Advanced Master's Degree

MBA in Artificial Intelligence in Clinical Research

AMDMBAAICR

tech global university

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Advanced Master's Degree
MBA in Artificial Intelligence in Clinical Research

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

Website: **www.techtitute.com/us/school-of-business/advanced-master-degree/advanced-master-degree-mba-artificial-intelligence-clinical-research**

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01

Welcome

The incursion of Artificial Intelligence in Clinical Research is proving to be a powerful tool for improving the efficiency of processes and the accuracy of healthcare results. So much so that the scientific community estimates that this technological discipline will reach an annual investment rate of 29.97 million dollars over the next few years. This highlights the importance of professionals having a solid knowledge of this field and incorporating the latest advances into their clinical practice to ensure medical care based on excellence. For this reason, TECH is developing a university degree that will focus on the most innovative methods and tools of Machine Learning to optimize Clinical Research.

MBA in Artificial Intelligence in Clinical Research
TECH Global University

A university program with which you will become the most outstanding Clinical Researcher in your environment. You will lead projects that will contribute to the advancement of Medicine!"

02

Why Study at TECH?

TECH is the world's largest 100% online business school. It is an elite business school, with a model based on the highest academic standards. A world-class center for intensive managerial skills education.

TECH is a university at the forefront of technology, and puts all its resources at the student's disposal to help them achieve entrepreneurial success"

At TECH Global University

Innovation

The university offers an online learning model that balances the latest educational technology with the most rigorous teaching methods. A unique method with the highest international recognition that will provide students with the keys to develop in a rapidly-evolving world, where innovation must be every entrepreneur's focus.

"Microsoft Europe Success Story", for integrating the innovative, interactive multi-video system.

The Highest Standards

Admissions criteria at TECH are not economic. Students don't need to make a large investment to study at this university. However, in order to obtain a qualification from TECH, the student's intelligence and ability will be tested to their limits. The institution's academic standards are exceptionally high...

95% | **of TECH students successfully complete their studies**

Networking

Professionals from countries all over the world attend TECH, allowing students to establish a large network of contacts that may prove useful to them in the future.

+100000
executives prepared each year

+200
different nationalities

Empowerment

Students will grow hand in hand with the best companies and highly regarded and influential professionals. TECH has developed strategic partnerships and a valuable network of contacts with major economic players in 7 continents.

+500 | **collaborative agreements with leading companies**

Talent

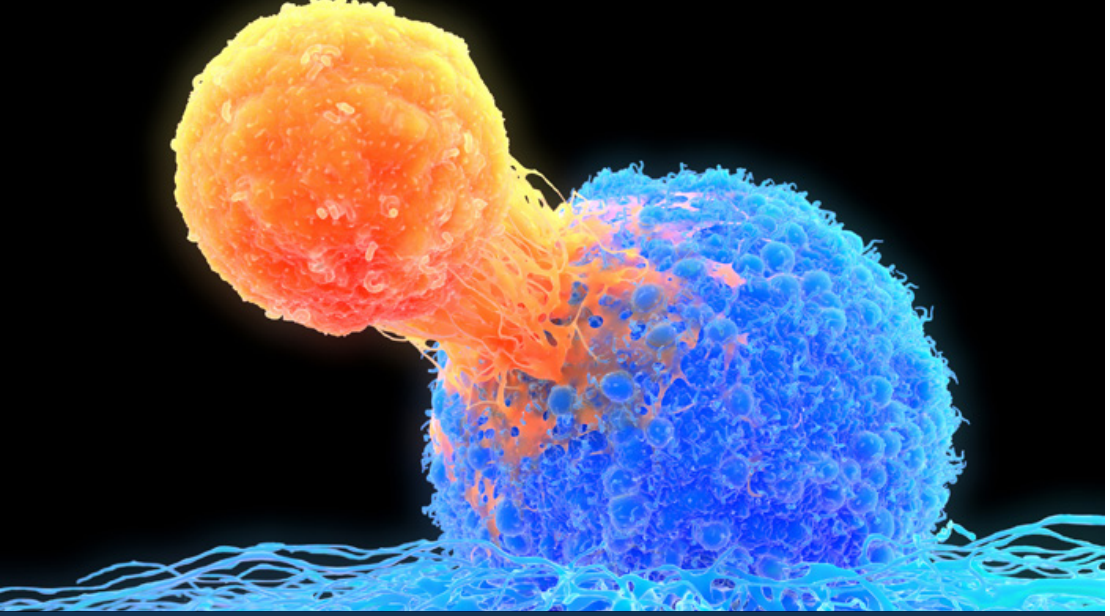
This program is a unique initiative to allow students to showcase their talent in the business world. An opportunity that will allow them to voice their concerns and share their business vision.

After completing this program, TECH helps students show the world their talent.

Multicultural Context

While studying at TECH, students will enjoy a unique experience. Study in a multicultural context. In a program with a global vision, through which students can learn about the operating methods in different parts of the world, and gather the latest information that best adapts to their business idea.

TECH students represent more than 200 different nationalities.



Learn with the best

In the classroom, TECH's teaching staff discuss how they have achieved success in their companies, working in a real, lively, and dynamic context. Teachers who are fully committed to offering a quality specialization that will allow students to advance in their career and stand out in the business world.

Teachers representing 20 different nationalities.

At TECH, you will have access to the most rigorous and up-to-date case analyses in academia"

TECH strives for excellence and, to this end, boasts a series of characteristics that make this university unique:

Analysis

TECH explores the student's critical side, their ability to question things, their problem-solving skills, as well as their interpersonal skills.

Academic Excellence

TECH offers students the best online learning methodology. The university combines the Relearning method (postgraduate learning methodology with the best international valuation) with the Case Study. Tradition and vanguard in a difficult balance, and in the context of the most demanding educational itinerary.

Economy of Scale

TECH is the world's largest online university. It currently boasts a portfolio of more than 10,000 university postgraduate programs. And in today's new economy, **volume + technology = a ground-breaking price**. This way, TECH ensures that studying is not as expensive for students as it would be at another university.

03

Why Our Program?

Studying this TECH program means increasing the chances of achieving professional success in senior business management.

It is a challenge that demands effort and dedication, but it opens the door to a promising future. Students will learn from the best teaching staff and with the most flexible and innovative educational methodology.

We have highly qualified teachers and the most complete syllabus on the market, which allows us to offer you education of the highest academic level"

This program will provide you with a multitude of professional and personal advantages, among which we highlight the following:

01

A Strong Boost to Your Career

By studying at TECH, students will be able to take control of their future and develop their full potential. By completing this program, students will acquire the skills required to make a positive change in their career in a short period of time.

70% of students achieve positive career development in less than 2 years.

02

Develop a strategic and global vision of the company

TECH offers an in-depth overview of general management to understand how each decision affects each of the company's different functional fields.

Our global vision of companies will improve your strategic vision.

03

Consolidate the student's senior management skills

Studying at TECH means opening the doors to a wide range of professional opportunities for students to position themselves as senior executives, with a broad vision of the international environment.

You will work on more than 100 real senior management cases.

04

You will take on new responsibilities

The program will cover the latest trends, advances and strategies, so that students can carry out their professional work in a changing environment.

45% of graduates are promoted internally.

05

Access to a powerful network of contacts

TECH connects its students to maximize opportunities. Students with the same concerns and desire to grow. Therefore, partnerships, customers or suppliers can be shared.

You will find a network of contacts that will be instrumental for professional development.

06

Thoroughly develop business projects.

Students will acquire a deep strategic vision that will help them develop their own project, taking into account the different fields in companies.

20% of our students develop their own business idea.

07

Improve *soft skills* and management skills

TECH helps students apply and develop the knowledge they have acquired, while improving their interpersonal skills in order to become leaders who make a difference.

Improve your communication and leadership skills and enhance your career.

08

You will be part of an exclusive community

Students will be part of a community of elite executives, large companies, renowned institutions, and qualified teachers from the most prestigious universities in the world: the TECH Global University community.

We give you the opportunity to study with a team of world-renowned teachers.

04

Objectives

This academic pathway will provide students with a solid foundation in the principles of Artificial Intelligence in Clinical Research. Therefore, graduates will use the most innovative technological tools to improve efficiency and accuracy in various areas such as medical diagnosis, clinical trials or drug discovery. Likewise, professionals will develop skills to handle algorithms to predict progression of diseases and assess the risk of medical complications. In this way, professionals will have a wide range of resources at their fingertips to meet the challenges that arise in this field of expertise.

Update your knowledge in Autoencoders, GANs and diffusion models through the innovative multimedia content offered in this program"

TECH makes the goals of their students their own goals too Working together to achieve them

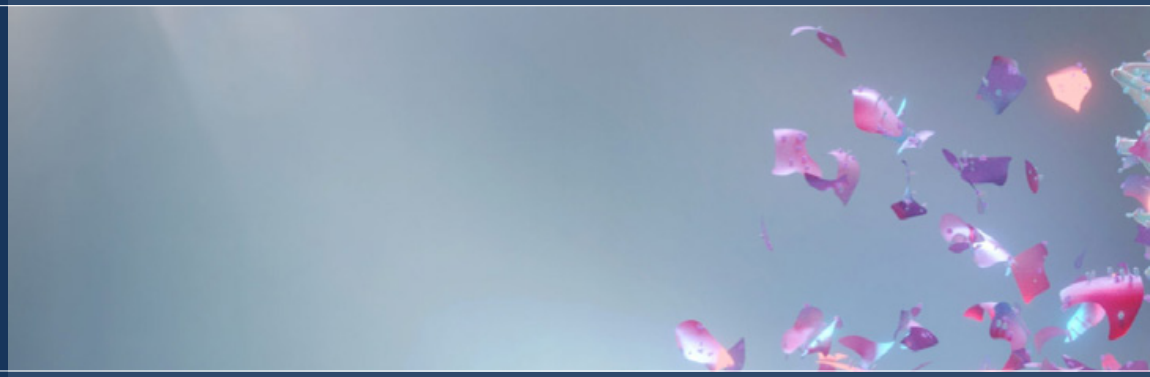
The **MBA in Artificial Intelligence in Clinical Research** will enable students to:

01 Define the latest trends in business management, taking into account the globalized environment that governs senior management criteria

02 Develop the key leadership skills that should define working professionals

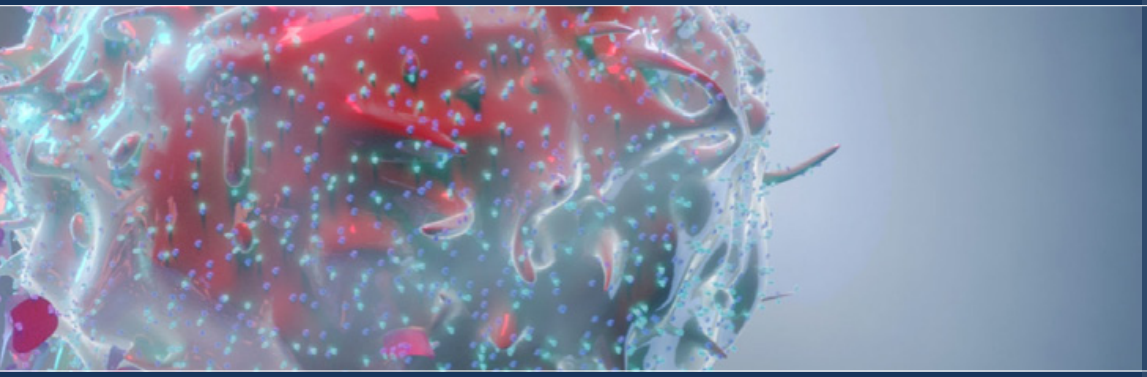
03 Delve into the the sustainability criteria set by international standards when developing a business plan

04 Develop strategies to carry out decision-making in a complex and unstable environment



05 Encourage the creation of corporate strategies that set the script for the company to follow in order to be more competitive and achieve its own objectives

06 Design innovative strategies and policies to improve management and business efficiency



07 Understand the best way to manage the company's human resources, getting greater performance from employees that, in turn, increases the company's profits

08 Acquire the communication skills that a business leader needs in order to ensure that their message is heard and understood by the members of their community

09 Understand the logistic operations that are necessary in the business environment, so as to manage them appropriately

10 Apply information and communication technologies to the different areas of the company

11 Carry out the marketing strategy that allows to make the product known to potential clients and to generate an adequate image of the company

12 Be able to develop all the phases of a business idea: design, feasibility plan, execution, monitoring

13 Address workload distribution mechanisms of shared resources among several projects

14 Create innovative strategies in line with different projects

15 Establish the appropriate guidelines for the company's adaptation to the changing society

16 Propose a dynamic business model that supports its growth in intangible resources

18 Study the different types of data and understand the data life cycle

19 Evaluate the crucial role of data in the development and implementation of AI solutions

17 Understand the theoretical foundations of Artificial Intelligence

20 Delve into algorithms and complexity to solve specific problems

21 Explore the theoretical basis of neural networks for Deep Learning development

22 Analyze bio-inspired computing and its relevance in the development of intelligent systems

23 Analyze current strategies of Artificial Intelligence in various fields, identifying opportunities and challenges

24 Obtain a comprehensive view of the transformation of Clinical Research through IA, from its historical foundations to current applications

25 Learn effective methods for integrating heterogeneous data into clinical research, including natural language processing and advanced data visualization

26 Acquire a solid understanding of model validation and simulations in the biomedical domain, exploring the use of synthetic datasets and practical applications of AI in health research

27 Understand and apply genomic sequencing technologies, AI data analysis and use of AI in biomedical imaging

28 Acquire expertise in key areas such as personalization of therapies, precision medicine, AI-assisted diagnostics, and clinical trial management

29 Obtain a solid understanding of Big Data concepts in the clinical setting and become familiar with essential tools for its analysis

30 Delve into ethical dilemmas, review legal considerations, explore the socioeconomic impact and future of AI in healthcare, and promote innovation and entrepreneurship in the field of clinical AI

05

Skills

This Advanced Master's Degree will provide graduates with new practical skills to enhance Artificial Intelligence assisted diagnosis. Therefore, professionals will use Machine Learning algorithms and Natural Language Processing techniques to help identify pathologies through clinical data, patient symptomatology or laboratory tests. Students will also design and execute clinical trials based on Intelligent Systems methodologies (such as predictive analytics) to optimize medical processes. They will also personalize treatments taking into account aspects such as medical history, genetic factors and patient preferences.

