2. Software
- 1.1.3. Programming Languages
- 1.1.4. Life Cycle of a Software Application

1.2. Algorithm Design
- 1.2.1. Problem Solving
- 1.2.2. Descriptive Techniques
- 1.2.3. Algorithm Elements and Structure

1.3. Elements of a Program
- 1.3.1. C++ Origin and Features
- 1.3.2. Development Environment
- 1.3.3. Concept of Program
- 1.3.4. Types of Fundamental Data
- 1.3.5. Operators
- 1.3.6. Expressions
- 1.3.7. Statements
- 1.3.8. Data Input and Output

1.4. Control Sentences
- 1.4.1. Statements
- 1.4.2. Branches
- 1.4.3. Loops

1.5. Abstraction and Modularity: Functions
- 1.5.1. Modular Design
- 1.5.2. Concept of Function and Utility
- 1.5.3. Definition of a Function
- 1.5.4. Execution Flow in a Function Call
- 1.5.5. Function Prototypes
- 1.5.6. Results Return
- 1.5.7. Calling a Function: Parameters
- 1.5.8. Passing Parameters by Reference and by Value
- 1.5.9. Scope Identifier

1.6. Static Data Structures
- 1.6.1. Arrays
- 1.6.2. Matrices. Polyhedra
- 1.6.3. Searching and Sorting
- 1.6.4. Chaining: I/O Functions for Chains
- 1.6.5. Structures. Unions
- 1.6.6. New Types of Data

1.7. Dynamic Data Structures: Pointers
- 1.7.1. Concept. Definition of Pointer
- 1.7.2. Pointer Operators and Operations
- 1.7.3. Pointer Arrays
- 1.7.4. Pointers and Arrays
- 1.7.5. Chain Pointers
- 1.7.6. Structure Pointers
- 1.7.7. Multiple Indirection
- 1.7.8. Function Pointers
- 1.7.9. Passing of Functions, Structures, and Arrays as Function Parameters

1.8. Files
- 1.8.1. Basic Concepts
- 1.8.2. File Operations
- 1.8.3. Types of Files
- 1.8.4. File Organization
- 1.8.5. Introduction to C++ Files
- 1.8.6. Managing Files

1.9. Recursion
- 1.9.1. Definition of Recursion
- 1.9.2. Types of Recursion
- 1.9.3. Advantages and Disadvantages
- 1.9.4. Considerations
- 1.9.5. Recursive-Iterative Conversion
- 1.9.6. Recursion Stack

1.10. Testing and Documentation
- 1.10.1. Program Testing
- 1.10.2. White Box Testing
- 1.10.3. Black Box Testing
- 1.10.4. Testing Tools
- 1.10.5. Program Documentation

Module 2. Data Structure

2.1. Introduction to C ++ Programming
- 2.1.1. Classes, Constructors, Methods and Attributes
- 2.1.2. Variables
- 2.1.3. Conditional Expressions and Loops
- 2.1.4. Objects

2.2. Abstract Data Types (ADT)
- 2.2.1. Types of Data
- 2.2.2. Basic Structures and TADs
- 2.2.3. Vectors and Arrays

2.3. Linear data Structures
- 2.3.1. TAD List. Definition
- 2.3.2. Linked and Doubly Linked Lists
- 2.3.3. Sorted Lists
- 2.3.4. Lists in C++
- 2.3.5. TAD Stack
- 2.3.6. TAD Queue
- 2.3.7. Stack and Queue in C++

2.4. Hierarchical Data Structures
- 2.4.1. TAD Tree
- 2.4.2. Paths
- 2.4.3. N-Ary Trees
- 2.4.4. Binary Trees
- 2.4.5. Binary Search Trees

2.5. Hierarchical Data Structures: Complex Trees
- 2.5.1. Perfectly Balanced or Minimum Height Trees
- 2.5.2. Multipath Trees
- 2.5.3. Bibliographical References

2.6. Priority Mounds and Queue
- 2.6.1. TAD Mounds
- 2.6.2. TAD Priority Queue

2.7. Hash Tables
- 2.7.1. ADT Hash Table
- 2.7.2. Hash Functions
- 2.7.3. Hash Function in Hash Tables
- 2.7.4. Redispersion
- 2.7.5. Open Hash Tables

2.8. Graphs
- 2.8.1. TAD Graph
- 2.8.2. Types of Graphs
- 2.8.3. Graphical Representation and Basic Operations
- 2.8.4. Graph Design

2.9. Algorithms and Advanced Graph Concepts
- 2.9.1. Problems about Graphs
- 2.9.2. Path Algorithms
- 2.9.3. Search or Path Algorithms
- 2.9.4. Other Algorithms

2.10. Other Data Structures
- 2.10.1. Sets
- 2.10.2. Parallel Arrays
- 2.10.3. Symbol Tables
- 2.10.4. Tries

Module 3. Algorithm and Complexity

3.1. Introduction to Algorithm Design Strategies
- 3.1.1. Recursion
- 3.1.2. Divide and Conquer
- 3.1.3. Other Strategies

3.2. Efficiency and Analysis of Algorithms
- 3.2.1. Efficiency Measures
- 3.2.2. Measuring the Size of the Input
- 3.2.3. Measuring Execution Time
- 3.2.4. Worst, Best and Average Case
- 3.2.5. Asymptotic Notation
- 3.2.6. Mathematical Analysis Criteria for Non-Recursive Algorithms
- 3.2.7. Mathematical Analysis of Recursive Algorithms
- 3.2.8. Empirical Analysis of Algorithms

3.3. Sorting Algorithms
- 3.3.1. Concept of Sorting
- 3.3.2. Bubble Sorting
- 3.3.3. Sorting by Selection
- 3.3.4. Sorting by Insertion
- 3.3.5. Mixed Sorting (merge_sort)
- 3.3.6. Quick Sorting (quick_sort)

3.4. Algorithms with Trees
- 3.4.1. Tree Concept
- 3.4.2. Binary Trees
- 3.4.3. Tree Paths
- 3.4.4. Representing Expressions
- 3.4.5. Ordered Binary Trees
- 3.4.6. Balanced Binary Trees

3.5. Algorithms Using Heaps
- 3.5.1. Heaps
- 3.5.2. The Heapsort Algorithm
- 3.5.3. Priority Queues

3.6. Graph Algorithms
- 3.6.1. Representation
- 3.6.2. Traversal in Width
- 3.6.3. Depth Travel
- 3.6.4. Topological Sorting

3.7. Greedy Algorithms
- 3.7.1. Greedy Strategy
- 3.7.2. Greedy Strategy Elements
- 3.7.3. Currency Exchange
- 3.7.4. Traveler's Problem
- 3.7.5. Backpack Problem

3.8. Minimal Path Finding
- 3.8.1. The Minimum Path Problem
- 3.8.2. Negative Arcs and Cycles
- 3.8.3. Dijkstra's Algorithm

3.9. Greedy Algorithms on Graphs
- 3.9.1. The Minimum Covering Tree
- 3.9.2. Prim's Algorithm
- 3.9.3. Kruskal's Algorithm
- 3.9.4. Complexity Analysis

3.10. Backtracking
- 3.10.1. Backtracking
- 3.10.2. Alternative Techniques

Module 4. Advanced Algorithms Design

4.1. Analysis of Recursive and Divide and Conquer Algorithms
- 4.1.1. Posing and Solving Homogeneous and Non-Homogeneous Recurrence Equations
- 4.1.2. General Description of the Divide and Conquer Strategy

4.2. Amortized Analysis
- 4.2.1. Aggregate Analysis
- 4.2.2. The Accounting Method
- 4.2.3. The Potential Method

4.3. Dynamic Programming and Algorithms for NP Problems
  4.3.1. Characteristics of Dynamic Programming
  4.3.2. Backtracking
  4.3.3. Branching and Pruning
4.4. Combinatorial Optimization
  4.4.1. Representation
  4.4.2. 1D Optimization
4.5. Randomization Algorithms
  4.5.1. Examples of Randomization Algorithms
  4.5.2. The Buffon Theorem
  4.5.3. Monte Carlo Algorithm
  4.5.4. Las Vegas Algorithm
4.6. Local and Candidate Search
  4.6.1. Garcient Ascent
  4.6.2. Hill Climbing
  4.6.3. Simulated Annealing
  4.6.4. Taboo Search
  4.6.5. Candidate Searches
4.7. Formal Verification of Programs
  4.7.1. Specification of Functional Abstractions
  4.7.2. The Language of First-Order Logic
  4.7.3. Hoare's Formal System
4.8. Verification of Iterative Programs
  4.8.1. Rules of Hoare's Formal System
  4.8.2. Concept of Invariant Iterations
4.9. Numeric Methods
  4.9.1. The Bisection Method
  4.9.2. Newton Raphson's Method
  4.9.3. The Secant Method
4.10. Parallel Algorithms
  4.10.1. Parallel Binary Operations
  4.10.2. Parallel Operations with Networks
  4.10.3. Parallelism in Divide and Conquer
  4.10.4. Parallelism in Dynamic Programming

Module 5. Advanced Programming

5.1. Introduction to Object-Oriented Programming
  5.1.1. Introduction to Object-Oriented Programming
  5.1.2. Class Design
  5.1.3. Introduction to UML for Problem Modeling
5.2. Relationships Between Classes
  5.2.1. Abstraction and Inheritance
  5.2.2. Advanced Inheritance Concepts
  5.2.3. Polymorphism
  5.2.4. Composition and Aggregation
5.3. Introduction to Design Patterns for Object-Oriented Problems
  5.3.1. What Are Design Patterns?
  5.3.2. Factory Pattern
  5.3.4. Singleton Pattern
  5.3.5. Observer Pattern
  5.3.6. Composite Pattern
5.4. Exceptions
  5.4.1. What Are Exceptions?
  5.4.2. Exception Catching and Handling
  5.4.3. Throwing Exceptions
  5.4.4. Exception Creation
5.5. User Interfaces
  5.5.1. Introduction to Qt
  5.5.2. Positioning
  5.5.3. What Are Events?
  5.5.4. Events: Definition and Catching
  5.5.5. User Interface Development
5.6. Introduction to Concurrent Programming
  5.6.1. Introduction to Concurrent Programming
  5.6.2. The Concept of Process and Thread
  5.6.3. Interaction Between Processes or Threads
  5.6.4. Threads in C++
  5.6.6. Advantages and Disadvantages of Concurrent Programming

5.7. Thread Management and Synchronization
- 5.7.1. Life Cycle of a Thread
- 5.7.2. Thread Class
- 5.7.3. Thread Planning
- 5.7.4. Thread Groups
- 5.7.5. Daemon Threads
- 5.7.6. Synchronization
- 5.7.7. Locking Mechanisms
- 5.7.8. Communication Mechanisms
- 5.7.9. Monitors

5.8. Common Problems in Concurrent Programming
- 5.8.1. The Problem of Consuming Producers
- 5.8.2. The Problem of Readers and Writers
- 5.8.3. The Problem of the Philosophers' Dinner Party

5.9. Software Documentation and Testing
- 5.9.1. Why is it Important to Document Software?
- 5.9.2. Design Documentation
- 5.9.3. Documentation Tool Use

5.10. Software Testing
- 5.10.1. Introduction to Software Testing
- 5.10.2. Types of Tests
- 5.10.3. Unit Test
- 5.10.4. Integration Test
- 5.10.5. Validation Test
- 5.10.6. System Test

Module 6. Theoretical Computer Science

6.1. Mathematical Concepts Used
- 6.1.1. Introduction to Propositional Logic
- 6.1.2. Theory of Relations
- 6.1.3. Numerable and Non-Numerable Sets

6.2. Formal Languages and Grammars and Introduction to Turing Machines
- 6.2.1. Formal Languages and Grammars
- 6.2.2. Decision Problem
- 6.2.3. The Turing Machine

6.3. Extensions to Turing Machines, Constrained Turing Machines and Computers
- 6.3.1. Programming Techniques for Turing Machines
- 6.3.2. Extensions for Turing Machines
- 6.3.3. Restricted Turing Machines
- 6.3.4. Turing Machines and Computers

6.4. Indecibility
- 6.4.1. Non-Recursively Enumerable Language
- 6.4.2. A Recursively Enumerable Undecidable Problem

6.5. Other Undecidable Problems
- 6.5.1. Undecidable Problems for Turing Machines
- 6.5.2. Post Correspondence Problem (PCP)

6.6. Intractable Problems
- 6.6.1. The Classes P and NP
- 6.6.2. A NP-Complete Problem
- 6.6.3. Restricted Satisfiability Problem
- 6.6.4. Other NP-Complete Problems

6.7. Co-NP and PS Problems
- 6.7.1. Complementary to NP Languages
- 6.7.2. Problems Solvable in Polynomial Space
- 6.7.3. Complete PS Problems

6.8. Classes of Randomization-Based Languages
- 6.8.1. MT Model with Randomization
- 6.8.2. RP and ZPP Classes
- 6.8.3. Primality Test
- 6.8.4. Complexity of the Primality Test

6.9. Other Classes and Grammars
- 6.9.1. Probabilistic Finite Automata
- 6.9.2. Cellular Automata
- 6.9.3. McCullogh and Pitts Cells
- 6.9.4. Lindenmayer Grammars

6.10. Advanced Computing Systems
- 6.10.1. Membrane Computing: P-Systems
- 6.10.2. DNA Computing
- 6.10.3. Quantum Computing

Module 7. Automata Theory and Formal Languages

7.1. Introduction to Automata Theory
- 7.1.1. Why Study Automata Theory?
- 7.1.2. Introduction to Formal Demonstrations
- 7.1.3. Other Forms of Demonstration
- 7.1.4. Mathematical Induction
- 7.1.5. Alphabets, Strings and Languages