TECH is a university at the forefront of technology, which puts all its resources at your disposal to help you achieve success in your professional career"

01 Resolve business conflicts and problems between workers

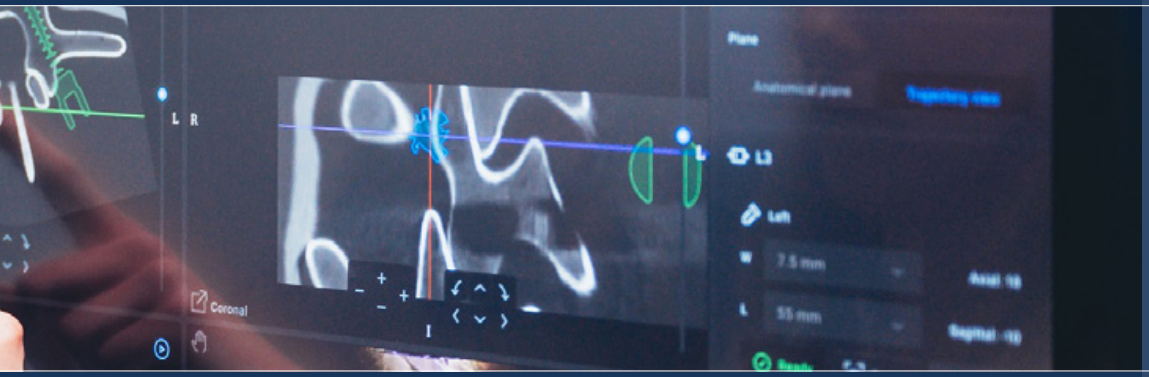
02 Apply Lean management methodologies

03 Correctly manage teams to improve productivity and, therefore, the company's profits

04 Exercise economic and financial control of a company

05 Manage tools and methods for the manipulation and better utilization of data, for the delivery of understandable results to the final recipient

06 Control the company's logistics processes, as well as purchasing and procurement



07 Delve into the new business models associated with information systems

08 Implement the keys to successful R+D+I management in organizations

09 Apply the most appropriate strategies to support e-commerce of the company's products

10 Develop and lead marketing plans

11 Develop metrics of goal achievement associated with a digital marketing strategy and analyze them in digital dashboards

12 Focus on innovation in all processes and areas of the company

13 Lead the different projects of the company, from defining when to prioritize and delay their development within an organization.

14 Commit to sustainably developing the company, avoiding environmental impacts

15 Master data mining techniques, including complex data selection, preprocessing and transformation

16 Design and develop intelligent systems capable of learning and adapting to changing environments

18 Employ Autoencoders, GANs and Diffusion Models to solve specific challenges in Artificial Intelligence

19 Implement an encoder-decoder network for neural machine translation

17 Control machine learning tools and their application in data mining for decision making

20 Apply the fundamental principles of neural networks in solving specific problems

21 Use AI tools, platforms and techniques, from data analysis to the application of neural networks and predictive modeling

22 Apply computational models to simulate biological processes and treatment responses, using the IA to improve understanding of complex biomedical phenomena

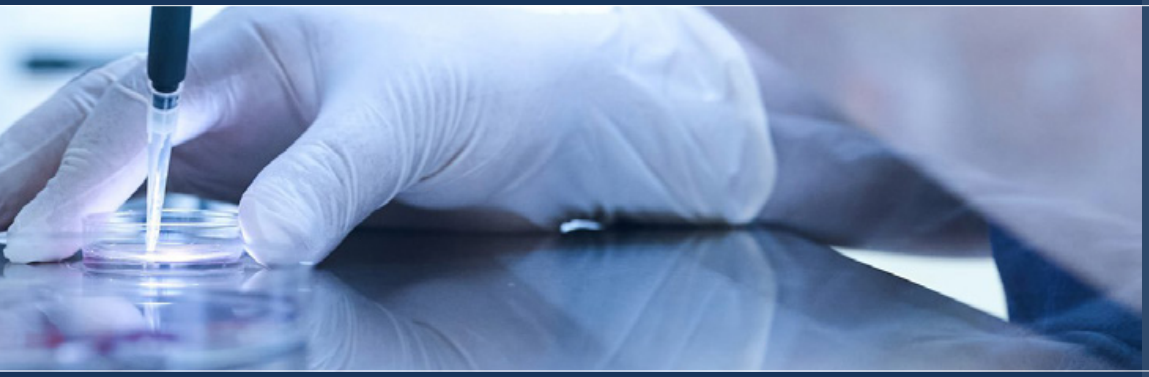
23 Address contemporary challenges in the biomedical field, including the efficient management of clinical trials and the application of AI in immunology

24 Acquire skills in the advanced visualization and effective communication of complex data, with a focus on developing AI-based tools

25 Apply genomic sequencing technologies and data analysis with Artificial Intelligence

26 Run grouping layers and their use in Deep Computer Vision models with Keras

28 Optimize the development and application of chatbots and virtual assistants, understanding their operation and potential applications



29 Master reuse of pre-workout layers to optimize and accelerate the training process

27 Use TensorFlow features and graphics to optimize the performance of custom models

30 Develop data cleaning techniques to ensure the quality and accuracy of the information used in subsequent analyses

06

Structure and Content

Through this university specialization, students will have a solid understanding of the principles of Artificial Intelligence and will be able to effectively integrate its tools into their Clinical Research projects. To this end, the syllabus will include topics such as Intelligent Systems, Algorithmics and Machine Learning. This will enable graduates to analyze large amounts of medical data, which will be used to make highly informed decisions. In addition, the program will include disruptive modules that will delve into Neural Networks, Model Personalization or Natural Language Processing.

This university program will allow you to exercise in simulated environments, which provide immersive learning programmed to specialize in front of real situations"

Syllabus

The MBA in Artificial Intelligence in Clinical Research at TECH Global University is an intensive program that prepares students to face business challenges and decisions internationally. Its content is designed to promote the development of managerial skills that enable more rigorous decision-making in uncertain environments.

Throughout 3,600 hours of study, students will analyze a multitude of practical cases through individual work, achieving high quality learning that can be applied to their daily practice. It is, therefore, an authentic immersion in real business situations.

This program deals in depth with the main areas of Artificial Intelligence and is designed for managers to understand its application in Clinical Research from a strategic, international and innovative perspective.

A plan designed for students, focused on their professional improvement and that prepares them to achieve excellence in the field of Artificial Intelligence in Clinical Research. A program that understands your needs and those of your company through innovative content based on the latest trends, and supported by the best educational methodology and an exceptional faculty, which will provide you with the competencies to solve critical situations in a creative and efficient way.

This program is developed over 2 years and is divided into 30 modules:

Module 1	Leadership, Ethics and Social Responsibility in Companies
Module 2	*Strategic Management* and Executive Management
Module 3	People and Talent Management
Module 4	Economic and Financial Management
Module 5	Operations and Logistics Management
Module 6	Information Systems Management
Module 7	Commercial Management, Strategic Marketing and Corporate Communications
Module 8	Market Research, Advertising and Commercial Management
Module 9	Innovation and Project Management
Module 10	Executive Management
Module 11	Fundamentals of Artificial Intelligence
Module 12	Data Types and Life Cycle
Module 13	Data in Artificial Intelligence
Module 14	Data Mining: Selection, Pre-Processing and Transformation
Module 15	Algorithm and Complexity in Artificial Intelligence

Module 16	Intelligent Systems
Module 17	Machine Learning and Data Mining
Module 18	Neural networks, the basis of *Deep Learning*
Module 19	Deep Neural Networks Training
Module 20	Model Customization and Training with TensorFlow
Module 21	Deep Computer Vision with Convolutional Neural Networks
Module 22	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention
Module 23	Autoencoders, GANs, and Diffusion Models
Module 24	Bio-Inspired Computing
Module 25	Artificial Intelligence: Strategies and Applications
Module 26	Artificial Intelligence Methods and Tools for Clinical Research
Module 27	Biomedical Research with AI
Module 28	Practical Application of Artificial Intelligence in Clinical Research
Module 29	*Big Data* Analytics and Machine Learning in Clinical Research
Module 30	Ethical, Legal and Future Aspects of Artificial Intelligence in Clinical Research

Where, When and How is it Taught?

TECH offers the possibility of developing this MBA in Artificial Intelligence in Clinical Research completely online. During the 2 years of the program, students will be able to access all the contents in this program at any time, which will allow them to manage their own study time

A unique, key, and decisive educational experience to boost your professional development and make the definitive leap.

Module 1. Leadership, Ethics and Social Responsibility in Companies

1.1. Globalization and Governance
1.1.1. Governance and Corporate Governance
1.1.2. The Fundamentals of Corporate Governance in Companies
1.1.3. The Role of the Board of Directors in the Corporate Governance Framework

1.2. Leadership
1.2.1. Leadership A Conceptual Approach
1.2.2. Leadership in Companies
1.2.3. The Importance of Leaders in Business Management

1.3. Cross Cultural Management
1.3.1. Cross Cultural Management Concept
1.3.2. Contributions to Knowledge of National Cultures
1.3.3. Diversity Management

1.4. Management and Leadership Development
1.4.1. Concept of Management Development
1.4.2. Concept of Leadership
1.4.3. Leadership Theories
1.4.4. Leadership Styles
1.4.5. Intelligence in Leadership
1.4.6. The Challenges of Today's Leader

1.5. Business Ethics
1.5.1. Ethics and Morality
1.5.2. Business Ethics
1.5.3. Leadership and Ethics in Companies

1.6. Sustainability
1.6.1. Sustainability and Sustainable Development
1.6.2. The 2030 Agenda
1.6.3. Sustainable Companies

1.7. Corporate Social Responsibility
1.7.1. International Dimensions of Corporate Social Responsibility
1.7.2. Implementing Corporate Social Responsibility
1.7.3. The Impact and Measurement of Corporate Social Responsibility

1.8. Responsible Management Systems and Tools
1.8.1. CSR: Corporate Social Responsibility
1.8.2. Essential Aspects for Implementing a Responsible Management Strategy
1.8.3. Steps for the Implementation of a Corporate Social Responsibility Management System
1.8.4. CSR Tools and Standards

1.9. Multinationals and Human Rights
1.9.1. Globalization, Multinational Companies and Human Rights
1.9.2. Multinational Companies vs. International Law
1.9.3. Legal Instruments for Multinationals in the Area of Human Rights

1.10. Legal Environment and Corporate Governance
1.10.1. International Rules on Importation and Exportation
1.10.2. Intellectual and Industrial Property
1.10.3. International Labor Law

Module 2. Strategic Management and Executive Management

2.1. Organizational Analysis and Design
2.1.1. Conceptual Framework
2.1.2. Key Elements in Organizational Design
2.1.3. Basic Organizational Models
2.1.4. Organizational Design: Typologies

2.2. Corporate Strategy
2.2.1. Competitive Corporate Strategy
2.2.2. Types of Growth Strategies
2.2.3. Conceptual Framework

2.3. Strategic Planning and Strategy Formulation
2.3.1. Conceptual Framework
2.3.2. Elements of Strategic Planning
2.3.3. Strategy Formulation: Strategic Planning Process

2.4. Strategic Thinking
2.4.1. The Company as a System
2.4.2. Organization Concept

2.5. Financial Diagnosis
2.5.1. Concept of Financial Diagnosis
2.5.2. Stages of Financial Diagnosis
2.5.3. Assessment Methods for Financial Diagnosis

2.6. Planning and Strategy
2.6.1. The Plan from a Strategy
2.6.2. Strategic Positioning
2.6.3. Strategy in Companies

2.7. Strategy Models and Patterns
2.7.1. Conceptual Framework
2.7.2. Strategic Models
2.7.3. Strategic Patterns: The Five P's of Strategy

2.8. Competitive Strategy
2.8.1. The Competitive Advantage
2.8.2. Choosing a Competitive Strategy
2.8.3. Strategies Based on the Strategic Clock Model
2.8.4. Types of Strategies According to the Industrial Sector Life Cycle

2.9. Strategic Management
2.9.1. The Concept of Strategy
2.9.2. The Process of Strategic Management
2.9.3. Approaches in Strategic Management

2.10. Strategy Implementation
2.10.1. Indicator Systems and Process Approach
2.10.2. Strategic Map
2.10.3. Strategic Alignment

2.11. Executive Management
2.11.1. Conceptual Framework of Executive Management
2.11.2. Executive Management The Role of the Board of Directors and Corporate Management Tools

2.12. Strategic Communication
2.12.1. Interpersonal Communication
2.12.2. Communication Skills and Influence
2.12.3. Internal Communication
2.12.4. Barriers to Business Communication

Module 3. People and Talent Management

3.1. Organizational Behavior
3.1.1. Organizational Behavior Conceptual Framework
3.1.2. Main Factors of Organizational Behavior

3.2. People in Organizations
3.2.1. Quality of Work Life and Psychological Well-Being
3.2.2. Work Teams and Meeting Management
3.2.3. Coaching and Team Management
3.2.4. Managing Equality and Diversity

3.3. Strategic People Management
3.3.1. Strategic Human Resources Management
3.3.2. Strategic People Management

3.4. Evolution of Resources An Integrated Vision
3.4.1. The Importance of HR
3.4.2. A New Environment for People Management and Leadership
3.4.3. Strategic HR Management

3.5. Selection, Group Dynamics and HR Recruitment
3.5.1. Approach to Recruitment and Selection
3.5.2. Recruitment.
3.5.3. The Selection Process

3.6. Human Resources Management by Competencies
3.6.1. Analysis of the Potential
3.6.2. Remuneration Policy
3.6.3. Career/Succession Planning