7.2. Deterministic Finite Automata
- 7.2.1. Introduction to Finite Automata
- 7.2.2. Deterministic Finite Automata

7.3. Non-Deterministic Finite Automata
- 7.3.1. Non-Deterministic Finite Automata
- 7.3.2. Equivalence Between AFD and AFN
- 7.3.3. Finite Automata with Transitions

7.4. Languages and Regular Expressions (I)
- 7.4.1. Languages and Regular Expressions
- 7.4.2. Finite Automata and Regular Expressions

7.5. Languages and Regular Expressions (II)
- 7.5.1. Conversion of Regular Expressions into Automata
- 7.5.2. Applications of Regular Expressions
- 7.5.3. Algebra of Regular Expressions

7.6. Pumping and Closure Lemma of Regular Languages
- 7.6.1. Pumping Lemma
- 7.6.2. Closure Properties of Regular Languages

7.7. Equivalence and Minimization of Automata
- 7.7.1. FA Equivalence
- 7.7.2. AF Minimization

7.8. Context-Independent Grammars (CIGs)
- 7.8.1. Context-Independent Grammars
- 7.8.2. Derivation Trees
- 7.8.3. GIC Applications
- 7.8.4. Ambiguity in Grammars and Languages

7.9. Stack Automatons and GIC
- 7.9.1. Definition of Stack Automata
- 7.9.2. Languages Accepted by a Stack Automaton
- 7.9.3. Equivalence between Stack Automata and GICs
- 7.9.4. Deterministic Stack Automata

7.10. Normal Forms, Pumping Lemma of GICs and Properties of LICs
- 7.10.1. Normal Forms of GICs
- 7.10.2. Pumping Lemma
- 7.10.3. Closure Properties of Languages
- 7.10.4. Decision Properties of LICs

Module 8. Language Processors

8.1. Introduction to the Compilation Process
- 8.1.1. Compilation and Interpretation
- 8.1.2. Compiler Execution Environment
- 8.1.3. Analysis Process
- 8.1.4. Synthesis Process

8.2. Lexical Analyzer
- 8.2.1. What Is a Lexical Analyzer?
- 8.2.2. Implementation of the Lexical Analyzer
- 8.2.3. Semantic Actions
- 8.2.4. Error Recovery
- 8.2.5. Implementation Issues

8.3. Parsing
- 8.3.1. What Is a Parser?
- 8.3.2. Previous Concepts
- 8.3.3. Top-Down Analyzers
- 8.3.4. Bottom-Up Analyzers

8.4. Top-Down Parsing and Bottom-Up Parsing
- 8.4.1. LL Parser (1)
- 8.4.2. LR Parser (0)
- 8.4.3. Analyzer Example

8.5. Advanced Bottom-Up Parsing
- 8.5.1. SLR Parser
- 8.5.2. LR Parser (1)
- 8.5.3. LR Analyzer (k)
- 8.5.4. LALR Parser

8.6. Semantic Analysis (I)
- 8.6.1. Syntax-Driven Translation
- 8.6.2. Table of Symbols

8.7. Semantic Analysis (II)
- 8.7.1. Type Checking
- 8.7.2. The Type Subsystem
- 8.7.3. Type Equivalence and Conversions

8.8. Code Generation and Execution Environment
- 8.8.1. Design Aspects
- 8.8.2. Execution Environment
- 8.8.3. Memory Organization
- 8.8.4. Memory Allocation

8.9. Intermediate Code Generation
- 8.9.1. Synthesis-Driven Translation
- 8.9.2. Intermediate Representations
- 8.9.3. Examples of Translations

8.10. Code Optimization
- 8.10.1. Register Allocation
- 8.10.2. Elimination of Dead Assignments
- 8.10.3. Compile-Time Execution
- 8.10.4. Expression Reordering
- 8.10.5. Loop Optimization

Module 9. Computer Graphics and Visualization

9.1. Color Theory
- 9.1.1. Properties of Light
- 9.1.2. Color Models
- 9.1.3. The CIE Standard
- 9.1.4. Profiling

9.2. Output Primitives
- 9.2.1. The Video Driver
- 9.2.2. Line Drawing Algorithms
- 9.2.3. Circle Drawing Algorithms
- 9.2.4. Filling Algorithms

9.3. 2D Transformations and 2D Coordinate Systems and 2D Clipping
- 9.3.1. Basic Geometric Transformations
- 9.3.2. Homogeneous Coordinates
- 9.3.3. Inverse Transformation
- 9.3.4. Composition of Transformations
- 9.3.5. Other Transformations
- 9.3.6. Coordinate Change
- 9.3.7. 2D Coordinate Systems
- 9.3.8. Coordinate Change
- 9.3.9. Standardization
- 9.3.10. Trimming Algorithms

9.4. 3D Transformations
- 9.4.1. Translation
- 9.4.2. Rotation
- 9.4.3. Scaling
- 9.4.4. Reflection
- 9.4.5. Shearing

9.5. Display and Change of 3D Coordinates
- 9.5.1. 3D Coordinate Systems
- 9.5.2. Visualization
- 9.5.3. Coordinate Change
- 9.5.4. Projection and Normalization

9.6. 3D Projection and Clipping
- 9.6.1. Orthogonal Projection
- 9.6.2. Oblique Parallel Projection
- 9.6.3. Perspective Projection
- 9.6.4. 3D Clipping Algorithms

9.7. Hidden Surface Removal
- 9.7.1. Back-Face Removal
- 9.7.2. Z-buffer
- 9.7.3. Painter Algorithm
- 9.7.4. Warnock Algorithm
- 9.7.5. Hidden Line Detection

9.8. Interpolation and Parametric Curves
- 9.8.1. Interpolation and Polynomial Approximation
- 9.8.2. Parametric Representation
- 9.8.3. Lagrange Polynomial
- 9.8.4. Natural Cubic Splines
- 9.8.5. Basic Functions
- 9.8.6. Matrix Representation

9.9. Bézier Curves
- 9.9.1. Algebraic Construction
- 9.9.2. Matrix Form
- 9.9.3. Composition
- 9.9.4. Geometric Construction
- 9.9.5. Drawing Algorithm

9.10. B-Splines
- 9.10.1. The Local Control Problem
- 9.10.2. Uniform Cubic B-Splines
- 9.10.3. Basis Functions and Control Points
- 9.10.4. Derivative to the Origin and Multiplicity
- 9.10.5. Matrix Representation
- 9.10.6. Non-Uniform B-Splines

Module 10. Bio-Inspired Computing

10.1. Introduction to Bio-Inspired Computing
- 10.1.1. Introduction to Bio-Inspired Computing

10.2. Social Adaptation Algorithms
- 10.2.1. Bio-Inspired Computation Based on Ant Colonies
- 10.2.2. Variants of Ant Colony Algorithms
- 10.2.3. Particle Cloud Computing

10.3. Genetic Algorithms
- 10.3.1. General Structure
- 10.3.2. Implementations of the Major Operators

10.4. Space Exploration-Exploitation Strategies for Genetic Algorithms
- 10.4.1. CHC Algorithm
- 10.4.2. Multimodal Problems

10.5. Evolutionary Computing Models (I)
- 10.5.1. Evolutionary Strategies
- 10.5.2. Evolutionary Programming
- 10.5.3. Algorithms Based on Differential Evolution

10.6. Evolutionary Computation Models (II)
- 10.6.1. Evolutionary Models Based on Estimation of Distributions (EDA)
- 10.6.2. Genetic Programming

10.7. Evolutionary Programming Applied to Learning Problems
- 10.7.1. Rules-Based Learning
- 10.7.2. Evolutionary Methods in Instance Selection Problems

10.8. Multi-Objective Problems
- 10.8.1. Concept of Dominance
- 10.8.2. Application of Evolutionary Algorithms to Multi-Objective Problems

10.9. Neural Networks (I)
- 10.9.1. Introduction to Neural Networks
- 10.9.2. Practical Example with Neural Networks

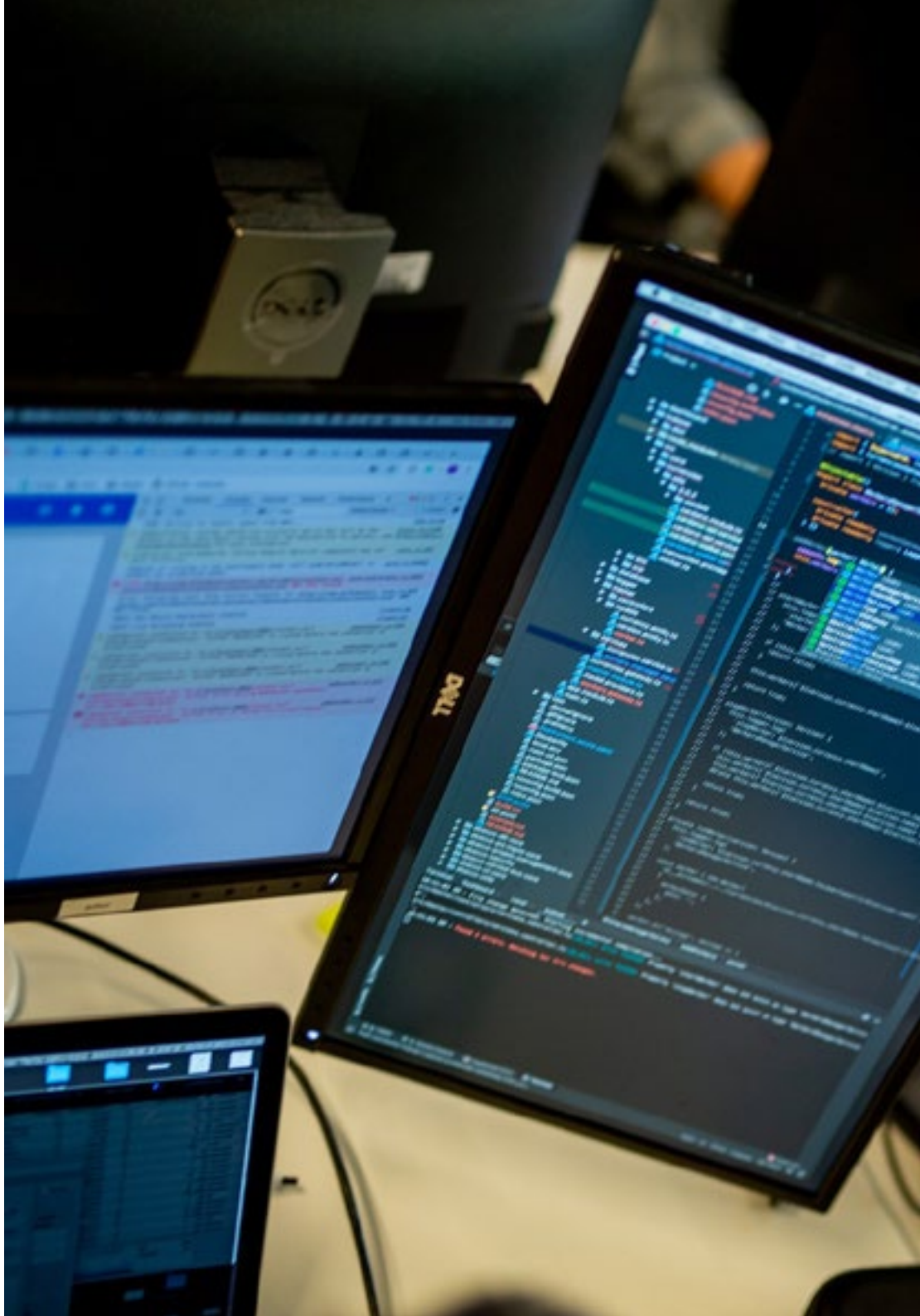
10.10. Neural Networks (II)
- 10.10.1. Use Cases of Neural Networks in Medical Research
- 10.10.2. Use Cases of Neural Networks in Economics
- 10.10.3. Use Cases of Neural Networks in Artificial Vision

Module 11. Security in System Design and Development

11.1. Information Systems
- 11.1.1. Information System Domains
- 11.1.2. Components of an Information System
- 11.1.3. Activities of an Information System
- 11.1.4. Life Cycle of an Information System
- 11.1.5. Information System Resources

11.2. IT Systems. Typology
- 11.2.1. Types of Information Systems
  - 11.2.1.1. Enterprise
  - 11.2.1.2. Strategic
  - 11.2.1.3. According to the Scope of Application
  - 11.2.1.4. Specific
- 11.2.2. Information Systems Real Examples
- 11.2.3. Evolution of Information Systems: Stages
- 11.2.4. Information Systems Methodologies

11.3. Security of Information Systems. Legal Implications
- 11.3.1. Access to Data
- 11.3.2. Security Threats Vulnerabilities
- 11.3.3. Legal Implications: Crimes
- 11.3.4. Information System Maintenance Procedures



11.4. Security of an Information System. Security Protocols
- 11.4.1. Security of an Information System
  - 11.4.1.1. Integrity
  - 11.4.1.2. Confidentiality
  - 11.4.1.3. Availability
  - 11.4.1.4. Authentication
- 11.4.2. Security Services
- 11.4.3. Information Security Protocols. Typology
- 11.4.4. Sensitivity of an Information System

11.5. Security in an Information System. Access Control Measures and Systems
- 11.5.1. Safety Measures
- 11.5.2. Type of Security Measures
  - 11.5.2.1. Prevention
  - 11.5.2.2. Detection
  - 11.5.2.3. Correction
- 11.5.3. Access Control Systems. Typology
- 11.5.4. Cryptography

11.6. Network and Internet Security
- 11.6.1. Firewalls
- 11.6.2. Digital Identification
- 11.6.3. Viruses and Worms
- 11.6.4. Hacking
- 11.6.5. Examples and Real Cases

11.7. Computer Crimes
- 11.7.1. Computer Crime
- 11.7.2. Computer Crimes. Typology
- 11.7.3. Computer Crimes. Attacks. Typology
- 11.7.4. The Case for Virtual Reality
- 11.7.5. Profiles of Offenders and Victims. Typification of the Crime
- 11.7.6. Computer Crimes. Examples and Real Cases

11.8. Security Plan in an Information System
- 11.8.1. Security Plan. Objectives
- 11.8.2. Security Plan. Planning
- 11.8.3. Risk Plan. Analysis
- 11.8.4. Security Policy. Implementation in the Organization
- 11.8.5. Security Plan. Implementation in the Organization
- 11.8.6. Security Procedures. Types
- 11.8.7. Security Plans. Examples

11.9. Contingency Plan
- 11.9.1. Contingency Plan. Functions
- 11.9.2. Emergency Plan Elements and Objectives
- 11.9.3. Contingency Plan in the Organization. Implementation
- 11.9.4. Contingency Plans. Examples

11.10. Information Systems Security Governance
- 11.10.1. Legal Regulations
- 11.10.2. Standards
- 11.10.3. Certifications
- 11.10.4. Technologies

Module 12. Information Security Architectures and Models

12.1. Information Security Architecture
- 12.1.1. ISMSI / PDS
- 12.1.2. Strategic Alignment
- 12.1.3. Risk Management
- 12.1.4. Performance Measurement

12.2. Information Security Models
- 12.2.1. Based on Security Policies
- 12.2.2. Based on Protection Tools
- 12.2.3. Based on Work Teams

12.3. Safety Model. Key Components
- 12.3.1. Identification of Risks
- 12.3.2. Definition of Controls
- 12.3.3. Continuous Assessment of Risk Levels
- 12.3.4. Awareness-Raising Plan for Employees, Suppliers, Partners, etc.

12.4. Risk Management Process
- 12.4.1. Asset Identification
- 12.4.2. Threat Identification
- 12.4.3. Risk Assessment
- 12.4.4. Prioritization of Controls
- 12.4.5. Re-Evaluation and Residual Risk

12.5. Business Processes and Information Security
- 12.5.1. Business Processes
- 12.5.2. Risk Assessment Based on Business Parameters
- 12.5.3. Business Impact Analysis
- 12.5.4. Business Operations and Information Security

12.6. Continuous Improvement Process
- 12.6.1. The Deming Cycle
  - 12.6.1.1. Plan
  - 12.6.1.2. Do
  - 12.6.1.3. Verify
  - 12.6.1.4. Act

12.7. Security Architectures
- 12.7.1. Selection and Homogenization of Technologies
- 12.7.2. Identity Management. Authentication
- 12.7.3. Access Management. Authorization
- 12.7.4. Network Infrastructure Security
- 12.7.5. Encryption Technologies and Solutions
- 12.7.6. Endpoint Detection Response (EDR)

12.8. Regulatory Framework
- 12.8.1. Sectoral Regulations
- 12.8.2. Certifications
- 12.8.3. Legislation

12.9. The ISO 27001 Standard
- 12.9.1. Implementation
- 12.9.2. Certification
- 12.9.3. Audits and Penetration Tests
- 12.9.4. Continuous Risk Management
- 12.9.5. Classification of Information

12.10. Privacy Legislation. GDPR
- 12.10.1. Scope of General Data Protection Regulation (GDPR)
- 12.10.2. Personal Data
- 12.10.3. Roles in the Processing of Personal Data
- 12.10.4. ARCO Rights
- 12.10.5. El DPO. Functions

Module 13. IT Security Management

13.1. Security Management
- 13.1.1. Security Operations
- 13.1.2. Legal and Regulatory Aspects
- 13.1.3. Business Qualification
- 13.1.4. Risk Management
- 13.1.5. Identity and Access Management

13.2. Structure of the Security Area. The CISO's Office
- 13.2.1. Organizational Structure. Position of the CISO in the Structure
- 13.2.2. Lines of Defense
- 13.2.3. Organizational Chart of the CISO's Office
- 13.2.4. Budget Management

13.3. Security Governance
- 13.3.1. Safety Committee
- 13.3.2. Risk Monitoring Committee
- 13.3.3. Audit Committee
- 13.3.4. Crisis Committee

13.4. Security Governance. Functions
- 13.4.1. Policies and Standards
- 13.4.2. Security Master Plan
- 13.4.3. Control Panels
- 13.4.4. Awareness and Education
- 13.4.5. Supply Chain Security

13.5. Security Operations
- 13.5.1. Identity and Access Management
- 13.5.2. Configuration of Network Security Rules. Firewalls
- 13.5.3. IDS/IPS Platform Management
- 13.5.4. Vulnerability Analysis

13.6. Cybersecurity Framework NIST CSF
- 13.6.1. Methodology NIST
  - 13.6.1.1. Identify
  - 13.6.1.2. Protect
  - 13.6.1.3. Detect
  - 13.6.1.4. Respond
  - 13.6.1.5. Retrieve

13.7. Security Operations Center (SOC). Functions
- 13.7.1. Protection Red Team, Pentesting, Threat Intelligence
- 13.7.2. Detection. SIEM, User Behavior Analytics, Fraud Prevention
- 13.7.3. Response

13.8. Security Audits
- 13.8.1. Intrusion Test
- 13.8.2. Red Team Exercises
- 13.8.3. Source Code Audits. Secure Development
- 13.8.4. Component Safety (Software Supply Chain)
- 13.8.5. Forensic Analysis

13.9. Incident Response
- 13.9.1. Preparation
- 13.9.2. Detection, Analysis and Notification
- 13.9.3. Containment, Eradication and Recovery
- 13.9.4. Post-Incident Activity
  - 13.9.4.1. Evidence Retention
  - 13.9.4.2. Forensic Analysis
  - 13.9.4.3. Gap Management
- 13.9.5. Official Cyber-Incident Management Guidelines

13.10. Vulnerability Management
- 13.10.1. Vulnerability Analysis
- 13.10.2. Vulnerability Assessment
- 13.10.3. System Basing
- 13.10.4. Zero-Day Vulnerabilities. Zero-Day

Module 14. Risk Analysis and IT Security Environment

14.1. Analysis of the Environment
- 14.1.1. Analysis of the Economic Situation
  - 14.1.1.1. VUCA Environments
    - 14.1.1.1.1. Volatile
    - 14.1.1.1.2. Uncertain
    - 14.1.1.1.3. Complex
    - 14.1.1.1.4. Ambiguous
  - 14.1.1.2. BANI Environments
    - 14.1.1.2.1. Brittle
    - 14.1.1.2.2. Anxious
    - 14.1.1.2.3. Nonlinear
    - 14.1.1.2.4. Incomprehensible
- 14.1.2. Analysis of the General Environment. PESTEL
  - 14.1.2.1. Politics
  - 14.1.2.2. Economics
  - 14.1.2.3. Social
  - 14.1.2.4. Technological
  - 14.1.2.5. Ecological/Environmental
  - 14.1.2.6. Legal
- 14.1.3. Analysis of the Internal Situation. SWOT Analysis
  - 14.1.3.1. Objectives
  - 14.1.3.2. Threats
  - 14.1.3.3. Opportunities
  - 14.1.3.4. Strengths

14.2. Risk and Uncertainty
- 14.2.1. Risk
- 14.2.2. Risk Management
- 14.2.3. Risk Management Standards

14.3. ISO 31.000:2018 Risk Management Guidelines
- 14.3.1. Object
- 14.3.2. Principles
- 14.3.3. Frame of Reference
- 14.3.4. Process

14.4. Information Systems Risk Analysis and Management Methodology (MAGERIT)
- 14.4.1. MAGERIT Methodology
  - 14.4.1.1. Objectives
  - 14.4.1.2. Method
  - 14.4.1.3. Components
  - 14.4.1.4. Techniques
  - 14.4.1.5. Available Tools (PILAR)

14.5. Cyber Risk Transfer
- 14.5.1. Risk Transfer
- 14.5.2. Cyber Risks. Typology
- 14.5.3. Cyber Risk Insurance

14.6. Agile Methodologies for Risk Management
- 14.6.1. Agile Methodologies
- 14.6.2. Scrum for Risk Management
- 14.6.3. Agile Risk Management

14.7. Technologies for Risk Management
- 14.7.1. Artificial Intelligence Applied to Risk Management
- 14.7.2. Blockchain and Cryptography. Value Preservation Methods
- 14.7.3. Quantum Computing. Opportunity or Threat

14.8. IT Risk Mapping Based on Agile Methodologies
- 14.8.1. Representation of Probability and Impact in Agile Environments
- 14.8.2. Risk as a Threat to Value
- 14.8.3. Revolution in Project Management and Agile Processes based on KRIs

14.9. Risk-Driven in Risk Management
- 14.9.1. Risk Driven
- 14.9.2. Risk-Driven in Risk Management
- 14.9.3. Development of a Risk-Driven Business Management Model

14.10. Innovation and Digital Transformation in IT Risk Management
- 14.10.1. Agile Risk Management as a Source of Business Innovation
- 14.10.2. Transforming Data into Useful Information for Decision Making
- 14.10.3. Holistic View of the Enterprise through Risk

Module 15. Cryptography in IT

15.1. Cryptography
- 15.1.1. Cryptography
- 15.1.2. Fundamentals of Mathematics

15.2. Cryptology
- 15.2.1. Cryptology
- 15.2.2. Cryptanalysis
- 15.2.3. Steganography and Stegoanalysis

15.3. Cryptographic Protocols
- 15.3.1. Basic Blocks
- 15.3.2. Basic Protocols
- 15.3.3. Intermediate Protocols
- 15.3.4. Advanced Protocol
- 15.3.5. Exoteric Protocols

15.4. Cryptographic Techniques
- 15.4.1. Key Length
- 15.4.2. Key Management
- 15.4.3. Types of Algorithms
- 15.4.4. Key Management Hash
- 15.4.5. Pseudo-Random Number Generators
- 15.4.6. Use of Algorithms

15.5. Symmetric Cryptography
- 15.5.1. Block Ciphers
- 15.5.2. DES (Data Encryption Standard)
- 15.5.3. RC4 Algorithm
- 15.5.4. AES (Advanced Encryption Standard)
- 15.5.5. Combination of Block Ciphers
- 15.5.6. Key Derivation

15.6. Asymmetric Cryptography
- 15.6.1. Diffie-Hellman
- 15.6.2. DSA (Digital Signature Algorithm)
- 15.6.3. RSA (Rivest, Shamir and Adleman)
- 15.6.4. Elliptic Curve
- 15.6.5. Asymmetric Cryptography. Typology

15.7. Digital Certificates
- 15.7.1. Digital Signature
- 15.7.2. X509 Certificates
- 15.7.3. Public Key Infrastructure (PKI)

15.8. Implementations
- 15.8.1. Kerberos
- 15.8.2. IBM CCA
- 15.8.3. Pretty Good Privacy (PGP)
- 15.8.4. ISO Authentication Framework
- 15.8.5. SSL and TLS
- 15.8.6. Smart Cards in Means of Payment (EMV)
- 15.8.7. Mobile Telephony Protocols
- 15.8.8. Blockchain

15.9. Steganography
- 15.9.1. Steganography
- 15.9.2. Stegoanalysis
- 15.9.3. Applications and Uses

15.10. Quantum Cryptography
- 15.10.1. Quantum Algorithms
- 15.10.2. Protection of Algorithms from Quantum Computing
- 15.10.3. Quantum Key Distribution

Module 16. Identity and Access Management in IT Security

16.1. Identity and Access Management (IAM)
- 16.1.1. Digital Identity
- 16.1.2. Identity Management
- 16.1.3. Identity Federation

16.2. Physical Access Control
- 16.2.1. Protection Systems
- 16.2.2. Area Security
- 16.2.3. Recovery Facilities

16.3. Logical Access Control
- 16.3.1. Authentication: Typology
- 16.3.2. Authentication Protocols
- 16.3.3. Authentication Attacks

16.4. Logical Access Control. MFA Authentication
- 16.4.1. Logical Access Control. MFA Authentication
- 16.4.2. Passwords. Importance
- 16.4.3. Authentication Attacks

16.5. Logical Access Control. Biometric Authentication
- 16.5.1. Logical Access Control. Biometric Authentication
  - 16.5.1.1. Biometric Authentication. Requirements
- 16.5.2. Operation
- 16.5.3. Models and Techniques

16.6. Authentication Management Systems
- 16.6.1. Single Sign On
- 16.6.2. Kerberos
- 16.6.3. AAA Systems

16.7. Authentication Management Systems: AAA Systems
- 16.7.1. TACACS
- 16.7.2. RADIUS
- 16.7.3. DIAMETER

16.8. Access Control Services
- 16.8.1. FW - Firewall
- 16.8.2. VPN - Virtual Private Networks
- 16.8.3. IDS - Intrusion Detection System

16.9. Network Access Control Systems
- 16.9.1. NAC
- 16.9.2. Architecture and Elements
- 16.9.3. Operation and Standardization

16.10. Access to Wireless Networks
- 16.10.1. Types of Wireless Networks
- 16.10.2. Security in Wireless Networks
- 16.10.3. Attacks on Wireless Networks

Module 17. Security in Communications and Software Operation

17.1. Computer Security in Communications and Software Operation
- 17.1.1. IT Security
- 17.1.2. Cybersecurity
- 17.1.3. Cloud Security