3.7. Performance Evaluation and Compliance Management
3.7.1. Performance Management
3.7.2. Performance Management: Objectives and Process

3.8. Training Management
3.8.1. Learning Theories
3.8.2. Talent Detection and Retention
3.8.3. Gamification and Talent Management
3.8.4. Training and Professional Obsolescence

3.9. Talent Management
3.9.1. Keys for Positive Management
3.9.2. Conceptual Origin of Talent and its Implication in the Company
3.9.3. Map of Talent in the Organization
3.9.4. Cost and Added Value

3.10. Innovation in Talent and People Management
3.10.1. Strategic Talent Management Models
3.10.2. Identification, Training and Development of Talent
3.10.3. Loyalty and Retention
3.10.4. Proactivity and Innovation

3.11. Motivation
3.11.1. The Nature of Motivation
3.11.2. Expectations Theory
3.11.3. Needs Theory
3.11.4. Motivation and Financial Compensation

3.12. *Employer Branding*
3.12.1. Employer Branding in HR
3.12.2. Personal Branding for HR Professionals

3.13. Developing High Performance Teams
3.13.1. High-Performance Teams: Self-Managed Teams
3.13.2. Methodologies for the Management of High Performance Self-Managed Teams

3.14. Management Skills Development
3.14.1. What are Manager Competencies?
3.14.2. Elements of Competencies
3.14.3. Knowledge
3.14.4. Management Skills
3.14.5. Attitudes and Values in Managers
3.14.6. Managerial Skills

3.15. Time Management
3.15.1. Benefits
3.15.2. What Can be the Causes of Poor Time Management?
3.15.3. Time
3.15.4. Time Illusions
3.15.5. Attention and Memory
3.15.6. State of Mind
3.15.7. Time Management
3.15.8. Being Proactive
3.15.9. Be Clear About the Objective
3.15.10. Order
3.15.11. Planning

3.16. Change Management
3.16.1. Change Management
3.16.2. Type of Change Management Processes
3.16.3. Stages or Phases in the Change Management Process

3.17. Negotiation and Conflict Management
3.17.1. Negotiation
3.17.2. Conflicts Management
3.17.3. Crisis Management

3.18. Executive Communication
3.18.1. Internal and External Communication in the Corporate Environment
3.18.2. Communication Departments
3.18.3. The Person in Charge of Communication of the Company. The Profile of the Dircom

3.19. Human Resources Management and PRL Teams
3.19.1. Management of Human Resources and Teams
3.19.2. Prevention of Occupational Hazards

3.20. Productivity, Attraction, Retention and Activation of Talent
3.20.1. Productivity
3.20.2. Talent Attraction and Retention Levers

3.21. Monetary Compensation Vs. Non-Cash
3.21.1. Monetary Compensation Vs. Non-Cash
3.21.2. Wage Band Models
3.21.3. Non-cash Compensation Models
3.21.4. Working Model
3.21.5. Corporate Community
3.21.6. Company Image
3.21.7. Emotional Salary

3.22. Innovation in Talent and People Management II
3.22.1. Innovation in Organizations
3.22.2. New Challenges in the Human Resources Department
3.22.3. Innovation Management
3.22.4. Tools for Innovation

3.23. Knowledge and Talent Management
3.23.1. Knowledge and Talent Management
3.23.2. Knowledge Management Implementation

3.24. Transforming Human Resources in the Digital Era
3.24.1. The Socioeconomic Context
3.24.2. New Forms of Corporate Organization
3.24.3. New Methodologies

Module 4. Economic and Financial Management

4.1. Economic Environment
4.1.1. Macroeconomic Environment and the National Financial System
4.1.2. Financial Institutions
4.1.3. Financial Markets
4.1.4. Financial Assets
4.1.5. Other Financial Sector Entities

4.2. Company Financing
4.2.1. Sources of Financing
4.2.2. Types of Financing Costs

4.3. Executive Accounting
4.3.1. Basic Concepts
4.3.2. The Company's Assets
4.3.3. The Company's Liabilities
4.3.4. The Company's Net Worth
4.3.5. The Income Statement

4.4. From General Accounting to Cost Accounting
4.4.1. Elements of Cost Calculation
4.4.2. Expenses in General Accounting and Cost Accounting
4.4.3. Costs Classification

4.5. Information Systems and Business Intelligence
4.5.1. Fundamentals and Classification
4.5.2. Cost Allocation Phases and Methods
4.5.3. Choice of Cost Center and Impact

4.6. Budget and Management Control
4.6.1. The Budget Model
4.6.2. The Capital Budget
4.6.3. The Operating Budget
4.6.4. Treasury Budget
4.6.5. Budget Monitoring

4.7. Treasury Management
4.7.1. Accounting Working Capital and Necessary Working Capital
4.7.2. Calculation of Operating Requirements of Funds
4.7.3. *Credit Management*

4.8. Corporate Tax Responsibility
4.8.1. Basic Tax Concepts
4.8.2. Corporate Income Tax
4.8.3. Value Added Tax
4.8.4. Other Taxes Related to Commercial with the Mercantile Activity
4.8.5. The Company as a Facilitator of the Work of the of the State

4.9. Systems of Controlof Enterprises
4.9.1. Analysis of Financial Statements
4.9.2. The Company's Balance Sheet
4.9.3. The Profit and Loss Statement
4.9.4. The Statement of Cash Flows
4.9.5. Ratio Analysis

4.10. Financial Management
4.10.1. The Company's Financial Decisions
4.10.2. Financial Department
4.10.3. Cash Surpluses
4.10.4. Risks Associated with Financial Management
4.10.5. Financial Administration Risk Management

4.11. Financial Planning
4.11.1. Definition of Financial Planning
4.11.2. Actions to be Taken in Financial Planning
4.11.3. Creation and Establishment of the Business Strategy
4.11.4. The Cash Flow Table
4.11.5. The Working Capital Table

4.12. Corporate Financial Strategy
4.12.1. Corporate Strategy and Sources of Financing
4.12.2. Financial Products for Corporate Financing

4.13. Macroeconomic Context
4.13.1. Macroeconomic Context
4.13.2. Relevant Economic Indicators
4.13.3. Mechanisms for Monitoring of Macroeconomic Magnitudes
4.13.4. Economic Cycles

4.14. Strategic Financing
4.14.1. Self-Financing
4.14.2. Increase in Equity
4.14.3. Hybrid Resources
4.14.4. Financing Through Intermediaries

4.15. Money and Capital Markets
4.15.1. The Money Market
4.15.2. The Fixed Income Market
4.15.3. The Equity Market
4.15.4. The Foreign Exchange Market
4.15.5. The Derivatives Market

4.16. Financial Analysis and Planning
4.16.1. Analysis of the Balance Sheet
4.16.2. Analysis of the Income Statement
4.16.3. Profitability Analysis

4.17. Analysis and Resolution of Cases/Problems
4.17.1. Financial Information on Industria de Diseño y Textil, S.A. (INDITEX)

Module 5. Operations and Logistics Management

5.1. Operations Direction and Management
5.1.1. The Role of Operations
5.1.2. The Impact of Operations on the Management of Companies.
5.1.3. Introduction to Operations Strategy
5.1.4. Operations Management

5.2. Industrial Organization and Logistics
5.2.1. Industrial Organization Department
5.2.2. Logistics Department

5.3. Structure and Types of Production (MTS, MTO, ATO, ETO, etc)
5.3.1. Production System
5.3.2. Production Strategy
5.3.3. Inventory Management System
5.3.4. Production Indicators

5.4. Structure and Types of Procurement
5.4.1. Function of Procurement
5.4.2. Procurement Management
5.4.3. Types of Purchases
5.4.4. Efficient Purchasing Management of a Company
5.4.5. Stages of the Purchase Decision Process

5.5. Economic Control of Purchasing
5.5.1. Economic Influence of Purchases
5.5.2. Cost Centers
5.5.3. Budget
5.5.4. Budgeting vs. Actual Expenditure
5.5.5. Budgetary Control Tools

5.6. Warehouse Operations Control
5.6.1. Inventory Control
5.6.2. Location Systems
5.6.3. Stock Management Techniques
5.6.4. Storage Systems

5.7. Strategic Purchasing Management
5.7.1. Business Strategy
5.7.2. Strategic Planning
5.7.3. Purchasing Strategies

5.8. Typologies of the Supply Chain (SCM)
5.8.1. Supply Chain
5.8.2. Benefits of Supply Chain Management
5.8.3. Logistical Management in the Supply Chain

5.9. Supply Chain Management
5.9.1. The Concept of Management of the Supply Chain (SCM)
5.9.2. Supply Chain Costs and Efficiency
5.9.3. Demand Patterns
5.9.4. Operations Strategy and Change

5.10. Interactions Between the SCM and All Other Departments
5.10.1. Interaction of the Supply Chain
5.10.2. Interaction of the Supply Chain. Integration by Parts
5.10.3. Supply Chain Integration Problems
5.10.4. Supply Chain

5.11. Logistics Costs
5.11.1. Logistics Costs
5.11.2. Problems with Logistics Costs
5.11.3. Optimizing Logistic Costs

5.12. Profitability and Efficiency of Logistics Chains: KPIS
5.12.1. Logistics Chain
5.12.2. Profitability and Efficiency of the Logistics Chain
5.12.3. Indicators of Profitability and Efficiency of the Supply Chain

5.13. Process Management
5.13.1. Process Management
5.13.2. Process-Based Approach: Process Mapping
5.13.3. Improvements in Process Management

5.14. Distribution and Transportation and Logistics
5.14.1. Distribution in the Supply Chain
5.14.2. Transportation Logistics
5.14.3. Geographic Information Systems as a Support to Logistics

5.15. Logistics and Customers
5.15.1. Demand Analysis
5.15.2. Demand and Sales Forecast
5.15.3. Sales and Operations Planning
5.15.4. Participatory Planning, Forecasting and and Replenishment Planning (CPFR)

5.16. International Logistics
5.16.1. Export and Import Processes
5.16.2. Customs
5.16.3. Methods and Means of International Payment
5.16.4. International Logistics Platforms

5.17. Outsourcing of Operations
5.17.1. Operations Management and Outsourcing
5.17.2. Outsourcing Implementation in Logistics Environments

5.18. Competitiveness in Operations
5.18.1. Operations Management
5.18.2. Operational Competitiveness
5.18.3. Operations Strategy and Competitive Advantages

5.19. Quality Management
5.19.1. Internal and External Customers
5.19.2. Quality Costs
5.19.3. Ongoing Improvement and the Deming Philosophy

Module 6. Information Systems Management

6.1. Technological Environment
6.1.1. Technology and Globalization
6.1.2. Economic Environment and Technology
6.1.3. Technological Environment and its Impact on Companies

6.2. Information Systems and Technologies in the Enterprise
6.2.1. The Evolution of the IT Model
6.2.2. Organization and IT Departments
6.2.3. Information Technology and Economic Environment

6.3. Corporate Strategy and Technology Strategy
6.3.1. Creating Value for Customers and Shareholders
6.3.2. Strategic IS/IT Decisions
6.3.3. Corporate Strategy Vs. Technology and Digital Strategy

6.4. Information Systems Management
6.4.1. Corporate Governance of Technology and Information Systems
6.4.2. Management of Information Systems in Companies
6.4.3. Expert Managers in Information Systems: Roles and Functions

6.5. Information Technology Strategic Planning
6.5.1. Information Systems and Corporate Strategy
6.5.2. Strategic Planning of Information Systems
6.5.3. Phases of Information Systems Strategic Planning

6.6. Information Systems for Decision-Making
6.6.1. Business Intelligence
6.6.2. Data Warehouse
6.6.3. BSC or Balanced Scorecard

6.7. Exploring the Information
6.7.1. SQL: Relational Databases Basic Concepts
6.7.2. Networks and Communications
6.7.3. Operational System: Standardized Data Models
6.7.4. Strategic System: OLAP, Multidimensional Model and Graphical Dashboards
6. 7.5. Strategic DB Analysis and Report Composition

6.8. Enterprise Business Intelligence
6.8.1. The World of Data
6.8.2. Relevant Concepts
6.8.3. Main Characteristics
6.8.4. Solutions in Today's Market
6.8.5. Overall Architecture of a BI Solution
6.8.6. Cybersecurity in BI and Data Science

6.9. New Business Concept
6.9.1. Why BI
6.9.2. Obtaining Information
6.9.3. BI in the Different Departments of the Company
6.9.4. Reasons to Invest in BI

6.10. BI Tools and Solutions
6.10.1. How to Choose the Best Tool?
6.10.2. Microsoft Power BI, MicroStrategy y Tableau
6.10.3. SAP BI, SAS BI and Qlikview
6.10.4. Prometheus

6.11. BI Project Planning and Management
6.11.1. First Steps to Define a BI Project
6.11.2. BI Solution for the Company
6.11.3. Requirements and Objectives

6.12. Corporate Management Applications
6.12.1. Information Systems and Corporate Management
6.12.2. Applications for Corporate Management
6.12.3. Enterprise Resource Planning or ERP Systems

6.13. Digital Transformation
6.13.1. Conceptual Framework of Digital Transformation
6.13.2. Digital Transformation; Key Elements, Benefits and Drawbacks
6.13.3. Digital Transformation in Companies

6.14. Technology and Trends
6.14.1. Main Trends in the Field of Technology that are Changing Business Models
6.14.2. Analysis of the Main Emerging Technologies

6.15. IT Outsourcing
6.15.1. Conceptual Framework of Outsourcing
6.15.2. IT Outsourcing and its Impact on the Business
6.15.3. Keys to Implement Corporate IT Outsourcing Projects

Module 7. Commercial Management, Strategic Marketing and Corporate Communication

7.1. Commercial Management
7.1.1. Conceptual Framework of Commercial Management
7.1.2. Business Strategy and Planning
7.1.3. The Role of Sales Managers

7.2. Marketing
7.2.1. The Concept of Marketing
7.2.2. Basic Elements of Marketing
7.2.3. Marketing Activities of the Company

7.3. Strategic Marketing Management
7.3.1. The Concept of Strategic Marketing
7.3.2. Concept of Strategic Marketing Planning
7.3.3. Stages in the Process of Strategic Marketing Planning

7.4. Digital Marketing and E-Commerce
7.4.1. Digital Marketing and E-Commerce Objectives
7.4.2. Digital Marketing and Media Used
7.4.3. E-Commerce General Context
7.4.4. Categories of E-Commerce
7.4.5. Advantages and Disadvantages of E-Commerce Versus Traditional Commerce.