17.2. IT Security in Communications and Software Operation. Typology
- 17.2.1. Physical Security
- 17.2.2. Logical Security

17.3. Communications Security
- 17.3.1. Main Elements
- 17.3.2. Network Security
- 17.3.3. Best Practices

17.4. Cyberintelligence
- 17.4.1. Social Engineering
- 17.4.2. Deep Web
- 17.4.3. Phishing
- 17.4.4. Malware

17.5. Secure Development in Communications and Software Operation
- 17.5.1. Secure Development. HTTP Protocol
- 17.5.2. Secure Development. Life Cycle
- 17.5.3. Secure Development. PHP Security
- 17.5.4. Secure Development. NET Security
- 17.5.5. Secure Development. Best Practices

17.6. Information Security Management Systems in Communications and Software Operation
- 17.6.1. GDPR
- 17.6.2. ISO 27021
- 17.6.3. ISO 27017/18

17.7. SIEM Technologies
- 17.7.1. SIEM Technologies
- 17.7.2. SOC Operation
- 17.7.3. SIEM Vendors

17.8. The Role of Security in Organizations
- 17.8.1. Roles in Organizations
- 17.8.2. Role of IoT Specialists in Companies
- 17.8.3. Recognized Certifications in the Market

17.9. Forensic Analysis
- 17.9.1. Forensic Analysis
- 17.9.2. Forensic Analysis. Study Methodology
- 17.9.3. Forensic Analysis. Tools and Implementation

17.10. Cybersecurity Today
- 17.10.1. Major Cyber-Attacks
- 17.10.2. Employability Forecasts
- 17.10.3. Challenges

Module 18. Security in Cloud Environments

18.1. Security in Cloud Computing Environments
- 18.1.1. Security in Cloud Computing Environments
- 18.1.2. Security in Cloud Computing Environments. Threats and Security Risks
- 18.1.3. Security in Cloud Computing Environments. Key Security Aspects

18.2. Types of Cloud Infrastructure
- 18.2.1. Public
- 18.2.2. Private
- 18.2.3. Hybrid

18.3. Shared Management Model
- 18.3.1. Security Elements Managed by Vendor
- 18.3.2. Elements Managed by Customer
- 18.3.3. Definition of the Security Strategy

18.4. Prevention Mechanisms
- 18.4.1. Authentication Management Systems
- 18.4.2. Authorization Management Systems: Access Policies
- 18.4.3. Key Management Systems

18.5. System Securitization
- 18.5.1. Securitization of Storage Systems
- 18.5.2. Protection of Database Systems
- 18.5.3. Securing Data in Transit

18.6. Infrastructure Protection
- 18.6.1. Secure Network Design and Implementation
- 18.6.2. Security in Computing Resources
- 18.6.3. Tools and Resources for Infrastructure Protection

18.7. Detection of Threats and Attacks
- 18.7.1. Auditing, Logging and Monitoring Systems
- 18.7.2. Event and Alarm Systems
- 18.7.3. SIEM Systems

18.8. Incident Response
- 18.8.1. Incident Response Plan
- 18.8.2. Business Continuity
- 18.8.3. Forensic Analysis and Remediation of Incidents of the Same Nature

18.9. Security in Public Clouds
- 18.9.1. AWS (Amazon Web Services)
- 18.9.2. Microsoft Azure
- 18.9.3. Google GCP
- 18.9.4. Oracle Cloud

18.10. Regulations and Compliance
- 18.10.1. Security Compliance
- 18.10.2. Risk Management
- 18.10.3. People and Process in Organizations

Module 19. Security in IoT Device Communications

19.1. From Telemetry to IoT
- 19.1.1. Telemetry
- 19.1.2. M2M Connectivity
- 19.1.3. Democratization of Telemetry

19.2. IoT Reference Models
- 19.2.1. IoT Reference Model
- 19.2.2. Simplified IoT Architecture

19.3. IoT Security Vulnerabilities
- 19.3.1. IoT Devices
- 19.3.2. IoT Devices. Usage Case Studies
- 19.3.3. IoT Devices. Vulnerabilities

19.4. IoT Connectivity
- 19.4.1. PAN, LAN, WAN Networks
- 19.4.2. Non IoT Wireless Technologies
- 19.4.3. LPWAN Wireless Technologies

19.5. LPWAN Technologies
- 19.5.1. The Iron Triangle of LPWAN Networks
- 19.5.2. Free Frequency Bands vs. Licensed Bands
- 19.5.3. LPWAN Technology Options

19.6. LoRaWAN Technology
- 19.6.1. LoRaWAN Technology
- 19.6.2. LoRaWAN Use Cases. Ecosystem
- 19.6.3. Security in LoRaWAN

19.7. Sigfox Technology
- 19.7.1. Sigfox Technology
- 19.7.2. Sigfox Use Cases. Ecosystem
- 19.7.3. Sigfox Security

19.8. IoT Cellular Technology
- 19.8.1. IoT Cellular Technology (NB-IoT and LTE-M)
- 19.8.2. Cellular IoT Use Cases. Ecosystem
- 19.8.3. IoT Cellular Security

19.9. WiSUN Technology
- 19.9.1. WiSUN Technology
- 19.9.2. WiSUN Use Cases. Ecosystem
- 19.9.3. Security in WiSUN

19.10. Other IoT Technologies
- 19.10.1. Other IoT Technologies
- 19.10.2. Use Cases and Ecosystem of Other IoT Technologies
- 19.10.3. Security in Other IoT Technologie

Module 20. Business Continuity Plan Associated with Security

20.1. Business Continuity Plans
- 20.1.1. Business Continuity Plans (BCP)
- 20.1.2. Business Continuity Plans (BCP). Key Aspects
- 20.1.3. Business Continuity Plan (BCP) for Business Valuation

20.2. Metrics in a Business Continuity Plan (BCP)
- 20.2.1. Recovery Time Objective (RTO) and Recovery Point Objective (RPO)
- 20.2.2. Maximum Tolerable Time (MTD)
- 20.2.3. Minimum Recovery Levels (ROL)
- 20.2.4. Recovery Point Objective (RPO)

20.3. Continuity Projects. Typology
- 20.3.1. Business Continuity Plan (BCP)
- 20.3.2. ICT Continuity Plan (ICTCP)
- 20.3.3. Disaster Recovery Plan (DRP)

20.4. Risk Management Associated with the BCP
- 20.4.1. Business Impact Analysis
- 20.4.2. Benefits of Implementing a BCP
- 20.4.3. Risk-Based Mentality

20.5. Life Cycle of a Business Continuity Plan
- 20.5.1. Phase 1: Organizational Analysis
- 20.5.2. Phase 2: Determining the Continuity Strategy
- 20.5.3. Phase 3: Response to Contingency
- 20.5.4. Phase 4: Tests, Maintenance and Review

20.6. Organizational Analysis Phase of a BCP
- 20.6.1. Identification of Processes in the Scope of the BCP
- 20.6.2. Identification of Critical Business Areas
- 20.6.3. Identification of Dependencies Between Areas and Processes
- 20.6.4. Determination of Appropriate BAT
- 20.6.5. Deliverables. Creation of a Plan

20.7. Determination Phase of the Continuity Strategy in a BCP
- 20.7.1. Roles in the Strategy Determination Phase
- 20.7.2. Tasks in the Strategy Determination Phase
- 20.7.3. Deliverables

20.8. Contingency Response Phase of a BCP
- 20.8.1. Roles in the Response Phase
- 20.8.2. Tasks in This Phase
- 20.8.3. Deliverables

20.9. Testing, Maintenance and Revision Phase of a BCP
- 20.9.1. Roles in the Testing, Maintenance and Review Phase
- 20.9.2. Tasks in the Testing, Maintenance and Review Phase
- 20.9.3. Deliverables

20.10. ISO Standards Associated with Business Continuity Plans (BCP)
- 20.10.1. ISO 22301:2019
- 20.10.2. ISO 22313:2020
- 20.10.3. Other Related ISO and International Standards

Module 21. Data Analysis in the Business Organization

21.1. Business Analysis
- 21.1.1. Business Analysis
- 21.1.2. Data Structure
- 21.1.3. Phases and Elements

21.2. Data Analysis in the Business
- 21.2.1. Scorecards and KPIs by Departments
- 21.2.2. Operational, Tactical and Strategic Reports

21.2.3. Data Analytics Applied to Each Department
21.2.3.1. Marketing and Communication
21.2.3.2. Commercial
21.2.3.3. Customer Service
2 1.2.3.4. Purchasing
21.2.3.5. Administration
21.2.3.6. Human Resources
21.2.3.7. Production
21.2.3.8. IT
21.3. Marketing and Communication
21.3.1. KPIs to be Measured, Applications and Benefits
21.3.2. Marketing Systems and Data Warehouse
21.3.3. Implementation of a Data Analytics Framework in Marketing
21.3.4. Marketing and Communication Plan
21.3.5. Strategies, Prediction and Campaign Management
21.4. Commerce and Sales
21.4.1. Contributions of Data Analytics in the Commercial Area
21.4.2. Sales Department Needs
21.4.3. Market Research
21.5. Customer Service
21.5.1. Loyalty
21.5.2. Personal Coaching and Emotional Intelligence
21.5.3. Customer Satisfaction
21.6. Purchasing
21.6.1. Data Analysis for Market Research
21.6.2. Data Analysis for Competency Research
21.6.3. Other Applications
21.7. Administration
21.7.1. Needs of the Administration Department
21.7.2. Data Warehouse and Financial Risk Analysis
21.7.3. Data Warehouse and Credit Risk Analysis
21.8. Human Resources
21.8.1. HR and the Benefits of Data Analysis
21.8.2. Data Analytics Tools in the HR Department
21.8.3. Data Analytics Applications in the HR Department
21.9. Production
21.9.1. Data Analysis in a Production Department
21.9.2. Applications
21.9.3. Benefits
21.10. IT
21.10.1. IT Department
21.10.2. Data Analysis and Digital Transformation
21.10.3. Innovation and Productivity

Module 22. Data and Information Management and Manipulation in Data Science

22.1. Statistics. Variables, Indices and Ratios
22.1.1. Statistics
22.1.2. Statistical Dimensions
22.1.3. Variables, Indices and Ratios
22.2. Type of Data
22.2.1. Qualitative
22.2.2. Quantitative
22.2.3. Characterization and Categories
22.3. Data Knowledge from the Measurements
22.3.1. Centralization Measurements
22.3.2. Measures of Dispersion
22.3.3. Correlation
22.4. Data Knowledge from the Graphs
22.4.1. Visualization According to Type of Data
22.4.2. Interpretation of Graphic Information
22.4.3. Customization of Graphics with R

22.5. Probability
- 22.5.1. Probability
- 22.5.2. Function of Probability
- 22.5.3. Distributions

22.6. Data Collection
- 22.6.1. Methodology of Data Collection
- 22.6.2. Data Collection Tools
- 22.6.3. Data Collection Channels

22.7. Data Cleaning
- 22.7.1. Phases of Data Cleansing
- 22.7.2. Data Quality
- 22.7.3. Data Manipulation (with R)

22.8. Data Analysis, Interpretation and Evaluation of Results
- 22.8.1. Statistical Measures
- 22.8.2. Relationship Indexes
- 22.8.3. Data Mining

22.9. Datawarehouse
- 22.9.1. Components
- 22.9.2. Design

22.10. Data Availability
- 22.10.1. Access
- 22.10.2. Uses
- 22.10.3. Security

Module 23. IoT Devices and Platforms as the Basis for Data Science

23.1. Internet of Things
- 23.1.1. Internet of the Future, Internet of Things
- 23.1.2. The Industrial Internet Consortium

23.2. Architecture of Reference
- 23.2.1. The Architecture of Reference
- 23.2.2. Layers
- 23.2.3. Components

23.3. Sensors and IoT Devices
- 23.3.1. Principal Components
- 23.3.2. Sensors and Actuators

23.4. Communications and Protocols
- 23.4.1. Protocols. OSI Model
- 23.4.2. Communication Technologies

23.5. Cloud Platforms for IoT and IIoT
- 23.5.1. General Purpose Platforms
- 23.5.2. Industrial Platforms
- 23.5.3. Open Code Platforms

23.6. Data Management on IoT Platforms
- 23.6.1. Data Management Mechanisms. Open Data
- 23.6.2. Data Exchange and Visualization

23.7. IoT Security
- 23.7.1. Requirements and Security Areas
- 23.7.2. Security Strategies in IIoT

23.8. Applications of IoT
- 23.8.1. Intelligent Cities
- 23.8.2. Health and Fitness
- 23.8.3. Smart Home
- 23.8.4. Other Applications

23.9. Applications of IIoT
- 23.9.1. Fabrication
- 23.9.2. Transport
- 23.9.3. Energy
- 23.9.4. Agriculture and Livestock
- 23.9.5. Other Sectors

23.10. Industry 4.0
- 23.10.1. IoRT (Internet of Robotics Things)
- 23.10.2. 3D Additive Manufacturing
- 23.10.3. Big Data Analytics

Module 24. Graphical Representation of Data Analysis

24.1. Exploratory Analysis
- 24.1.1. Representation for Information Analysis
- 24.1.2. The Value of Graphical Representation
- 24.1.3. New Paradigms of Graphical Representation

24.2. Optimization for Data Science
- 24.2.1. Color Range and Design
- 24.2.2. Gestalt in Graphic Representation
- 24.2.3. Errors to Avoid and Advice

24.3. Basic Data Sources
- 24.3.1. For Quality Representation
- 24.3.2. For Quantity Representation
- 24.3.3. For Time Representation

24.4. Complex Data Sources
- 24.4.1. Files, Lists and Databases
- 24.4.2. Open Data
- 24.4.3. Continuous Data Generation

24.5. Types of Graphs
- 24.5.1. Basic Representations
- 24.5.2. Block Representation
- 24.5.3. Representation for Dispersion Analysis
- 24.5.4. Circular Representations
- 24.5.5. Bubble Representations
- 24.5.6. Geographical Representations

24.6. Types of Visualization
- 24.6.1. Comparative and Relational
- 24.6.2. Distribution
- 24.6.3. Hierarchical

24.7. Report Design with Graphic Representation
- 24.7.1. Application of Graphs in Marketing Reports
- 24.7.2. Application of Graphs in Scorecards and KPI's
- 24.7.3. Application of Graphs in Strategic Plans
- 24.7.4. Other Uses: Science, Health, Business

24.8. Graphic Narration
- 24.8.1. Graphic Narration
- 24.8.2. Evolution
- 24.8.3. Uses

24.9. Tools Oriented Towards Visualization
- 24.9.1. Advanced Tools
- 24.9.2. Online Software
- 24.9.3. Open Source

24.10. New Technologies in Data Visualization
- 24.10.1. Systems for Virtualization of Reality
- 24.10.2. Reality Enhancement and Improvement Systems
- 24.10.3. Intelligent Systems

Module 25. Data Science Tools

25.1. Data Science
- 25.1.1. Data Science
- 25.1.2. Advanced Tools for the Data Scientist

25.2. Data, Information and Knowledge
- 25.2.1. Data, Information and Knowledge
- 25.2.2. Types of Data
- 25.2.3. Data Sources

25.3. From Data to Information
- 25.3.1. Data Analysis
- 25.3.2. Types of Analysis
- 25.3.3. Extraction of Information from a Dataset

25.4. Extraction of Information Through Visualization
- 25.4.1. Visualization as an Analysis Tool
- 25.4.2. Visualization Methods
- 25.4.3. Visualization of a Data Set

25.5. Data Quality
- 25.5.1. Quality Data
- 25.5.2. Data Cleaning
- 25.5.3. Basic Data Pre-Processing

25.6. Dataset
- 25.6.1. Dataset Enrichment
- 25.6.2. The Curse of Dimensionality
- 25.6.3. Modification of Our Data Set

25.7. Unbalance
- 25.7.1. Classes of Unbalance
- 25.7.2. Unbalance Mitigation Techniques
- 25.7.3. Balancing a Dataset

25.8. Unsupervised Models
- 25.8.1. Unsupervised Model
- 25.8.2. Methods
- 25.8.3. Classification with Unsupervised Models

25.9. Supervised Models
- 25.9.1. Supervised Model
- 25.9.2. Methods
- 25.9.3. Classification with Supervised Models

25.10. Tools and Good Practices
- 25.10.1. Good Practices for Data Scientists
- 25.10.2. The Best Model
- 25.10.3. Useful Tools

Module 26. Data Mining: Selection, Pre-Processing and Transformation

26.1. Statistical Inference
- 26.1.1. Descriptive Statistics vs. Statistical Inference
- 26.1.2. Parametric Procedures
- 26.1.3. Non-Parametric Procedures

26.2. Exploratory Analysis
- 26.2.1. Descriptive Analysis
- 26.2.2. Visualization
- 26.2.3. Data Preparation

26.3. Data Preparation
- 26.3.1. Integration and Data Cleaning
- 26.3.2. Normalization of Data
- 26.3.3. Transforming Attributes

26.4. Missing Values
- 26.4.1. Treatment of Missing Values
- 26.4.2. Maximum Likelihood Imputation Methods
- 26.4.3. Missing Value Imputation Using Machine Learning

26.5. Noise in the Data
- 26.5.1. Noise Classes and Attributes
- 26.5.2. Noise Filtering
- 26.5.3. The Effect of Noise

26.6. The Curse of Dimensionality
- 26.6.1. Oversampling
- 26.6.2. Undersampling
- 26.6.3. Multidimensional Data Reduction

26.7. From Continuous to Discrete Attributes
- 26.7.1. Continuous Data vs. Discreet Data
- 26.7.2. Discretization Process

26.8. The Data
- 26.8.1. Data Selection
- 26.8.2. Prospects and Selection Criteria
- 26.8.3. Selection Methods

26.9. Instance Selection
- 26.9.1. Methods for Instance Selection
- 26.9.2. Prototype Selection
- 26.9.3. Advanced Methods for Instance Selection

26.10. Data Pre-Processing in Big Data Environments
- 26.10.1. Big Data
- 26.10.2. Classical Versus Massive Pre-Processing
- 26.10.3. Smart Data

Module 27. Predictability and Analysis of Stochastic Phenomena

27.1. Time Series
- 27.1.1. Time Series
- 27.1.2. Utility and Applicability
- 27.1.3. Related Case Studies

27.2. Time Series
- 27.2.1. Trend Seasonality of TS
- 27.2.2. Typical Variations
- 27.2.3. Waste Analysis

27.3. Typology
- 27.3.1. Stationary
- 27.3.2. Non-Stationary
- 27.3.3. Transformations and Settings

27.4. Time Series Schemes
- 27.4.1. Additive Scheme (Model)
- 27.4.2. Multiplicative Scheme (Model)
- 27.4.3. Procedures to Determine the Type of Model

27.5. Basic Forecasting Methods
- 27.5.1. Media
- 27.5.2. Naïve
- 27.5.3. Seasonal Naïve
- 27.5.4. Method Comparison

27.6. Waste Analysis
- 27.6.1. Autocorrelation
- 27.6.2. ACF of Waste
- 27.6.3. Correlation Test

27.7. Regression in the Context of Time Series
- 27.7.1. ANOVA
- 27.7.2. Fundamentals
- 27.7.3. Practical Applications

27.8. Predictive Methods of Time Series
- 27.8.1. ARIMA
- 27.8.2. Exponential Smoothing

27.9. Manipulation and Analysis of Time Series with R
- 27.9.1. Data Preparation
- 27.9.2. Identification of Patterns
- 27.9.3. Model Analysis
- 27.9.4. Prediction

27.10. Combined Graphical Analysis with R
- 27.10.1. Normal Situations
- 27.10.2. Practical Application for the Resolution of Simple Problems
- 27.10.3. Practical Application for the Resolution of Advanced Problems

Module 28. Design and Development of Intelligent Systems

28.1. Data Pre-Processing
- 28.1.1. Data Pre-Processing
- 28.1.2. Data Transformation
- 28.1.3. Data Mining

28.2. Machine Learning
- 28.2.1. Supervised and Unsupervised Learning
- 28.2.2. Reinforcement Learning
- 28.2.3. Other Learning Paradigms

28.3. Classification Algorithms
- 28.3.1. Inductive Machine Learning
- 28.3.2. SVM and KNN
- 28.3.3. Metrics and Scores for Ranking

28.4. Regression Algorithms
- 28.4.1. Lineal Regression, Logistical Regression and Non-Lineal Models
- 28.4.2. Time Series
- 28.4.3. Metrics and Scores for Regression

28.5. Clustering Algorithms
- 28.5.1. Hierarchical Clustering Techniques
- 28.5.2. Partitional Clustering Techniques
- 28.5.3. Metrics and Scores for Clustering

28.6. Association Rules Techniques
- 28.6.1. Methods for Rule Extraction
- 28.6.2. Metrics and Scores for Association Rule Algorithms

28.7. Advanced Classification Techniques. Multiclassifiers
- 28.7.1. Bagging Algorithms
- 28.7.2. Random Forests Sorter
- 28.7.3. Boosting for Decision Trees

28.8. Probabilistic Graphical Models
- 28.8.1. Probabilistic Models
- 28.8.2. Bayesian Networks. Properties, Representation and Parameterization
- 28.8.3. Other Probabilistic Graphical Models

28.9. Neural Networks
- 28.9.1. Machine Learning with Artificial Neural Networks
- 28.9.2. Feedforward Networks

28.10. Deep Learning
- 28.10.1. Deep Feedforward Networks
- 28.10.2. Convolutional Neural Networks and Sequence Models
- 28.10.3. Tools for Implementing Deep Neural Networks

Module 29. Architecture and Systems for Intensive Use of Data

29.1. Non-Functional Requirements. Pillars of Big Data Applications
- 29.1.1. Reliability
- 29.1.2. Adaptation
- 29.1.3. Maintainability

29.2. Data Models
- 29.2.1. Relational Model
- 29.2.2. Document Model
- 29.2.3. Graph Type Data Model

29.3. Databases. Storage Management and Data Recovery
- 29.3.1. Hash Indexes
- 29.3.2. Structured Log Storage
- 29.3.3. B Trees

29.4. Data Coding Formats
- 29.4.1. Language-Specific Formats
- 29.4.2. Standardized Formats
- 29.4.3. Binary Coding Formats
- 29.4.4. Data Stream Between Processes

29.5. Replication
- 29.5.1. Objectives of Replication
- 29.5.2. Replication Models
- 29.5.3. Problems with Replication

29.6. Distributed Transactions
- 29.6.1. Transaction
- 29.6.2. Protocols for Distributed Transactions
- 29.6.3. Serializable Transactions

29.7. Partitions
- 29.7.1. Forms of Partitioning
- 29.7.2. Secondary Index Interaction and Partitioning
- 29.7.3. Partition Rebalancing

29.8. Processing of Offline Data
- 29.8.1. Batch Processing
- 29.8.2. Distributed File Systems
- 29.8.3. MapReduce

29.9. Data Processing in Real Time
- 29.9.1. Types of Message Brokers
- 29.9.2. Representation of Databases as Data Streams
- 29.9.3. Data Stream Processing

29.10. Practical Applications in Business
- 29.10.1. Consistency in Readings
- 29.10.2. Holistic Focus of Data
- 29.10.3. Scaling of a Distributed Service

Module 30. Practical Application of Data Science in Business Sectors

30.1. Health Sector
- 30.1.1. Implications of AI and Data Analysis in the Health Sector
- 30.1.2. Opportunities and Challenges

30.2. Risks and Trends in the Healthcare Sector
- 30.2.1. Use of the Health Sector
- 30.2.2. Potential Risks Related to the Use of AI

30.3. Financial Services
- 30.3.1. Implications of AI and Data Analysis in Financial Services Sector
- 30.3.2. Use in the Financial Services
- 30.3.3. Potential Risks Related to the Use of AI

30.4. Retail
- 30.4.1. Implications of AI and Data Analysis in the Retail Sector
- 30.4.2. Use in Retail
- 30.4.3. Potential Risks Related to the Use of AI

30.5. Industry 4.0
- 30.5.1. Implications of AI and Data Analysis in Industry 4.0
- 30.5.2. Use in Industry 4.0

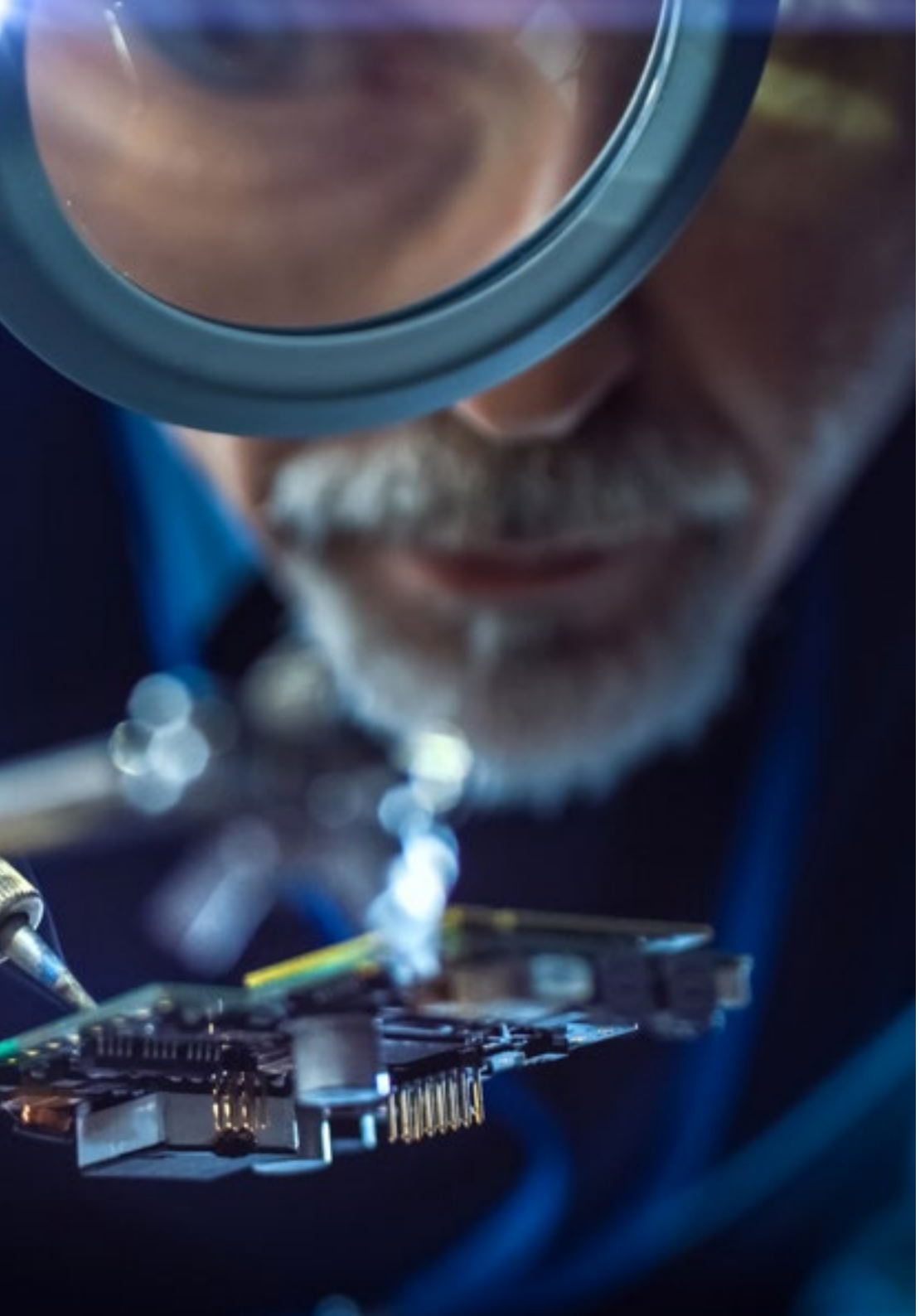
30.6. Risks and Trends in Industry 4.0
- 30.6.1. Potential Risks Related to the Use of AI