7.5. Managing Digital Business
7.5.1. Competitive Strategy in the Face of the Growing Digitalization of the Media
7.5.2. Design and Creation of a Digital Marketing Plan
7.5.3. ROI Analysis in a Digital Marketing Plan

7.6. Digital Marketing to Reinforce the Brand
7.6.1. Online Strategies to Improve Your Brand's Reputation
7.6.2. Branded Content and Storytelling

7.7. Digital Marketing Strategy
7.7.1. Defining the Digital Marketing Strategy
7.7.2. Digital Marketing Strategy Tools

7.8. Digital Marketing to Attract and Retain Customers
7.8.1. Loyalty and Engagement Strategies Through the Internet
7.8.2. *Visitor Relationship Management*
7.8.3. Hypersegmentation

7.9. Managing Digital Campaigns
7.9.1. What is a Digital Advertising Campaign?
7.9.2. Steps to Launch an Online Marketing Campaign
7.9.3. Mistakes in Digital Advertising Campaigns

7.10. Online Marketing Plan
7.10.1. What is an Online Marketing Plan?
7.10.2. Steps to Create an Online Marketing Plan
7.10.3. Advantages of Having an Online Marketing Plan

7.11. Blended Marketing
7.11.1. What is Blended Marketing?
7.11.2. Differences Between Online and Offline Marketing
7.11.3. Aspects to be Taken into Account in the Blended Marketing Strategy
7.11.4. Characteristics of a Blended Marketing Strategy
7.11.5. Recommendations in Blended Marketing
7.11.6. Benefits of Blended Marketing

7.12. Sales Strategy
7.12.1. Sales Strategy
7.12.2. Sales Methods

7.13. Corporate Communication
7.13.1. Concept
7.13.2. The Importance of Communication in the Organization
7.13.3. Type of Communication in the Organization
7.13.4. Functions of Communication in the Organization
7.13.5. Elements of Communication
7.13.6. Communication Problems
7.13.7. Communication Scenarios

7.14. Corporate Communication Strategy
7.14.1. Motivational Programs, Social Action, Participation and Training with HR
7.14.2. Internal Communication Tools and Supports
7.14.3. Internal Communication Plan

7.15. Digital Communication and Reputation
7.15.1. Online Reputation
7.15.2. How to Measure Digital Reputation?
7.15.3. Online Reputation Tools
7.15.4. Online Reputation Report
7.15.5. Online Branding

Module 8. Market Research, Advertising and Commercial Management

8.1. Market Research
8.1.1. Marketing Research: Historical Origin
8.1.2. Analysis and Evolution of the Conceptual Framework of Marketing Research
8.1.3. Key Elements and Value Contribution of Market Research

8.2. Quantitative Research Methods and Techniques
8.2.1. Sample Size
8.2.2. Sampling
8.2.3. Types of Quantitative Techniques

8.3. Qualitative Research Methods and Techniques
8.3.1. Types of Qualitative Research
8.3.2. Qualitative Research Techniques

8.4. Market Segmentation
8.4.1. Market Segmentation Concept
8.4.2. Utility and Segmentation Requirements
8.4.3. Consumer Market Segmentation
8.4.4. Industrial Market Segmentation
8.4.5. Segmentation Strategies
8.4.6. Segmentation Based on Marketing - Mix Criteria
8.4.7. Market Segmentation Methodology

8.5. Research Project Management
8.5.1. Market Research as a Process
8.5.2. Planning Stages in Market Research
8.5.3. Stages of Market Research Implementation
8.5.4. Managing a Research Project

8.6. International Market Research
8.6.1. International Market Research
8.6.2. International Market Research Process
8.6.3. The Importance of Secondary Sources in International Market Research

8.7. Feasibility Studies
8.7.1. Concept and Usefulness
8.7.2. Outline of a Feasibility Study
8.7.3. Development of a Feasibility Study

8.8. Publicity
8.8.1. Historical Background of Advertising
8.8.2. Conceptual Framework of Advertising; Principles, Concept of Briefing and Positioning
8.8.3. Advertising Agencies, Media Agencies and Advertising Professionals
8.8.4. Importance of Advertising in Business
8.8.5. Advertising Trends and Challenges

8.9. Developing the Marketing Plan
8.9.1. Marketing Plan Concept
8.9.2. Situation Analysis and Diagnosis
8.9.3. Strategic Marketing Decisions
8.9.4. Operational Marketing Decisions

8.10. Promotion and Merchandising Strategies
8.10.1. Integrated Marketing Communication
8.10.2. Advertising Communication Plan
8.10.3. Merchandising as a Communication Technique

8.11. Media Planning
8.11.1. Origin and Evolution of Media Planning
8.11.2. Media
8.11.3. Media Plan

8.12. Fundamentals of Commercial Management
8.12.1. The Role of Commercial Management
8.12.2. Systems of Analysis of the Company/Market Commercial Competitive Situation
8.12.3. Commercial Planning Systems of the Company
8.12.4. Main Competitive Strategies

8.13. Commercial Negotiation
8.13.1. Commercial Negotiation
8.13.2. Psychological Issues in Negotiation
8.13.3. Main Negotiation Methods
8.13.4. The Negotiation Process

8.14. Decision-Making in Commercial Management
8.14.1. Commercial Strategy and Competitive Strategy
8.14.2. Decision Making Models
8.14.3. Decision-Making Analytics and Tools
8.14.4. Human Behavior in Decision Making

8.15. Leadership and Management of the Sales Network
8.15.1. Sales Management Sales Management
8.15.2. Networks Serving Commercial Activity
8.15.3. Salesperson Recruitment and Training Policies
8.15.4. Remuneration Systems for Own and External Commercial Networks
8.15.5. Management of the Commercial Process Control and Assistance to the Work of the Sales Representatives Based on the Information

8.16. Implementing the Commercial Function
8.16.1. Recruitment of Own Sales Representatives and Sales Agents
8.16.2. Controlling Commercial Activity
8.16.3. The Code of Ethics of Sales Personnel
8.16.4. Compliance with Legislation
8.16.5. Generally Accepted Standards of Business Conduct

8.17. Key Account Management
8.17.1. Concept of Key Account Management
8.17.2. The Key Account Manager
8.17.3. Key Account Management Strategy

8.18. Financial and Budgetary Management
8.18.1. The Break-Even Point
8.18.2. The Sales Budget Control of Management and of the Annual Sales Plan
8.18.3. Financial Impact of Strategic Sales Decisions
8.18.4. Cycle Management, Turnover, Profitability and Liquidity
8.18.5. Income Statement

Module 9. Innovation and Project Management

9.1. Innovation
9.1.1. Introduction to Innovation
9.1.2. Innovation in the Entrepreneurial Ecosystem
9.1.3. Instruments and Tools for the Business Innovation Process

9.2. Innovation Strategy
9.2.1. Strategic Intelligence and Innovation
9.2.2. Innovation from Strategy

9.3. *Project Management* for *Startups*
9.3.1. Startup Concept
9.3.2. Lean Startup Philosophy
9.3.3. Stages of Startup Development
9.3.4. The Role of a Project Manager in a Startup

9.4. Business Model Design and Validation
9.4.1. Conceptual Framework of a Business Model
9.4.2. Business Model Design and Validation

9.5. Project Management
9.5.1. Project Management: Identification of Opportunities to Develop Corporate Innovation Projects
9.5.2. Main stages or Phases in the Direction and Management of Innovation Projects

9.6. Project Change Management: Training Management
9.6.1. Concept of Change Management
9.6.2. The Change Management Process
9.6.3. Change Implementation

9.7. Project Communication Management
9.7.1. Project Communications Management
9.7.2. Key Concepts for Project Communications Management
9.7.3. Emerging Trends
9.7.4. Adaptations to Equipment
9.7.5. Planning Communications Management
9.7.6. Manage Communications
9.7.7. Monitoring Communications

9.8. Traditional and Innovative Methodologies
9.8.1. Innovative Methodologies
9.8.2. Basic Principles of Scrum
9.8.3. Differences between the Main Aspects of Scrum and Traditional Methodologies

9.9. Creation of a Startup
9.9.1. Creation of a Startup
9.9.2. Organization and Culture
9.9.3. Top Ten Reasons Why Startups Fail
9.9.4. Legal Aspects

9.10. Project Risk Management Planning
9.10.1. Risk Planning
9.10.2. Elements for Creating a Risk Management Plan
9.10.3. Tools for Creating a Risk Management Plan
9.10.4. Content of the Risk Management Plan

Module 10. Executive Management

10.1. General Management
10.1.1. The Concept of General Management
10.1.2. The General Manager's Action
10.1.3. The CEO and their Responsibilities
10.1.4. Transforming the Work of Management

10.2. Manager Functions: Organizational Culture and Approaches
10.2.1. Manager Functions: Organizational Culture and Approaches

10.3. Operations Management
10.3.1. The Importance of Management
10.3.2. Value Chain
10.3.3. Quality Management

10.4. Public Speaking and Spokesperson Education
10.4.1. Interpersonal Communication
10.4.2. Communication Skills and Influence
10.4.3. Communication Barriers

10.5. Personal and Organizational Communications Tools
10.5.1. Interpersonal Communication
10.5.2. Interpersonal Communication Tools
10.5.3. Communication in the Organization
10.5.4. Tools in the Organization

10.6. Communication in Crisis Situations
10.6.1. Crisis
10.6.2. Phases of the Crisis
10.6.3. Messages: Contents and Moments

10.7. Preparation of a Crisis Plan
10.7.1. Analysis of Possible Problems
10.7.2. Planning
10.7.3. Adequacy of Personnel

10.8. Emotional Intelligence
10.8.1. Emotional Intelligence and Communication
10.8.2. Assertiveness, Empathy, and Active Listening
10.8.3. Self-Esteem and Emotional Communication

10.9. Personal Branding
10.9.1. Strategies to Develop Personal Branding
10.9.2. Personal Branding Laws
10.9.3. Tools for Creating Personal Brands

10.10. Leadership and Team Management
10.10.1. Leadership and Leadership Styles
10.10.2. Leader Capabilities and Challenges
10.10.3. Managing Change Processes
10.10.4. Managing Multicultural Teams

Module 11. Fundamentals of Artificial Intelligence

11.1. History of Artificial Intelligence
11.1.1. When Do We Start Talking About Artificial Intelligence?
11.1.2. References in Film
11.1.3. Importance of Artificial Intelligence
11.1.4. Technologies that Enable and Support Artificial Intelligence

11.2. Artificial Intelligence in Games
11.2.1. Game Theory
11.2.2. Minimax and Alpha-Beta Pruning
11.2.3. Simulation: Monte Carlo

11.3. Neural Networks
11.3.1. Biological Fundamentals
11.3.2. Computational Model
11.3.3. Supervised and Unsupervised Neural Networks
11.3.4. Simple Perceptron
11.3.5. Multilayer Perceptron

11.4. Genetic Algorithms
11.4.1. History
11.4.2. Biological Basis
11.4.3. Problem Coding
11.4.4. Generation of the Initial Population
11.4.5. Main Algorithm and Genetic Operators
11.4.6. Evaluation of Individuals: Fitness

11.5. Thesauri, Vocabularies, Taxonomies
11.5.1. Vocabulary
11.5.2. Taxonomy
11.5.3. Thesauri
11.5.4. Ontologies
11.5.5. Knowledge Representation Semantic Web

11.6. Semantic Web
11.6.1. Specifications RDF, RDFS and OWL
11.6.2. Inference/ Reasoning
11.6.3. *Linked Data*

11.7. Expert Systems and DSS
11.7.1. Expert Systems
11.7.2. Decision Support Systems

11.8. Chatbots and Virtual Assistants
11.8.1. Types of Assistants: Voice and Text Assistants
11.8.2. Fundamental Parts for the Development of an Assistant: Intents, Entities and Dialogue Flow
11.8.3. Integrations: Web, Slack, WhatsApp, Facebook
11.8.4. Assistant Development Tools: *Dialog Flow, Watson Assistant*

11.9. AI Implementation Strategy

11.10. Future of Artificial Intelligence
11.10.1. Understand How to Detect Emotions Using Algorithms
11.10.2. Creating a Personality: Language, Expressions and Content
11.10.3. Trends of Artificial Intelligence
11.10.4. Reflections

Module 12. Data Types and Life Cycle

12.1. Statistics
12.1.1. Statistics: Descriptive Statistics, Statistical Inferences
12.1.2. Population, Sample, Individual
12.1.3. Variables: Definition, Measurement Scales

12.2. Types of Data Statistics
12.2.1. According to Type
  12.2.1.1. Quantitative: Continuous Data and Discrete Data
  12.2.1.2. Qualitative. Binomial Data, Nominal Data and Ordinal Data
12.2.2. According to their Shape
  12.2.2.1. Numeric
  12.2.2.2. Text:
  12.2.2.3. Logical
12.2.3. According to its Source
  12.2.3.1. Primary
  12.2.3.2. Secondary

12.3. Life Cycle of Data
12.3.1. Stages of the Cycle
12.3.2. Milestones of the Cycle
12.3.3. FAIR Principles

12.4. Initial Stages of the Cycle
12.4.1. Definition of Goals
12.4.2. Determination of Resource Requirements
12.4.3. Gantt Chart
12.4.4. Data Structure

12.5. Data Collection
12.5.1. Methodology of Data Collection
12.5.2. Data Collection Tools
12.5.3. Data Collection Channels

12.6. Data Cleaning
12.6.1. Phases of Data Cleansing
12.6.2. Data Quality
12.6.3. Data Manipulation (with R)

12.7. Data Analysis, Interpretation and Result Evaluation
12.7.1. Statistical Measures
12.7.2. Relationship Indexes
12.7.3. Data Mining