30.7. Public Administration
- 30.7.1. Implications of AI and Data Analytics for Public Administration
- 30.7.2. Use in Public Administration
- 30.7.3. Potential Risks Related to the Use of AI

30.8. Educational
- 30.8.1. Implications of AI and Data Analysis in Education
- 30.8.2. Potential Risks Related to the Use of AI

30.9. Forestry and Agriculture
- 30.9.1. Implications of AI and Data Analytics in Forestry and Agriculture
- 30.9.2. Use in Forestry and Agriculture
- 30.9.3. Potential Risks Related to the Use of AI

30.10. Human Resources
- 30.10.1. Implications of AI and Data Analysis in Human Resources
- 30.10.2. Practical Applications in the Business World
- 30.10.3. Potential Risks Related to the Use of AI



You will solve real cases and face complex situations in simulated environments designed for practical and effective learning"

04

Teaching Objectives

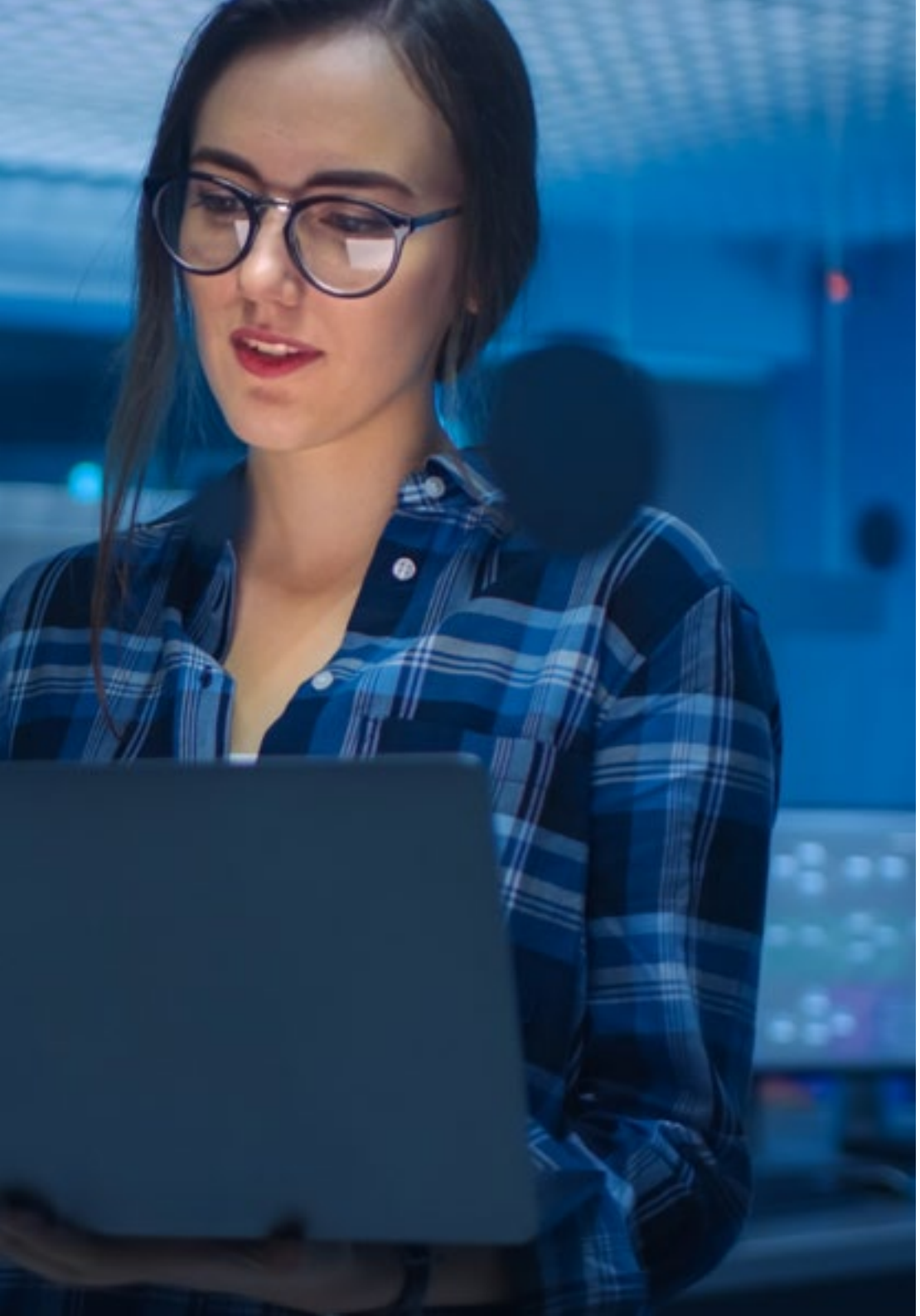
This program in Computer Science, Cybersecurity and Data Analytics at TECH is designed to provide IT professionals with the specific tools necessary to apply in their daily practice. This program guarantees comprehensive learning that will be key to professional development, providing access to updated knowledge in a constantly growing sector. Undoubtedly, a unique opportunity to strengthen your career path, improve your employability and advance in leadership positions within the technology industry.

Discover an absolutely innovative program that will completely transform your professional specialization"

General Objectives

- Perform advanced technical work in computing and cybersecurity, designing and implementing strategies to ensure protection of systems and data from threats
- Develop effective security policies and plans, including audits and incident response, to minimize risks and ensure business continuity
- Implement innovative data analytics solutions, leveraging current algorithms and tools to optimize processes and facilitate strategic decision making
- Evaluate and improve information systems through the application of best practices in secure development and efficient key and access management

Specialize with a program that will open doors to senior management in cybersecurity and data analytics"



Specific Objectives

Module 1. Programming Fundamentals

- Develop skills in the use of programming languages such as Python or Java
- Apply basic programming principles to solve simple computer problems

Module 2. Data Structure

- Understand fundamental data structures, such as lists, stacks, queues, trees, and graphs
- Evaluate the efficiency and performance of different data structures based on the needs of algorithms

Module 3. Algorithm and Complexity

- Analyze the time and space complexity of algorithms
- Obtain skills to design and optimize efficient algorithms for solving computational problems

Module 4. Advanced Algorithms Design

- Delve into the design of advanced algorithms for complex problems
- Apply techniques such as dynamic programming, search and backtracking in problem solving

Module 5. Advanced Programming

- Explore advanced programming concepts, such as object-oriented programming, recursion, and concurrency
- Apply design patterns and advanced techniques for developing more robust and efficient software

Module 6. Theoretical Computer Science
- Explore the limits of computation and its applicability to real problems
- Analyze the theory behind algorithms and the structure of formal languages

Module 7. Automata Theory and Formal Languages
- Apply automata theory in the construction and analysis of formal languages
- Develop skills for the design and analysis of compilers and language processors

Module 8. Language Processors
- Apply techniques to build a compiler or interpreter of a programming language
- Evaluate compilation processes and their impact on program execution

Module 9. Computer Graphics and Visualization
- Explore the fundamentals of computer graphics and data visualization techniques
- Apply computer graphics tools for the creation of 2D and 3D images

Module 10. Bio-Inspired Computing
- Explore techniques such as genetic algorithms, artificial neural networks and swarm algorithms
- Develop computational solutions inspired by biological processes to solve complex problems

Module 11. Security in System Design and Development
- Analyze the safety considerations that must be taken into account during the design and development of systems
- Apply secure design principles to protect software applications and systems

Module 12. Information Security Architectures and Models
- Understand the principles of access control, authentication, confidentiality and data integrity
- Develop robust security architectures for protecting information on networks and systems

Module 13. IT Security Management
- Develop skills to identify, assess and mitigate security risks in IT environments
- Implement policies and procedures to ensure the protection of information assets

Module 14. Risk Analysis and IT Security Environment
- Assess the risks associated with security threats to IT systems
- Apply preventative and corrective measures based on risk analysis to protect IT infrastructure

Module 15. Cryptography in IT
- Explore the principles of cryptography and its application to data protection in IT systems
- Understand encryption algorithms and their uses in information security

Module 16. Identity and Access Management in IT Security
- Apply authentication and authorization technologies to control access to resources in IT systems
- Evaluate and manage identity security policies to protect IT infrastructure

Module 17. Security in Communications and Software Operation
- Apply techniques for the protection of information in transit and secure management of running software
- Develop solutions to ensure privacy and integrity in digital communications

Module 18. Security in Cloud Environments

- Assess threats and vulnerabilities in cloud services platforms
- Implement specific security strategies to protect data and services in cloud environments

Module 19. Security in IoT Device Communications

- Apply security solutions to ensure data integrity and privacy in IoT devices
- Develop skills to implement security measures in IoT networks and systems

Module 20. Business Continuity Plan Associated with Security

- Explore the concepts of business continuity and its relationship to information security
- Develop continuity plans to ensure that business operations continue in case of security incidents

Module 21. Data Analysis in the Business Organization

- Develop skills to implement data analytics solutions in the business organization
- Evaluate the impact of data analytics on business performance and competitiveness

Module 22. Data and Information Management and Manipulation in Data Science

- Develop skills to apply data processing and analysis techniques in data science projects
- Evaluate the impact of data quality on data science outcomes

Module 23. IoT Devices and Platforms as the Basis for Data Science

- Study IoT devices and platforms used to collect and analyze real-time data
- Develop data science solutions using data from IoT devices

Module 24. Graphical Representation of Data Analysis

- Apply data graphing techniques to reveal patterns and trends
- Use data visualization tools to create effective reports and presentations

Module 25. Data Science Tools

- Develop skills to implement data science solutions using specialized tools
- Apply data analytics techniques using open source and commercial tools

Module 26. Data Mining: Selection, Pre-Processing and Transformation

- Introduce data mining techniques to extract patterns and knowledge from large volumes of information
- Study the processes of data selection, preprocessing and transformation prior to data analysis

Module 27. Predictability and Analysis of Stochastic Phenomena

- Develop mathematical models and algorithms to predict behaviors and random events
- Apply stochastic analysis techniques in the simulation and modeling of complex systems

Module 28. Design and Development of Intelligent Systems

- Apply advanced deep learning techniques, neural networks and evolutionary algorithms in the development of intelligent systems
- Evaluate the impact of intelligent systems in the automation and optimization of processes

Module 29. Architecture and Systems for Intensive Use of Data

- Develop scalable and efficient solutions for handling massive data in distributed systems
- Evaluate emerging technologies and their impact on the development of high-performance data-intensive systems

Module 30. Practical Application of Data Science in Sectors of Business Activity

- Analyze the impact of AI and data analytics in different business sectors
- Assess the risks and trends associated with its use in the business environment

05

Career Opportunities

Upon completion of this program, professionals will have acquired a comprehensive understanding of the most advanced strategies for addressing cybersecurity and data analytics challenges in complex environments. They will also be able to design and implement innovative solutions to ensure information protection and business process optimization. In this way, graduates will enhance their career prospects and be prepared to take on strategic roles in data management and IT security.

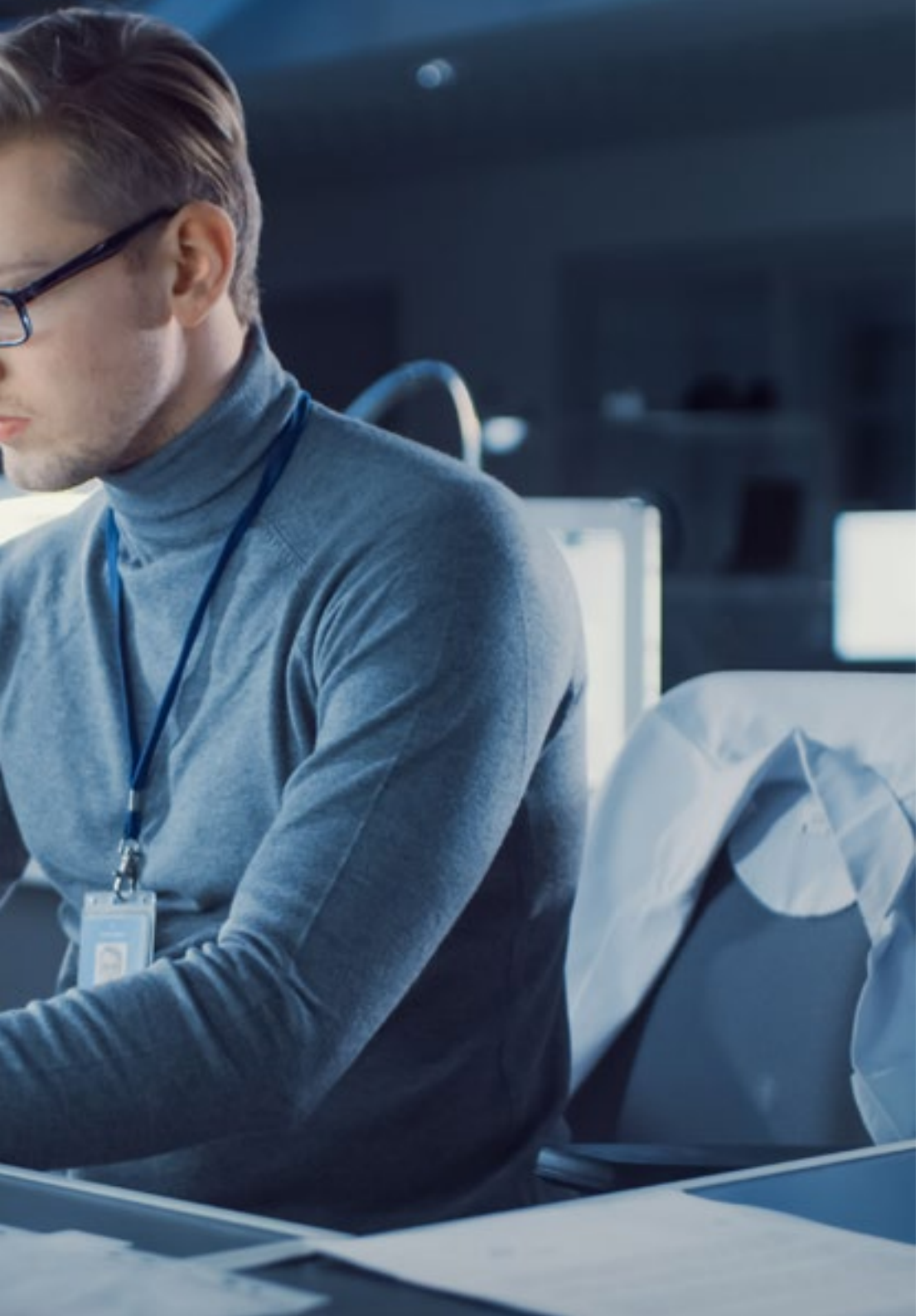
You will apply best-practice approaches to maximize security and efficiency in information management"

Graduate Profile

Graduates of the Computer Science, Cybersecurity and Data Analysis program are highly qualified to address the most complex technological challenges. They have a deep knowledge of security strategies, data analysis and advanced programming, essential to protect and optimize information systems. In addition, they are prepared to design and implement innovative solutions, collaborate with multidisciplinary teams and lead technological projects, ensuring the protection of information and operational efficiency in any organization.

You will integrate advanced theory and practice in algorithms, security and data analysis to excel in a dynamic industry.

- **Effective Communication Skills:** Professionals will develop skills to convey complex concepts clearly, adapting their language to different audiences and technical levels, ensuring accurate understanding in the field of information technology
- **Project and Resource Management:** A core skill is the ability to manage technology projects, optimizing resources, meeting deadlines, and resolving conflicts effectively in multidisciplinary teams
- **Critical Thinking and Problem Solving:** Experts will acquire the ability to analyze complex situations in cybersecurity and data analytics, identifying risks and developing innovative solutions
- **Advanced Digital Competence:** In a technological environment, it is essential to master advanced digital tools to implement security strategies, manage large volumes of data and develop interactive and effective IT solutions



After completing the Advanced Master's Degree , you will be able to use your knowledge and skills in the following positions:

1. **Cybersecurity Director:** Expert in the management and direction of computer security programs and in the integral protection of systems and data.
2. **Data Analyst:** Professional specialized in the evaluation, interpretation and transformation of data for strategic decision making.
3. **Cloud Security Engineer:** Specialist in ensuring the protection of systems and data in cloud computing environments.
4. **IoT Security Specialist:** Professional focused on implementing and monitoring security measures for IoT devices.
5. **Advanced Algorithm Developer:** Expert in algorithm design and optimization to solve complex problems in IT.
6. **IT Risk Management Consultant:** Specialist in the identification, analysis and mitigation of risks in technological environments.
7. **Information Systems Administrator:** Professional in charge of the management, security and optimization of enterprise IT systems.
8. **Cybersecurity Auditor:** In charge of evaluating and improving security policies and strategies in organizations.
9. **Machine Learning Engineer:** Expert in the development and implementation of machine learning models to extract knowledge from data.
10. **Data Architect:** Professional who designs and oversees systems for the efficient management of massive data.

06

Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.

TECH will prepare you to face new challenges in uncertain environments and achieve success in your career"

The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.
The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

"At TECH you will NOT have live classes (which you might not be able to attend)"

The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

> *TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want"*

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.

Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

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.

A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.

The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule"

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.

As such, the best educational materials, thoroughly prepared, will be available in this program:

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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.

Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.

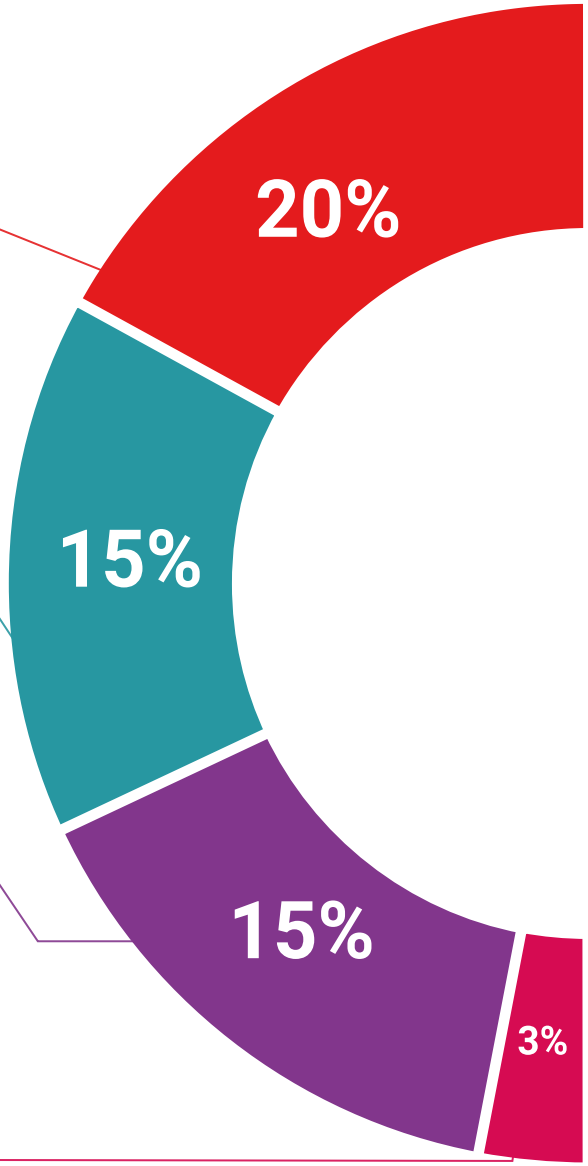
Interactive Summaries

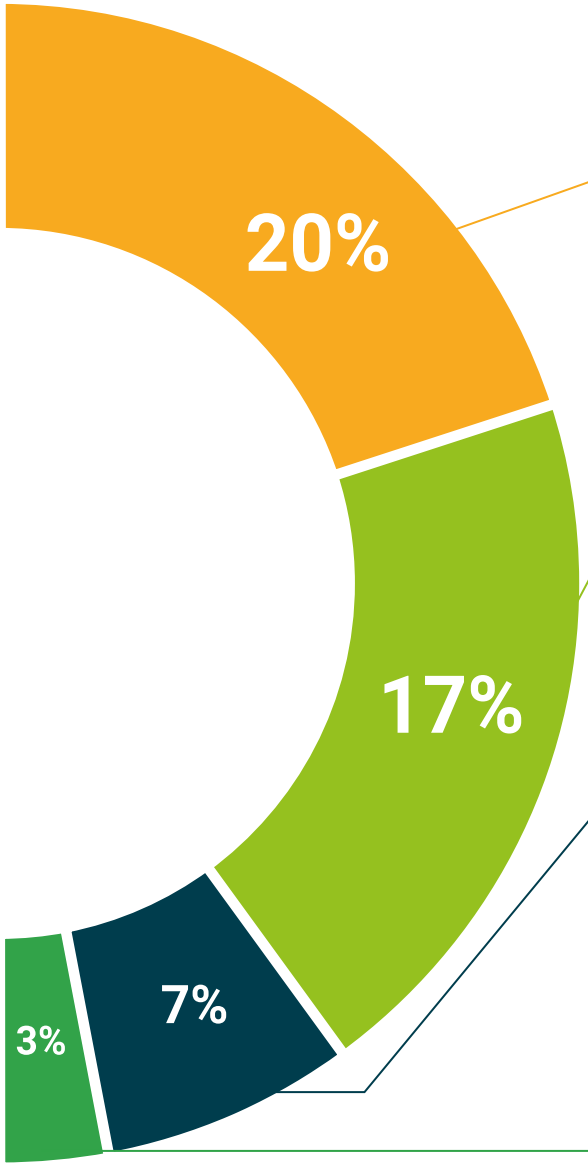
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.





Case Studies

Students will complete a selection of the best case studies in the field. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Testing & Retesting

We periodically assess and re-assess your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.

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 for 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.

07

Teaching Staff

Mastering the field of Computer Science, Cybersecurity and Data Analytics requires a deep and detailed immersion. For this reason, TECH has assembled an outstanding faculty composed of renowned experts, who bring years of experience and up-to-date knowledge to ensure preparation aligned with the demands of an ever-growing industry. This teaching team, always at the forefront of the latest advances in Cybersecurity and Data Analytics, ensures an educational experience of excellence, offering participants the support and supervision needed to excel at an international level.

Succeed with the best and acquire the knowledge and skills needed to excel in the cybersecurity and data analytics industry"

International Guest Director

Dr. Jeremy Gibbons is considered an **international eminence** for his contributions in the field of **Programming Methodology** and its applications in **Software Engineering**. For more than two decades, this expert, associated with the Department of Computer Science at the University of Oxford, has driven **different development projects** whose most tangible results are applied by computer scientists from different parts of the world.

His work covers areas such as **generic programming**, formal methods, computational biology, bioinformatics and algorithm design with Haskell. This last topic he developed extensively in conjunction with his mentor, Dr. Richard Bird.

In his role as **Director** of the **Algebra of Programming Research Group**, Gibbons has led advances in **Functional Programming Languages** and **Pattern Theory in Programming**. At the same time, the applications of his innovations have been linked to the healthcare framework, as evidenced by his collaboration with **CancerGrid** and **Datatype-Generic Programming**. These and other initiatives reflect his interest in solving practical problems in **cancer research** and **clinical informatics**.

Gibbons has also made a significant mark as **Editor-in-Chief** of **scholarly publications** in The Journal of Functional Programming and The Programming Journal: The Art, Science, and Engineering of Programming. Through these responsibilities he has carried out intensive **outreach** and **dissemination of knowledge**. In addition, he has led several study chairs linked to renowned institutions such as Oxford Brookes University and the University of Auckland, New Zealand.

Moreover, this specialist is a member of the Working Group 2.1 on Algorithmic Languages and Computation of the **International Federation for Information Processing (IFIP)**. With this organization, he provides maintenance for the ALGOL 60 and ALGOL 68 programming languages

Dr. Gibbons, Jeremy

- Director, Software Engineering Program, University of Oxford, UK
- Deputy Head of the Informatics Laboratory and Department of Computer Science, University of Oxford, UK
- Professor at Kellogg College, Oxford Brookes University and the University of Auckland, New Zealand
- Director of the Algebra of Programming Research Group
- Editor-in-Chief of The Art, Science, and Engineering of Programming and the Journal of Functional Programming
- Doctorate in Computer Science from Oxford University
- Bachelor's Degree in Computer Science from the University of Edinburgh
- Member of: Working Group 2.1 on Algorithmic Languages and Computation of the International Federation for Information Processing (IFIP)

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

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shepherds GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- Doctorate in Psychology from the University of Castilla La Mancha
- Doctorate in Economics, Business and Finance from the Camilo José Cela University
- Doctorate in Psychology from University of Castilla La Mancha
- Master's Degree in Executive MBA from the Isabel I University
- Master's Degree in Sales and Marketing Management from the Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Master's Degree in Advanced Information Technologies from the University of Castilla La Mancha
- Member of: SMILE Research Group

Mr. Olalla Bonal, Martín

- Senior Blockchain Practice Manager at EY
- Blockchain Client Technical Specialist for IBM
- Director of Architecture for Blocknitive
- Team Coordinator in Non-Relational Distributed Databases for WedoIT, a subsidiary of IBM
- Infrastructure Architect at Bankia
- Head of Layout Department at T-Systems
- Department Coordinator for Bing Data España SL

Professors

Mr. Tobal Redondo, Javier

- Head of Information Security of the Means of Payment Division at Amadeus IT Group
- Head of Information Security at FINTONIC, Financial Services
- Manager of HUAWEI's Application Innovation Program
- Services Engineer and Architect in the Services and Security Planning and Architecture Area at Orange Spain
- Degree in Computer Forensics from the University of Deusto
- Postgraduate Degree in Industrial Computing from the School of Industrial Engineering

Mr. Gonzalo Alonso, Félix

- CEO and Founder of Smart REM Solutions
- Head of Risk Engineering and Innovation at Dynargy
- Manager and founding partner of Risknova, a technology consultancy firm
- Master's Degree in Insurance Management from the Higher Institute for Collaboration between Insurance Companies
- Degree in Industrial Technical Engineering, specializing in Industrial Electronics from Comillas Pontifical University ICAI