12.8. Datawarehouse
12.8.1. Elements that Comprise it
12.8.2. Design
12.8.3. Aspects to Consider

12.9. Data Availability
12.9.1. Access
12.9.2. Uses
12.9.3. Security

12.10. Regulatory Framework
12.10.1. Data Protection Law
12.10.2. Good Practices
12.10.3. Other Regulatory Aspects

Module 13. Data in Artificial Intelligence

13.1. Data Science
13.1.1. Data Science
13.1.2. Advanced Tools for the Data Scientist

13.2. Data, Information and Knowledge
13.2.1. Data, Information and Knowledge
13.2.2. Types of Data
13.2.3. Data Sources

13.3. From Data to Information
13.3.1. Data Analysis
13.3.2. Types of Analysis
13.3.3. Extraction of Information from a Dataset

13.4. Extraction of Information Through Visualization
13.4.1. Visualization as an Analysis Tool
13.4.2. Visualization Methods
13.4.3. Visualization of a Data Set

13.5. Data Quality
13.5.1. Quality Data
13.5.2. Data Cleaning
13.5.3. Basic Data Pre-Processing

13.6. Dataset
13.6.1. Dataset Enrichment
13.6.2. The Curse of Dimensionality
13.6.3. Modification of Our Data Set

13.7. Unbalance
13.7.1. Classes of Unbalance
13.7.2. Unbalance Mitigation Techniques
13.7.3. Balancing a Dataset

13.8. Unsupervised Models
13.8.1. Unsupervised Model
13.8.2. Methods
13.8.3. Classification with Unsupervised Models

13.9. Supervised Models
13.9.1. Supervised Model
13.9.2. Methods
13.9.3. Classification with Supervised Models

13.10. Tools and Good Practices
13.10.1. Good Practices for Data Scientists
13.10.2. The Best Model
13.10.3. Useful Tools

Module 14. Data Mining Selection, Pre-Processing and Transformation

14.1. Statistical Inference
14.1.1. Descriptive Statistics vs. Statistical Inference
14.1.2. Parametric Procedures
14.1.3. Non-Parametric Procedures

14.2. Exploratory Analysis
14.2.1. Descriptive Analysis
14.2.2. Visualization
14.2.3. Data Preparation

14.3. Data Preparation
14.3.1. Integration and Data Cleaning
14.3.2. Normalization of Data
14.3.3. Transforming Attributes

14.4. Missing Values
14.4.1. Treatment of Missing Values
14.4.2. Maximum Likelihood Imputation Methods
14.4.3. Missing Value Imputation Using Machine Learning

14.5. Noise in the Data
14.5.1. Noise Classes and Attributes
14.5.2. Noise Filtering
14.5.3. The Effect of Noise

14.6. The Curse of Dimensionality
14.6.1. *Oversampling*
14.6.2. *Undersampling*
14.6.3. Multidimensional Data Reduction

14.7. From Continuous to Discrete Attributes
14.7.1. Continuous Data Vs. Discreet Data
14.7.2. Discretization Process

14.8. The Data
14.8.1. Data Selection
14.8.2. Prospects and Selection Criteria
14.8.3. Selection Methods

14.9. Instance Selection
14.9.1. Methods for Instance Selection
14.9.2. Prototype Selection
14.9.3. Advanced Methods for Instance Selection

14.10. Data Pre-Processing in *Big Data* Environments

Module 15. Algorithm and Complexity in Artificial Intelligence

15.1. Introduction to Algorithm Design Strategies
15.1.1. Recursion
15.1.2. Divide and Conquer
15.1.3. Other Strategies

15.2. Efficiency and Analysis of Algorithms
15.2.1. Efficiency Measures
15.2.2. Measuring the Size of the Input
15.2.3. Measuring Execution Time
15.2.4. Worst, Best and Average Case
15.2.5. Asymptotic Notation
15.2.6. Criteria for Mathematical Analysis of Non-Recursive Algorithms
15.2.7. Mathematical Analysis of Recursive Algorithms
15.2.8. Empirical Analysis of Algorithms

15.3. Sorting Algorithms
15.3.1. Concept of Sorting
15.3.2. Bubble Sorting
15.3.3. Sorting by Selection
15.3.4. Sorting by Insertion
15.3.5. Merge Sort
15.3.6. Quick Sort

15.4. Algorithms with Trees
15.4.1. Tree Concept
15.4.2. Binary Trees
15.4.3. Tree Paths
15.4.4. Representing Expressions
15.4.5. Ordered Binary Trees
15.4.6. Balanced Binary Trees

15.5. Algorithms Using Heaps
15.5.1. Heaps
15.5.2. The Heapsort Algorithm
15.5.3. Priority Queues

15.6. Graph Algorithms
15.6.1. Representation
15.6.2. Traversal in Width
15.6.3. Depth Travel
15.6.4. Topological Sorting

15.7. Greedy Algorithms
15.7.1. Greedy Strategy
15.7.2. Elements of the Greedy Strategy
15.7.3. Currency Exchange
15.7.4. Traveler's Problem
15.7.5. Backpack Problem

15.8. Minimal Path Finding
15.8.1. The Minimum Path Problem
15.8.2. Negative Arcs and Cycles
15.8.3. Dijkstra's Algorithm

15.9. Greedy Algorithms on Graphs
15.9.1. The Minimum Covering Tree
15.9.2. Prim's Algorithm
15.9.3. Kruskal's Algorithm
15.9.4. Complexity Analysis

15.10. Backtracking
15.10.1. Backtracking
15.10.2. Alternative Techniques

Module 16. Intelligent Systems

16.1. Agent Theory
16.1.1. Concept History
16.1.2. Agent Definition
16.1.3. Agents in Artificial Intelligence
16.1.4. Agents in Software Engineering

16.2. Agent Architectures
16.2.1. The Reasoning Process of an Agent
16.2.2. Reactive Agents
16.2.3. Deductive Agents
16.2.4. Hybrid Agents
16.2.5. Comparison

16.3. Information and Knowledge
16.3.1. Difference between Data, Information and Knowledge
16.3.2. Data Quality Assessment
16.3.3. Data Collection Methods
16.3.4. Information Acquisition Methods
16.3.5. Knowledge Acquisition Methods

16.4. Knowledge Representation
16.4.1. The Importance of Knowledge Representation
16.4.2. Definition of Knowledge Representation According to Roles
16.4.3. Knowledge Representation Features

16.5. Ontologies
16.5.1. Introduction to Metadata
16.5.2. Philosophical Concept of Ontology
16.5.3. Computing Concept of Ontology
16.5.4. Domain Ontologies and Higher-Level Ontologies
16.5.5. How to Build an Ontology?

16.6. Ontology Languages and Ontology Creation Software
16.6.1. Triple RDF, Turtle and N
16.6.2. RDF Schema
16.6.3. OWL
16.6.4. SPARQL
16.6.5. Introduction to Ontology Creation Tools
16.6.6. Installing and Using Protégé

16.7. Semantic Web
16.7.1. Current and Future Status of the Semantic Web
16.7.2. Semantic Web Applications

16.8. Other Knowledge Representation Models
16.8.1. Vocabulary
16.8.2. Global Vision
16.8.3. Taxonomy
16.8.4. Thesauri
16.8.5. Folksonomy
16.8.6. Comparison
16.8.7. Mind Maps

16.9. Knowledge Representation Assessment and Integration
16.9.1. Zero-Order Logic
16.9.2. First-Order Logic
16.9.3. Descriptive Logic
16.9.4. Relationship between Different Types of Logic
16.9.5. Prolog: Programming Based on First-Order Logic

16.10. Semantic Reasoners, Knowledge-Based Systems and Expert Systems
16.10.1. Concept of Reasoner
16.10.2. Reasoner Applications
16.10.3. Knowledge-Based Systems
16.10.4. MYCIN: History of Expert Systems
16.10.5. Expert Systems Elements and Architecture
16.10.6. Creating Expert Systems

Module 17. Machine Learning and Data Mining

17.1. Introduction to Knowledge Discovery Processes and Basic Concepts of Machine Learning
17.1.1. Key Concepts of Knowledge Discovery Processes
17.1.2. Historical Perspective of Knowledge Discovery Processes
17.1.3. Stages of the Knowledge Discovery Processes
17.1.4. Techniques Used in Knowledge Discovery Processes
17.1.5. Characteristics of Good Machine Learning Models
17.1.6. Types of Machine Learning Information
17.1.7. Basic Learning Concepts
17.1.8. Basic Concepts of Unsupervised Learning

17.2. Data Exploration and Pre-Processing
17.2.1. Data Processing
17.2.2. Data Processing in the Data Analysis Flow
17.2.3. Types of Data
17.2.4. Data Transformations
17.2.5. Visualization and Exploration of Continuous Variables
17.2.6. Visualization and Exploration of Categorical Variables
17.2.7. Correlation Measures
17.2.8. Most Common Graphic Representations
17.2.9. Introduction to Multivariate Analysis and Dimensionality Reduction

17.3. Decision Trees
17.3.1. ID Algorithm
17.3.2. Algorithm C
17.3.3. Overtraining and Pruning
17.3.4. Result Analysis

17.4. Evaluation of Classifiers
17.4.1. Confusion Matrixes
17.4.2. Numerical Evaluation Matrixes
17.4.3. Kappa Statistic
17.4.4. ROC Curves

17.5. Classification Rules
17.5.1. Rule Evaluation Measures
17.5.2. Introduction to Graphic Representation
17.5.3. Sequential Overlay Algorithm

17.6. Neural Networks
17.6.1. Basic Concepts
17.6.2. Simple Neural Networks
17.6.3. Backpropagation Algorithm
17.6.4. Introduction to Recurrent Neural Networks

17.7. Bayesian Methods
17.7.1. Basic Probability Concepts
17.7.2. Bayes' Theorem
17.7.3. Naive Bayes
17.7.4. Introduction to Bayesian Networks

17.8. Regression and Continuous Response Models
17.8.1. Simple Linear Regression
17.8.2. Multiple Linear Regression
17.8.3. Logistic Regression
17.8.4. Regression Trees
17.8.5. Introduction to Support Vector Machines (SVM)
17.8.6. Goodness-of-Fit Measures

17.9. Clustering
17.9.1. Basic Concepts
17.9.2. Hierarchical Clustering
17.9.3. Probabilistic Methods
17.9.4. EM Algorithm
17.9.5. B-Cubed Method
17.9.6. Implicit Methods

17.10. Text Mining and Natural Language Processing (NLP)
17.10.1. Basic Concepts
17.10.2. Corpus Creation
17.10.3. Descriptive Analysis
17.10.4. Introduction to Feelings Analysis

Module 18. Neural Networks, the Basis of Deep Learning

18.1. Deep Learning
18.1.1. Types of Deep Learning
18.1.2. Applications of Deep Learning
18.1.3. Advantages and Disadvantages of Deep Learning

18.2. Surgery
18.2.1. Sum
18.2.2. Product
18.2.3. Transfer

18.3. Layers
18.3.1. Input Layer
18.3.2. Cloak
18.3.3. Output Layer

18.4. Layer Bonding and Operations
18.4.1. Architecture Design
18.4.2. Connection between Layers
18.4.3. Forward Propagation

18.5. Construction of the First Neural Network
18.5.1. Network Design
18.5.2. Establish the Weights
18.5.3. Network Training

18.6. Trainer and Optimizer
18.6.1. Optimizer Selection
18.6.2. Establishment of a Loss Function
18.6.3. Establishing a Metric

18.7. Application of the Principles of Neural Networks
18.7.1. Activation Functions
18.7.2. Backward Propagation
18.7.3. Parameter Adjustment

18.8. From Biological to Artificial Neurons
18.8.1. Functioning of a Biological Neuron
18.8.2. Transfer of Knowledge to Artificial Neurons
18.8.3. Establish Relations Between the Two

18.9. Implementation of MLP (Multilayer Perceptron) with Keras
18.9.1. Definition of the Network Structure
18.9.2. Model Compilation
18.9.3. Model Training

18.10. Fine Tuning Hyperparameters of Neural Networks
18.10.1. Selection of the Activation Function
18.10.2. Set the Learning Rate
18.10.3. Adjustment of Weights

Module 19. Deep Neural Networks Training

19.1. Gradient Problems
19.1.1. Gradient Optimization Techniques
19.1.2. Stochastic Gradients
19.1.3. Weight Initialization Techniques

19.2. Reuse of Pre-Trained Layers
19.2.1. Learning Transfer Training
19.2.2. Feature Extraction
19.2.3. Deep Learning

19.3. Optimizers
19.3.1. Stochastic Gradient Descent Optimizers
19.3.2. Optimizers Adam and RMSprop
19.3.3. Moment Optimizers

19.4. Programming of the Learning Rate
19.4.1. Automatic Learning Rate Control
19.4.2. Learning Cycles
19.4.3. Smoothing Terms

19.5. Overfitting
19.5.1. Cross Validation
19.5.2. Regularization
19.5.3. Evaluation Metrics

19.6. Practical Guidelines
19.6.1. Model Design
19.6.2. Selection of Metrics and Evaluation Parameters
19.6.3. Hypothesis Testing

19.7. Transfer Learning
19.7.1. Learning Transfer Training
19.7.2. Feature Extraction
19.7.3. Deep Learning

19.8. Data Augmentation
19.8.1. Image Transformations
19.8.2. Synthetic Data Generation
19.8.3. Text Transformation

19.9. Practical Application of Transfer Learning
19.9.1. Learning Transfer Training
19.9.2. Feature Extraction
19.9.3. Deep Learning

19.10. Regularization
19.10.1. L and L
19.10.2. Regularization by Maximum Entropy
19.10.3. *Dropout*

Module 20. Model Customization and Training with TensorFlow

20.1. TensorFlow
20.1.1. Use of the TensorFlow Library
20.1.2. Model Training with TensorFlow
20.1.3. Operations with Graphs in TensorFlow

20.2. TensorFlow and NumPy
20.2.1. NumPy Computing Environment for TensorFlow
20.2.2. Using NumPy Arrays with TensorFlow
20.2.3. NumPy Operations for TensorFlow Graphs

20.3. Model Customization and Training Algorithms
20.3.1. Building Custom Models with TensorFlow
20.3.2. Management of Training Parameters
20.3.3. Use of Optimization Techniques for Training

20.4. TensorFlow Features and Graphs
20.4.1. Functions with TensorFlow
20.4.2. Use of Graphs for Model Training
20.4.3. Grap Optimization with TensorFlow Operations

20.5. Loading and Preprocessing Data with TensorFlow
20.5.1. Loading Data Sets with TensorFlow
20.5.2. Preprocessing Data with TensorFlow
20.5.3. Using TensorFlow Tools for Data Manipulation

20.6. The Tf.data API
20.6.1. Using the Tf.data API for Data Processing
20.6.2. Construction of Data Streams with Tf.data
20.6.3. Using the Tf.data API for Model Training

20.7. The TFRecord Format
20.7.1. Using the TFRecord API for Data Serialization
20.7.2. TFRecord File Upload with TensorFlow
20.7.3. Using TFRecord Files for Model Training

20.8. Keras Preprocessing Layers
20.8.1. Using the Keras Preprocessing API
20.8.2. Preprocessing Pipelined Construction with Keras
20.8.3. Using the Keras Preprocessing API for Model Training

20.9. The TensorFlow Datasets Project
20.9.1. Using TensorFlow Datasets for Data Loading
20.9.2. Preprocessing Data with TensorFlow Datasets
20.9.3. Using TensorFlow Datasets for Model Training

20.10. Building a Deep Learning App with TensorFlow
20.10.1. Practical Applications
20.10.2. Building a Deep Learning App with TensorFlow
20.10.3. Model Training with TensorFlow
20.10.4. Use of the Application for the Prediction of Results

Module 21. *Deep Computer Vision* with Convolutional Neural Networks

21.1. The Visual Cortex Architecture
21.1.1. Functions of the Visual Cortex
21.1.2. Theories of Computational Vision
21.1.3. Models of Image Processing

21.2. Convolutional Layers
21.2.1. Reuse of Weights in Convolution
21.2.2. Convolution D
21.2.3. Activation Functions

21.3. Grouping Layers and Implementation of Grouping Layers with Keras
21.3.1. Pooling and Striding
21.3.2. *Flattening*
21.3.3. Types of Pooling

21.4. CNN Architecture
21.4.1. VGG Architecture
21.4.2. AlexNet Architecture
21.4.3. ResNet Architecture

21.5. Implementing a CNN ResNet using Keras
21.5.1. Weight Initialization
21.5.2. Input Layer Definition
21.5.3. Output Definition

21.6. Use of Pre-Trained Keras Models
21.6.1. Characteristics of Pre-Trained Models
21.6.2. Uses of Pre-Trained Models
21.6.3. Advantages of Pre-Trained Models

21.7. Pre-Trained Models for Transfer Learning
21.7.1. Learning by Transfer
21.7.2. Transfer Learning Process
21.7.3. Advantages of Transfer Learning

21.8. Deep Computer Vision Classification and Localization
21.8.1. Image Classification
21.8.2. Localization of Objects in Images
21.8.3. Object Detection

21.9. Object Detection and Object Tracking
21.9.1. Object Detection Methods
21.9.2. Object Tracking Algorithms
21.9.3. Tracking and Localization Techniques

21.10. Semantic Segmentation
21.10.1. Deep Learning for Semantic Segmentation
21.10.1. Edge Detection
21.10.1. Rule-Based Segmentation Methods

Module 22. Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention

22.1. Text Generation using RNN
22.1.1. Training an RNN for Text Generation
22.1.2. Natural Language Generation with RNN
22.1.3. Text Generation Applications with RNN

22.2. Training Data Set Creation
22.2.1. Preparation of the Data for Training an RNN
22.2.2. Storage of the Training Dataset
22.2.3. Data Cleaning and Transformation
22.2.4. Sentiment Analysis

22.3. Classification of Opinions with RNN
22.3.1. Detection of Themes in Comments
22.3.2. Sentiment Analysis with Deep Learning Algorithms

22.4. Encoder-Decoder Network for Neural Machine Translation
22.4.1. Training an RNN for Machine Translation
22.4.2. Use of an Encoder-Decoder Network for Machine Translation
22.4.3. Improving the Accuracy of Machine Translation with RNNs

22.5. Attention Mechanisms
22.5.1. Application of Care Mechanisms in RNN
22.5.2. Use of Care Mechanisms to Improve the Accuracy of the Models
22.5.3. Advantages of Attention Mechanisms in Neural Networks

22.6. Transformer Models
22.6.1. Using Transformers Models for Natural Language Processing
22.6.2. Application of Transformers Models for Vision
22.6.3. Advantages of Transformers Models

22.7. Transformers for Vision
22.7.1. Use of Transformers Models for Vision
22.7.2. Image Data Preprocessing
22.7.3. Training a Transformers Model for Vision

22.8. Hugging Face Transformer Library
22.8.1. Using the Hugging Face's Transformers Library
22.8.2. Hugging Face´s Transformers Library Application
22.8.3. Advantages of Hugging Face´s Transformers Library

22.9. Other Transformers Libraries Comparison
22.9.1. Comparison Between Different Transformers Libraries
22.9.2. Use of the Other Transformers Libraries
22.9.3. Advantages of the Other Transformers Libraries

22.10. Development of an NLP Application with RNN and Attention Practical Applications
22.10.1. Development of a Natural Language Processing Application with RNN and Attention.
22.10.2. Use of RNN, Attention Mechanisms and Transformers Models in the Application
22.10.3. Evaluation of the Practical Application

Module 23. *Autoencoders, GANs* and Diffusion Models

23.1. Representation of Efficient Data
23.1.1. Dimensionality Reduction
23.1.2. Deep Learning
23.1.3. Compact Representations

23.2. PCA Realization with an Incomplete Linear Automatic Encoder
23.2.1. Training Process
23.2.2. Implementation in Python
23.2.3. Use of Test Data

23.3. Stacked Automatic Encoders
23.3.1. Deep Neural Networks
23.3.2. Construction of Coding Architectures
23.3.3. Use of Regularization

23.4. Convolutional Autoencoders
23.4.1. Design of Convolutional Models
23.4.2. Convolutional Model Training
23.4.3. Results Evaluation

23.5. Noise Suppression of Automatic Encoders
23.5.1. Filter Application
23.5.2. Design of Coding Models
23.5.3. Use of Regularization Techniques

23.6. Sparse Automatic Encoders
23.6.1. Increasing Coding Efficiency
23.6.2. Minimizing the Number of Parameters
23.6.3. Using Regularization Techniques

23.7. Variational Automatic Encoders
23.7.1. Use of Variational Optimization
23.7.2. Unsupervised Deep Learning
23.7.3. Deep Latent Representations

23.8. Generation of Fashion MNIST Images
23.8.1. Pattern Recognition
23.8.2. Image Generation
23.8.3. Deep Neural Networks Training

23.9. Generative Adversarial Networks and Diffusion Models
23.9.1. Content Generation from Images
23.9.2. Modeling of Data Distributions
23.9.3. Use of Adversarial Networks

23.10. Implementation of the Models
23.10.1. Practical Application
23.10.2. Implementation of the Models
23.10.3. Use of Real Data
23.10.4. Results Evaluation

Module 24. Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention

24.1. Introduction to Bio-Inspired Computing
24.1.1. Introduction to Bio-Inspired Computing

24.2. Social Adaptation Algorithms
24.2.1. Bio-Inspired Computation Based on Ant Colonies
24.2.2. Variants of Ant Colony Algorithms
24.2.3. Particle Cloud Computing

24.3. Genetic Algorithms
24.3.1. General Structure
24.3.2. Implementations of the Major Operators

24.4. Space Exploration-Exploitation Strategies for Genetic Algorithms
24.4.1. CHC Algorithm
24.4.2. Multimodal Problems

24.5. Evolutionary Computing Models (I)
24.5.1. Evolutionary Strategies
24.5.2. Evolutionary Programming
24.5.3. Algorithms Based on Differential Evolution

24.6. Evolutionary Computation Models (II)
24.6.1. Evolutionary Models Based on Estimation of Distributions (EDA)
24.6.2. Genetic Programming

24.7. Evolutionary Programming Applied to Learning Problems
24.7.1. Rules-Based Learning
24.7.2. Evolutionary Methods in Instance Selection Problems

24.8. Multi-Objective Problems
24.8.1. Concept of Dominance
24.8.2. Application of Evolutionary Algorithms to Multi-Objective Problems

24.9. Neural Networks (I)
24.9.1. Introduction to Neural Networks
24.9.2. Practical Example with Neural Networks

24.10. Neural Networks (II)
24.10.1. Use Cases of Neural Networks in Medical Research
24.10.2. Use Cases of Neural Networks in Economics
24.10.3. Use Cases of Neural Networks in Artificial Vision

Module 25. Artificial Intelligence: Strategies and Applications

25.1. Financial Services
25.1.1. The Implications of Artificial Intelligence (AI) in Financial Services Opportunities and Challenges
25.1.2. Case Uses
25.1.3. Potential Risks Related to the Use of AI
25.1.4. Potential Future Developments/Uses of AI

25.2. Implications of Artificial Intelligence in the Healthcare Service
25.2.1. Implications of AI in the Healthcare Sector Opportunities and Challenges
25.2.2. Case Uses

25.3. Risks Related to the Use of AI in the Health Service
25.3.1. Potential Risks Related to the Use of AI
25.3.2. Potential Future Developments/Uses of AI

25.4. Retail
25.4.1. Implications of AI in Retail Opportunities and Challenges
25.4.2. Case Uses
25.4.3. Potential Risks Related to the Use of AI
25.4.4. Potential Future Developments/Uses of AI

25.5. Industry
25.5.1. Implications of AI in Industry Opportunities and Challenges
25.5.2. Case Uses

25.6. Potential Risks Related to the Use of AI in Industry
25.6.1. Case Uses
25.6.2. Potential Risks Related to the Use of AI
25.6.3. Potential Future Developments/Uses of AI

25.7. Public Administration
25.7.1. AI Implications for Public Administration Opportunities and Challenges
25.7.2. Case Uses
25.7.3. Potential Risks Related to the Use of AI
25.7.4. Potential Future Developments/Uses of AI

25.8. Educational
25.8.1. AI Implications for Education Opportunities and Challenges
25.8.2. Case Uses
25.8.3. Potential Risks Related to the Use of AI
25.8.4. Potential Future Developments/Uses of AI

25.9. Forestry and Agriculture
25.9.1. Implications of AI in Forestry and Agriculture Opportunities and Challenges
25.9.2. Case Uses
25.9.3. Potential Risks Related to the Use of AI
25.9.4. Potential Future Developments/Uses of AI

25.10 Human Resources
25.10.1. Implications of AI for Human Resources Opportunities and Challenges
25.10.2. Case Uses
25.10.3. Potential Risks Related to the Use of AI
25.10.4. Potential Future Developments/Uses of AI

Module 26. Artificial Intelligence Methods and Tools for Clinical Research

26.1. AI Technologies and Tools in Clinical Research
26.1.1. Using Machine Learning to Identify Patterns in Clinical Data
26.1.2. Development of Predictive Algorithms for Clinical Trials
26.1.3. Implementation of AI Systems to Improve Patient Recruitment
26.1.4. AI Tools for Real-Time Analysis of Research Data with Tableau

26.2. Statistical Methods and Algorithms in Clinical Trials
26.2.1. Application of Advanced Statistical Techniques for Clinical Data Analysis
26.2.2. Use of Algorithms for the Validation and Verification of Trial Results
26.2.3. Implementation of Regression and Classification Models in Clinical Studies
26.2.4. Analysis of Large Data Sets using Computational Statistical Methods

26.3. Design of Experiments and Analysis of Results
26.3.1. Strategies for the Efficient Design of Clinical Trials Using IA, with IBM Watson Health
26.3.2. AI Techniques for Analysis and Interpretation of Experimental Data
26.3.3. Optimization of Research Protocols Using AI Simulations
26.3.4. Evaluation of Efficacy and Safety of Treatments Using AI Models

26.4. Interpretation of Medical Images in Research Using AI through Aidoc
26.4.1. Development of AI Systems for the Automatic Detection of Pathologies in Images
26.4.2. Use of Deep Learning for Classification and Segmentation in Medical Images
26.4.3. AI Tools to Improve Accuracy in Image Diagnostics
26.4.4. Analysis of Radiological and Magnetic Resonance Imaging Using AI

26.5. Clinical Analysis and Biomedical Data Analysis
26.5.1. AI in Genomics and Proteomics Data Processing and Analysis DeepGenomics
26.5.2. Tools for the Integrated Analysis of Clinical and Biomedical Data
26.5.3. Use of AI to Identify Biomarkers in Clinical Research
26.5.4. Predictive Analysis of Clinical Outcomes Based on Biomedical Data

26.6. Advanced Data Visualization in Clinical Research
26.6.1. Development of Interactive Visualization Tools for Clinical Data
26.6.2. Use of AI in the Creation of Graphical Representations of Complex Data Microsoft Power BI
26.6.3. Visualization Techniques for Easy Interpretation of Research Results
26.6.4. Augmented and Virtual Reality Tools for Visualization of Biomedical Data

26.7. Natural Language Processing in Scientific and Clinical Documentation
26.7.1. Application of NLP for the Analysis of Scientific Literature and Clinical Records with Linguamatics
26.7.2. AI Tools for the Extraction of Relevant Information from Medical Texts
26.7.3. AI Systems for Summarizing and Categorizing Scientific Publications
26.7.4. Use of NLP to Identify Trends and Patterns in Clinical Documentation