Mr. Sevillano Izquierdo, Javier

- Global Cyber Security Architect at Vodafone Spain
- Chief Technology Security Office (CTSO) at Vodafone Spain
- Head of Technology Security at Bankia
- Head of Technology Security at Caja Madrid
- Security Manager at Sistema 4B
- Senior Analyst at SEINCA
- Senior Technician in Business Informatics at Instituto Cibernos

Mr. Entrenas, Alejandro

- Cybersecurity Project Manager. Entelgy Innotec Security
- Cybersecurity Consultant. Entelgy
- Information Security Analyst. Innovery Spain
- Information Security Analyst. Atos
- Degree in Technical Engineering in Computer Systems from the University of Cordoba.
- Master's Degree in Information Security Management from the Polytechnic University of Madrid
- ITIL v4 Foundation Certificate in IT Service Management. ITIL Certified
- IBM Security QRadar SIEM 7.1 Advanced. Avnet
- IBM Security QRadar SIEM 7.1 Foundations. Avnet

Mr. Nogales Ávila, Javier

- Enterprise Cloud and Sourcing Senior Consultant at Quint
- Cloud and Technology Consultant at Indra
- Associate Technology Consultant at Accenture
- Graduate in Industrial Organization Engineering from the University of Jaén
- MBA in Business Administration and Management from ThePower Business School

Mr. Del Valle Arias, Jorge

- Telecommunications Engineer with expertise in Business Development
- Smart City Solutions & Software Business Development Manager Spain Itron, Inc
- IoT Consultant
- Interim IoT Business Director. TCOMET
- IoT, Industry 4.0 Business Unit Manager. Diode Spain
- IoT and Telecommunications Sales Area Manager. Aicox Solutions
- Chief Technical Officer (CTO) and Business Development Manager. TELYC Consulting
- Founder and CEO of Sensor Intelligence
- Head of Operations and Projects. Codio
- Operations Director at Codium Networks
- Chief Engineer of hardware and firmware design. AITEMIN
- Regional Head of RF Planning and Optimization - LMDS 3.5 GHz Network. Clearwire
- Telecommunications Engineer from Universidad Politécnica de Madrid
- Executive MBA from the International Graduate School of La Salle of Madrid
- Master's Degree in Renewable Energies. CEPYME

Mr. Gómez Rodríguez, Antonio

- Principal Cloud Solutions Engineer for Oracle
- Co-organizer of Málaga Developer Meetup
- Specialist Consultant for Sopra Group and Everis
- Team Leader at System Dynamics
- Software Developer at SGO Software
- Master's Degree in E-Business from from La Salle Business School
- Postgraduate degree in Information Technologies and Systems from the Catalan Institute of Technology.
- Degree in Telecommunications Engineering from the Polytechnic University of Catalonia.

Mr. Gozalo Fernández, Juan Luis

- Blockchain-based Product Manager for Open Canarias
- Director Blockchain DevOps Director at Alastria
- Director of Service Level Technology at Santander Spain
- Tinkerlink Mobile Application Development Manager at Cronos Telecom
- IT Service Management Technology Director at Barclays Bank Spain
- Bachelor's Degree in Computer Engineering from UNED
- Specialization in Deep Learning at DeepLearning.ai

Mr. Tato Sánchez, Rafael

- Technical Director at Indra Sistemas SA
- Systems Engineer in ENA TRÁFICO SAU
- Master's Degree in Industry 4.0. by the Online University
- Master's Degree in Industrial Engineering from the European University
- Industrial Electronics and Automation Engineering Degree from the European University
- Industrial Technical Engineer by the Polytechnic University of Madrid

Ms. Jurado Jabonero, Lorena

- Head of Information Security (CISO) at Grupo Pascual
- Cybersecurity Manager at KPMG. Spain
- IT Processes and Infrastructure Control and Project Management Consultant at Bankia
- Exploitation Tools Engineer at Dalkia
- Developer at Banco Popular Group
- Applications Developer at the Polytechnic University of Madrid
- Graduate in Computer Engineering from the Alfonso X El Sabio University.
- Technical Engineer in Computer Management from the Polytechnic University of Madrid
- Certified Data Privacy Solutions Engineer (CDPSE) by ISACA

Mr. Armero Fernández, Rafael

- Business Intelligence Consultant en SDG Group
- Digital Engineer at MI-GSO
- Logistic Engineer at Torrecid SA
- Quality Intern at INDRA
- Degree in Aerospace Engineering from the Polytechnic University of Valencia
- Master's Degree in Professional Development 4.0 from the University of Alcalá

Mr. Peris Morillo, Luis Javier

- Technical Lead at Capitole Consulting for Inditex
- Senior Technical Lead and Delivery Lead Support at HCL Technologies
- Technical Editor at Baeldung
- Agile Coach and Operations Manager at Mirai Advisory
- Developer, Team Lead, Scrum Master, Agile Coach and Product Manager at DocPath
- Technologist at ARCO
- Degree in Computer Science Engineering from the University of Castilla-La Mancha
- Master's Degree in Project Management from CEOE

Ms. Fernández Meléndez, Galina

- Specialist's Degree in Big Data
- Data Analyst at Aresi Gestión de Fincas
- Data Analyst in ADN Mobile Solution
- Bachelor's Degree in Business Administration at Universidad Bicentenaria Aragua. Caracas, Venezuela
- Diploma in Planning and Public Finance from the Venezuelan School of Planning
- Master's Degree in Data Analysis and Business Intelligence from the University of Oviedo
- MBA in Business Administration and Management (Escuela De Negocios Europea De Barcelona
- Master's Degree in Big Data and Business Intelligence from the European Business School of Barcelona

Dr. Montoro Montarroso, Andrés

- Researcher in the SMILe Group at the University of Castilla-La Mancha.
- Researcher at the University of Granada
- Data Scientist at Prometeus Global Solutions
- Vice President and Software Developer at CireBits
- PhD in Advanced Information Technologies from the University of Castilla La Mancha
- Degree in Computer Engineering from the University of Castilla-La Mancha
- Master's Degree in Data Science and Computer Engineering from the University of Granada
- Guest lecturer in the subject of Knowledge-Based Systems at the Ciudad Real Higher School of Computer Science, giving the Lecture: *Advanced Artificial Intelligence Techniques: Search and Analysis of Potential Social Media Radicals*
- Guest lecturer in the subject of Data Mining at the Escuela Superior de Informática de Ciudad Real , giving the lecture: *Applications of Natural Language Processing: Fuzzy logic to the analysis of messages in social networks*
- Speaker at the Seminar on Prevention of Corruption in Public Administrations and Artificial Intelligence at the Faculty of Law and Social Sciences of Toledo, giving the lecture: *Artificial Intelligence Techniques*
- Speaker at the first International Seminar on Administrative Law and Artificial Intelligence (DAIA). Organized by the Luis Ortega Álvarez Centre for European Studies and the TransJus Research Institute. Conference entitled *"Sentiment Analysis for the prevention of hate speech on social media*

Ms. Pedrajas Parabá, María Elena

- New Technologies and Digital Transformation Consultant en Management Solutions
- Researcher in the Department of Computer Science and Numerical Analysis at the University of Cordoba
- Researcher at the Singular Center for Research in Intelligent Technologies in Santiago de Compostela
- Degree in Computer Engineering from the University of Cordoba
- Master's Degree in Data Science and Computer Engineering from the University of Granada
- Master's Degree in Business Consulting at the Pontificia Comillas University

Ms. Martínez Cerrato, Yésica

- Responsible for Technical Training at Securitas Seguridad España
- Education, Business and Marketing Specialist
- Product Manager in Electronic Security at Securitas Direct
- Business Intelligence Analyst at Ricopia Technologies
- Computer Technician and Responsible for OTEC computer classrooms at the University of Alcalá de Henares
- Collaborator in the ASALUMA Association
- Degree in Electronic Communications Engineering at the Polytechnic School, University of Alcalá de Henares
-

Mr. Fondón Alcalde, Rubén

- Analyst EMEA at Amazon Web Services
- Business Analyst in Customer Value Management at Vodafone Spain
- Head of Service Integration at Entelgy for Telefónica Global Solutions
- Online Account Manager for Clone Servers at EDM Electronics
- International Services Implementation Manager at Vodafone Global Enterprise
- Solutions Consultant for Spain and Portugal at Telvent Global Services
- Business Analyst for Southern Europe at Vodafone Global Enterprise
- Telecommunications Engineer from the European University of Madrid
- Master's Degree in Big Data and Data Science from the International University of Valencia

Mr. Díaz Díaz-Chirón, Tobías

- Expert consultant in Telecommunications
- Researcher in the ArCO laboratory of the University of Castilla-La Mancha
- Consultant at Blue Telecom
- Freelance mainly dedicated to the telecommunications sector, specialising in 4G/5G networks.
- OpenStack: deploy and administration
- Computer Engineer from the University of Castilla - la Mancha
- Specialization in Architecture and computer network
- Associate Professor at the University of Castilla-La Mancha
- Speaker at Sepecam course on network administration

08

Certificate

The Advanced Master's Degree in Computer Science, Cybersecurity and Data Analytics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.

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

This private qualification will allow you to obtain a **Advanced Master's Degree in Computer Science, Cybersecurity and Data Analytics** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra (***official bulletin***). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

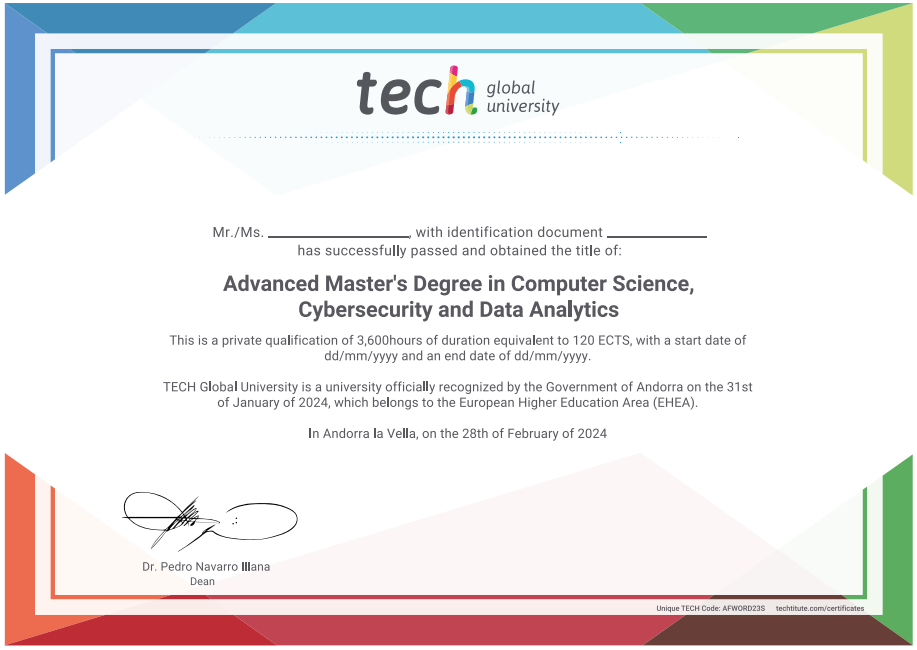
This **TECH Global University** private qualification is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Advanced Master's Degree in Computer Science, Cybersecurity and Data Analytics**

Modality: **online**

Duration: **2 years**

Accreditation: **120 ECTS**


tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Advanced Master's Degree in Computer Science, Cybersecurity and Data Analytics

This is a private qualification of 3,600hours of duration equivalent to 120 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Dean

Unique TECH Code: AFWORD23S techtitute.com/certificates


Advanced Master's Degree in Computer Science, Cybersecurity and Data Analytics

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Programming Fundamentals	4	CO
1º	Data Structure	4	CO
1º	Algorithm and Complexity	4	CO
1º	Advanced Algorithms Design	4	CO
1º	Advanced Programming	4	CO
1º	Theoretical Computer Science	4	CO
1º	Automata Theory and Formal Languages	4	CO
1º	Language Processors	4	CO
1º	Computer Graphics and Visualization	4	CO
1º	Bio-Inspired Computing	4	CO
1º	Security in System Design and Development	4	CO
1º	Information Security Architectures and Models	4	CO
1º	IT Security Management	4	CO
1º	Risk Analysis and IT Security Environment	4	CO
1º	Cryptography in IT	4	CO

Year	Subject	ECTS	Type
2º	Identity and Access Management in IT Security	4	CO
2º	Security in Communications and Software Operation	4	CO
2º	Security in Cloud Environments	4	CO
2º	Security in IoT Device Communications	4	CO
2º	Business Continuity Plan Associated with Security	4	CO
2º	Data Analysis in the Business Organization	4	CO
2º	Data and Information Management and Manipulation in Data Science	4	CO
2º	IoT Devices and Platforms as the Basis for Data Science	4	CO
2º	Graphical Representation of Data Analysis	4	CO
2º	Data Science Tools	4	CO
2º	Data Mining: Selection, Pre-Processing and Transformation	4	CO
2º	Predictability and Analysis of Stochastic Phenomena	4	CO
2º	Design and Development of Intelligent Systems	4	CO
2º	Architecture and Systems for Intensive Use of Data	4	CO
2º	Practical Application of Data Science in Sectors of Business Activity	4	CO

Dr. Pedro Navarro Illana
Dean

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*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

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Advanced Master's Degree
Computer Science, Cybersecurity and Data Analytics

- Modality: **online**
- Duration: **2 years**
- Certificate: **TECH Global University**
- Accreditation: **120 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Advanced Master's Degree

Computer Science, Cybersecurity and Data Analytics

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