26.8. Heterogeneous Data Processing in Clinical Research with Google Cloud Healthcare API and IBM *Watson* Health
26.8.1. AI Techniques for Integrating and Analyzing Data from Diverse Clinical Sources
26.8.2. Tools for the Management of Unstructured Clinical Data
26.8.3. AI Systems for Correlating Clinical and Demographic Data
26.8.4. Analysis of Multidimensional Data for Clinical Insights

26.9. Applications of Neural Networks in Biomedical Research
26.9.1. Use of Neural Networks for Disease Modeling and Treatment Prediction
26.9.2. Implementation of Neural Networks in Genetic Disease Classification
26.9.3. Development of Diagnostic Systems Based on Neural Networks
26.9.4. Application of Neural Networks in the Personalization of Medical Treatments

26.10. Predictive Modeling and its Impact on Clinical Research
26.10.1. Development of Predictive Models for the Anticipation of Clinical Outcomes
26.10.2. Use of AI in the Prediction of Side Effects and Adverse Reactions
26.10.3. Implementation of Predictive Models in the Optimization of Clinical Trials
26.10.4. Risk Analysis in Medical Treatments Using Predictive Modeling

Module 27. Biomedical Research with AI

27.1. Design and Implementation of Observational Studies with AI

27.1.1. Implementation of AI for the Selection and Segmentation of Populations in Studies
27.1.2. Use of Algorithms for Real-Time Monitoring of Observational Study Data
27.1.3. AI Tools for Identifying Patterns and Correlations in Observational Studies with Flatiron Health
27.1.4. Automation of the Data Collection and Analysis Process in Observational Studies

27.2. Validation and Calibration of Models in Clinical Research

27.2.1. AI Techniques to Ensure the Accuracy and Reliability of Clinical Models
27.2.2. Use of AI in the Calibration of Predictive Models in Clinical Research
27.2.3. Cross-Validation Methods Applied to Clinical Models Using IA, with KINME Analytics Platform
27.2.4. AI Tools for the Evaluation of Generalization of Clinical Models

27.3. Methods for Integration of Heterogeneous Data in Clinical Research

27.3.1. AI Techniques for Combining Clinical, Genomic and Environmental Data with DeepGenomics
27.3.2. Use of Algorithms to Manage and Analyze Unstructured Clinical Data
27.3.3. AI Tools for Clinical Data Standardization and Normalization with Informatica's Healthcare Data Management
27.3.4. AI Systems for Correlation of Different Types of Data in Research

27.4. Multidisciplinary Biomedical Data Integration using Flatiron Health's OncologyCloud and AutoML

27.4.1. AI Systems to Combine Data from Different Biomedical Disciplines
27.4.2. Algorithms for Integrated Analysis of Laboratory and Clinical Data
27.4.3. AI Tools for Visualization of Complex Biomedical Data
27.4.4. Use of AI in the Creation of Holistic Health Models from Multidisciplinary Data

27.5. Deep Learning Algorithms in Biomedical Data Analysis

27.5.1. Implementation of Neural Networks in the Analysis of Genetic and Proteomic Data
27.5.2. Use of Deep Learning for Pattern Identification in Biomedical Data
27.5.3. Development of Predictive Models in Precision Medicine with Deep Learning
27.5.4. Application of AI in Advanced Biomedical Image Analysis Using Aidoc

27.6. Optimization of Research Processes with Automation

27.6.1. Automation of Laboratory Routines by Means of AI Systems with Beckman Coulter
27.6.2. Use of AI for Efficient Management of Resources and Time in Research
27.6.3. AI Tools for Optimization of Workflows in Clinical Research
27.6.4. Automated Systems for Tracking and Reporting Progress in Research

27.7. Simulation and Computational Modeling in Medicine with AI

27.7.1. Development of Computational Models to Simulate Clinical Scenarios
27.7.2. Use of AI for the Simulation of Molecular and Cellular Interactions with Schrödinger
27.7.3. AI Tools in the Creation of Predictive Disease Models with GNS Healthcare
27.7.4. Application of AI in the Simulation of Drug and Treatment Effects

27.8. Use of Virtual and Augmented Reality in Clinical Studies with Surgical Theater

27.8.1. Implementation of Virtual Reality for Training and Simulation in Medicine
27.8.2. Use of Augmented Reality in Surgical and Diagnostic Procedures
27.8.3. Virtual Reality Tools for Behavioral and Psychological Studies
27.8.4. Application of Immersive Technologies in Rehabilitation and Therapy

27.9. Data Mining Tools Applied to Biomedical Research

27.9.1. Use of Data Mining Techniques to Extract Knowledge from Biomedical Databases
27.9.2. Implementation of AI Algorithms to Discover Patterns in Clinical Data
27.9.3. AI Tools for Trend Identification in Large Data Sets with Tableau
27.9.4. Application of Data Mining in the Generation of Research Hypotheses

27.10. Development and Validation of Biomarkers with Artificial Intelligence

27.10.1. Use of AI for the Identification and Characterization of Innovative Biomarkers
27.10.2. Implementation of AI Models for the Validation of Biomarkers in Clinical Studies
27.10.3. AI tools in Correlating Biomarkers with Clinical Outcomes with Oncimmune
27.10.4. Application of AI in Biomarker Analysis for Personalized Medicine

Module 28. Practical Application of Artificial Intelligence in Clinical Research

28.1. Genomic Sequencing Technologies and Data Analysis with AI with DeepGenomics
28.1.1. Use of AI for Rapid and Accurate Analysis of Genetic Sequences
28.1.2. Implementation of Machine Learning Algorithms in the Interpretation of Genomic Data
28.1.3. AI Tools for Identification of Genetic Variants and Mutations
28.1.4. Development of AI Systems for Anomaly Detection in Medical Images

28.2. AI in Biomedical Images Analysis with Aidoc
28.2.1. Development of AI Systems for the Detection of Anomalies in Medical Images
28.2.2. Use of Deep Learning in the Interpretation of X-rays, MRI and CT Scans
28.2.3. AI Tools to Improve Accuracy in Diagnostic Imaging
28.2.4. Implementation of AI in Biomedical Image Classification and Segmentation

28.3. Robotics and Automation in Clinical Laboratories
28.3.1. Use of Robots for the Automation of Tests and Processes in Laboratories
28.3.2. Implementation of Automatic Systems for the Management of Biological Samples
28.3.3. Development of Robotic Technologies to Improve Efficiency and Accuracy in Clinical Analysis
28.3.4. AI Application in Optimization of Workflows in Laboratories with Optum

28.4. AI in the Personalization of Therapies and Precision Medicine
28.4.1. Development of AI Models for the Personalization of Medical Treatments
28.4.2. Use of Predictive Algorithms in the Selection of Therapies based on Genetic Profiling
28.4.3. AI Tools in the Adaptation of Drug Doses and Combinations with PharmGKB
28.4.4. Application of AI in the Identification of Effective Treatments for Specific Groups

28.5. Innovations in AI-Assisted Diagnostics using ChatGPT and Amazon Comprehend Medical
28.5.1. Implementation of AI Systems for Rapid and Accurate Diagnostics
28.5.2. Use of AI in Early Identification of Diseases through Data Analysis
28.5.3. Development of AI Tools for Clinical Test Interpretation
28.5.4. Application of AI in Combining Clinical and Biomedical Data for Comprehensive Diagnostics

28.6. AI Applications in Microbiome and Microbiology Studies with Metabiomics
28.6.1. Use of AI in the Analysis and Mapping of the Human Microbiome
28.6.2. Implementation of Algorithms to Study the Relationship between Microbiome and Diseases
28.6.3. AI Tools in the Identification of Patterns in Microbiological Studies
28.6.4. Application of AI in Microbiome-Based Therapeutics Research

28.7. Wearables and Remote Monitoring in Clinical Trials
28.7.1. Development of *Wearable* Devices with AI for Continuous Health Monitoring with FitBit
28.7.2. Use of AI in the Interpretation of Data Collected by Wearables
28.7.3. Implementation of Remote Monitoring Systems in Clinical Trials
28.7.4. Application of AI in the Prediction of Clinical Events through Wearable Data

28.8. AI in Clinical Trial Management with Oracle Health Sciences
28.8.1. Use of AI Systems for Optimization of Clinical Trial Management
28.8.2. Implementation of AI in the Selection and Monitoring of Participants
28.8.3. AI Tools for Analysis of Clinical Trial Data and Results
28.8.4. Application of AI to Improve Trial Efficiency and Reduce Trial Costs

28.9. Development of AI-Assisted Vaccines and Treatments with Benevolent AI
28.9.1. Use of AI to Accelerate Vaccine Development
28.9.2. Implementation of Predictive Models in the Identification of Potential Treatments
28.9.3. AI Tools to Simulate Responses to Vaccines and Drugs
28.9.4. Application of AI in the Personalization of Vaccines and Therapies

28.10. AI Applications in Immunology and Immune Response Studies
28.10.1. Development of AI Models to Understand Immunological Mechanisms with Immuneering
28.10.2. Use of AI in the Identification of Patterns in Immune Responses
28.10.3. Implementation of AI in Autoimmune Disorders Research
28.10.4. Application of AI in the Design of Personalized Immunotherapies

Module 29. Big Data *Analytics* and Machine Learning in Clinical Research

29.1. Big Data in Clinical Research: Concepts and Tools

29.1.1. The Explosion of Data in the Field of Clinical Research
29.1.2. Concept of Big Data and Main Tools
29.1.3. Applications of Big Data in Clinical Research

29.2. Data Mining in Clinical and biomedical Records with KNIME and Python

29.2.1. Main Methodologies for Data Mining
29.2.2. Data Integration of Clinical and Biomedical Registry Data
29.2.3. Detection of Patterns and Anomalies in Clinical and Biomedical Records

29.3. Machine Learning Algorithms in Biomedical Research with KNIME and Python

29.3.1. Classification Techniques in Biomedical Research
29.3.2. Regression Techniques in Biomedical Research
29.3.3. Unsupervised Techniques in Biomedical Research

29.4. Predictive Analytics Techniques in Clinical Research with KNIME and Python

29.4.1. Classification Techniques in Clinical Research
29.4.2. Regression Techniques in Clinical Research
29.4.3. Deep Learning in Clinical Research

29.5. AI Models in Epidemiology and Public Health with KNIME and Python

29.5.1. Classification Techniques for Epidemiology and Public Health
29.5.2. Regression Techniques for Epidemiology and Public Health
29.5.3. Unsupervised Techniques for Epidemiology and Public Health

29.6. Analysis of Biological Networks and Disease Patterns with KNIME and Python

29.6.1. Exploration of Interactions in Biological Networks for the Identification of Disease Patterns
29.6.2. Integration of Omics Data in Network Analysis to Characterize Biological Complexities
29.6.3. Application of Machine Learning Algorithms for the Discovery of Disease Patterns

29.7. Development of Tools for Clinical Prognosis with Workflow and Python Platforms

29.7.1. Creation of Innovative Clinical Prognostic Tools based on Multidimensional Data
29.7.2. Integration of Clinical and Molecular Variables in the Development of Prognostic Tools
29.7.3. Evaluating the Effectiveness of Prognostic Tools in Diverse Clinical Contexts

29.8. Advanced Visualization and Communication of Complex Data with Tools such as PowerBI and Python

29.8.1. Use of Advanced Visualization Techniques to Represent Complex Biomedical Data
29.8.2. Development of Effective Communication Strategies to Present Results of Complex Analyses
29.8.3. Implementation of Interactivity Tools in Visualizations to Enhance Understanding

29.9. Data Security and Challenges in Big Data Management

29.9.1. Addressing Data Security Challenges in the Context of Biomedical Big Data
29.9.1. Strategies for Privacy Protection in the Management of Large Biomedical Datasets
29.9.3. Implementation of Security Measures to Mitigate Risks in the Handling of Sensitive Data

29.10. Practical Applications and Case Studies on Biomedical Big Data

29.10.1. Exploration of Successful Cases in the Implementation of Biomedical Big Data in Clinical Research
29.10.2. Development of Practical Strategies for the Application of Big Data in Clinical Decision-Making
29.10.3. Evaluation of Impact and Lessons Learned through Case Studies in the Biomedical Field

Module 30. Ethical, Legal and Future Aspects of Artificial Intelligence in Clinical Research

30.1. Ethics in the Application of AI in Clinical Research
30.1.1. Ethical Analysis of AI-Assisted Decision Making in Clinical Research Settings
30.1.2. Ethics in the Use of AI Algorithms for Participant Selection in Clinical Trials
30.1.3. Ethical Considerations in the Interpretation of Results Generated by AI Systems in Clinical Research

30.2. Legal and Regulatory Considerations in Biomedical AI
30.2.1. Analysis of Legal Regulations in the Development and Application of AI Technologies in the Biomedical Field
30.2.2. Assessment of Compliance with Specific Regulations to Ensure the Safety and Efficacy of AI-Based Solutions
30.2.3. Addressing Emerging Regulatory Challenges Associated with the Use of AI in Biomedical Research

30.3. Informed Consent and Ethical Aspects in the Use of Clinical Data
30.3.1. Development of Strategies to Ensure Effective Informed Consent in AI Projects
30.3.2. Ethics in the Collection and Use of Sensitive Clinical Data in the Context of AI-Driven Research
30.3.3. Addressing Ethical Issues Related to Ownership and Access to Clinical Data in Research Projects

30.4. AI and Liability in Clinical Research
30.4.1. Evaluation of Ethical and Legal Accountability in the Implementation of AI Systems in Clinical Research Protocols
30.4.2. Development of Strategies to Address Potential Adverse Consequences of the Application of AI in Biomedical Research
30.4.3. Ethical Considerations in the Active Participation of AI in Clinical Research Decision Making

30.5. Impact of AI on Equity and Access to Health Care
30.5.1. Evaluation of the Impact of AI Solutions on Equity in Clinical Trial Participation
30.5.2. Development of Strategies to Improve Access to AI Technologies in Diverse Clinical Settings
30.5.3. Ethics in the Distribution of Benefits and Risks Associated with the Application of AI in Health Care

30.6. Privacy and Data Protection in Research Projects
30.6.1. Ensuring the Privacy of Participants in Research Projects Involving the Use of AI
30.6.2. Development of Policies and Practices for Data Protection in Biomedical Research
30.6.3. Addressing Specific Privacy and Security Challenges in the Handling of Sensitive Data in the Clinical Environment

30.7. AI and Sustainability in Biomedical Research
30.7.1. Assessment of the Environmental Impact and Resources Associated with the Implementation of AI in Biomedical Research
30.7.2. Development of Sustainable Practices in the Integration of AI Technologies into Clinical Research Projects
30.7.3. Ethics in Resource Management and Sustainability in the Adoption of AI in Biomedical Research

30.8. Auditing and Explainability of AI Models in the Clinical Setting
30.8.1. Development of Audit Protocols for Assessing the Reliability and Accuracy of AI Models in Clinical Research
30.8.2. Ethics in Explainability of Algorithms to Ensure Understanding of Decisions Made by AI Systems in Clinical Contexts
30.8.3. Addressing Ethical Challenges in the Interpretation of AI Model Results in Biomedical Research

30.9. Innovation and Entrepreneurship in the Field of Clinical AI
30.9.1. Responsible Innovation Ethics in Developing AI Solutions for Clinical Applications
30.9.2. Development of Ethical Business Strategies in the Field of Clinical AI
30.9.3. Ethical Considerations in the Commercialization and Adoption of AI Solutions in the Clinical Sector

30.10. Ethical Considerations in International Collaboration in Clinical Research
30.10.1. Development of Ethical and Legal Arrangements for International Collaboration in AI-Driven Research Projects
30.10.2. Ethics in Multi-Institutional and Multi-Country Involvement in Clinical Research using AI Technologies
30.10.3. Addressing Emerging Ethical Challenges Associated with Global Collaboration in Biomedical Research

07

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

TECH Business School uses the Case Study to contextualize all content

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

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

This program prepares you to face business challenges in uncertain environments and achieve business success.

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

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch to present executives with challenges and business decisions at the highest level, whether at the national or international level. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and business reality is taken into account.

> *You will learn, through collaborative activities and real cases, how to solve complex situations in real business environments"*

The case method has been the most widely used learning system among the world's leading business schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

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

Relearning Methodology

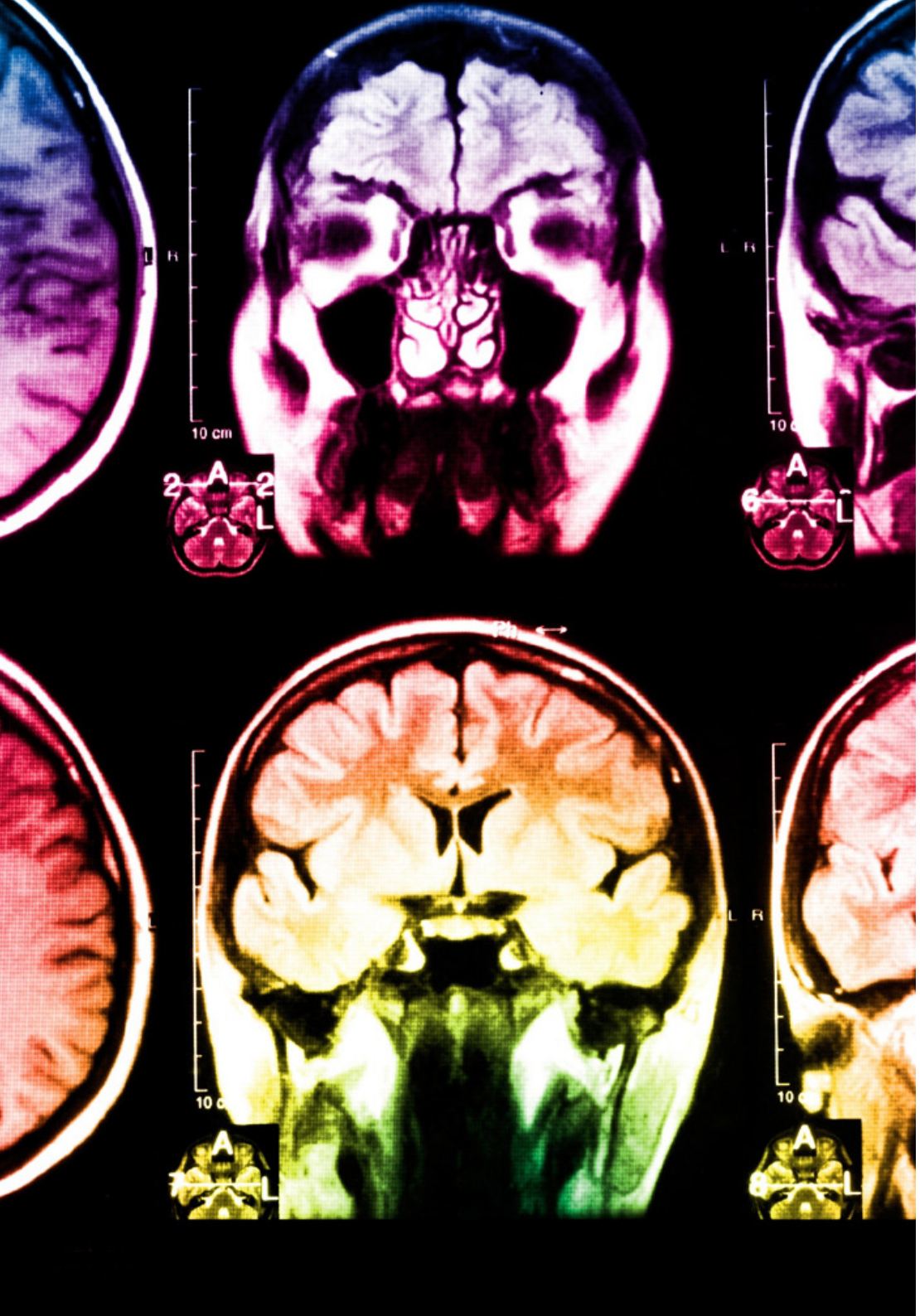
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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

Our online system will allow you to organize your time and learning pace, adapting it to your schedule. You will be able to access the contents from any device with an internet connection.

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

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



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. With this methodology we have trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, markets, and financial instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

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

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

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

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

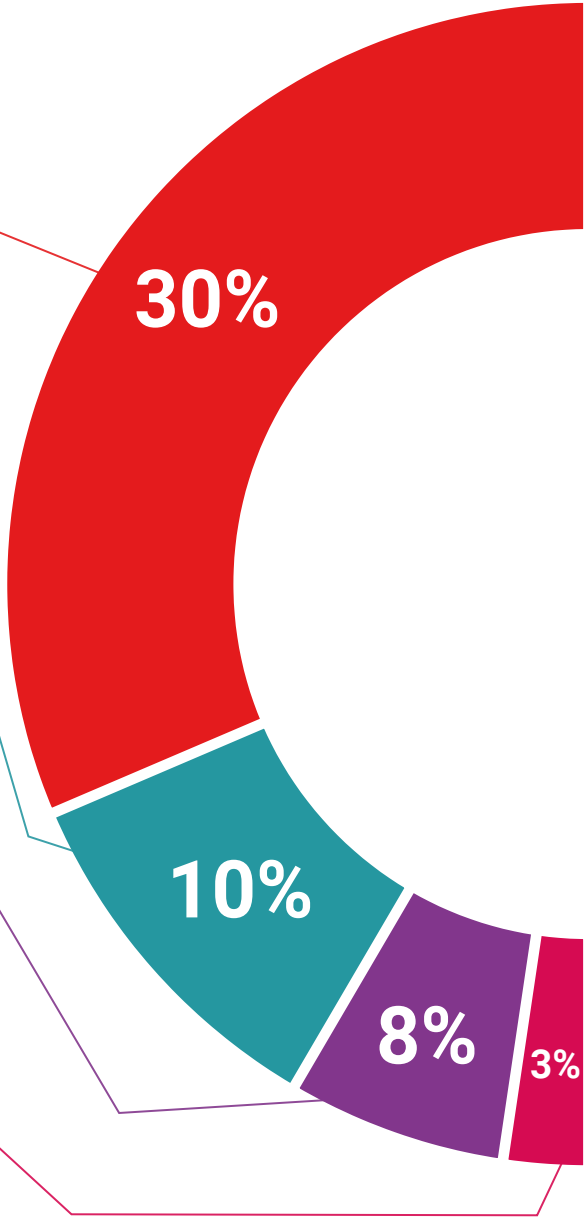
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

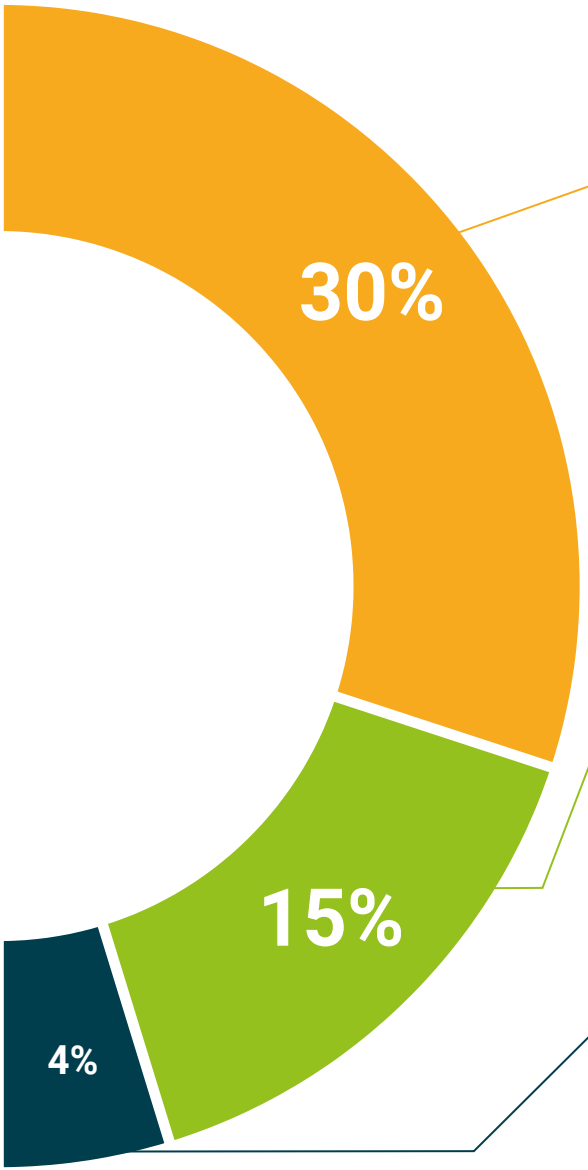
Management Skills Exercises

They will carry out activities to develop specific executive competencies in each thematic area. Practices and dynamics to acquire and develop the skills and abilities that a high-level manager needs to develop in the context of the globalization we live in.

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Case Studies

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

Interactive Summaries

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

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

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

08

Our Students' Profiles

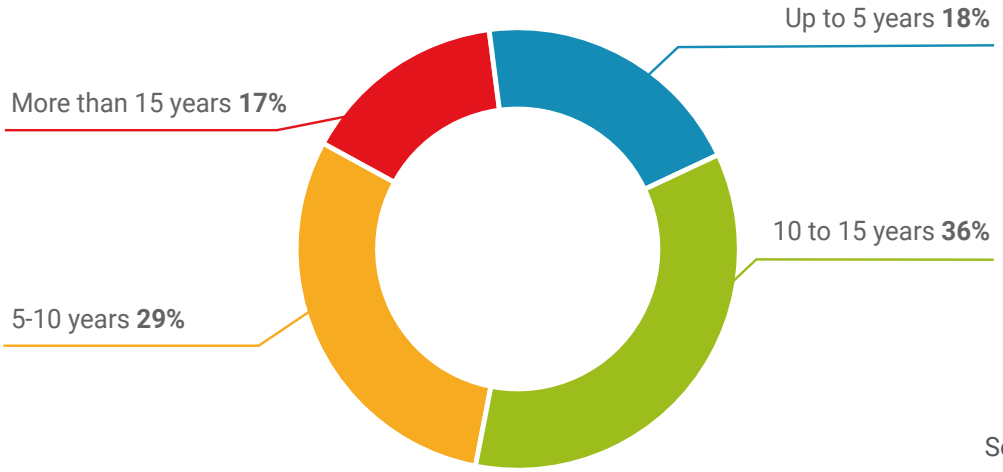
The student profile of this program stands out for its interdisciplinary nature. Therefore, most of them have a deep specialization in fields related to Health Sciences, Computer Engineering, Business Administration and Management. These professionals are united by the same objective: to get up to date with the latest trends in Artificial Intelligence in Research, in order to improve their daily practice and continue to improve the quality of life of their patients. In the same vein, they have an approach oriented towards both innovation and social impact, being fully aware of the importance of technologies for the health area.

A high intensity Advanced Master's Degree that will allow professionals to advance in an efficient and fast way in their learning"

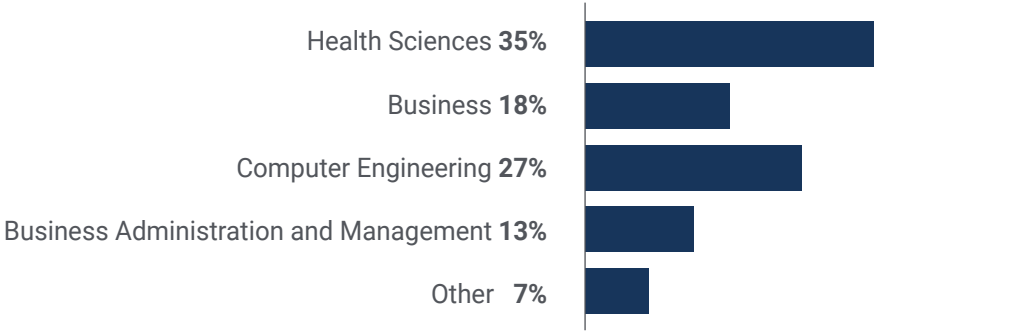
Average Age

Between **35** and **45** years old

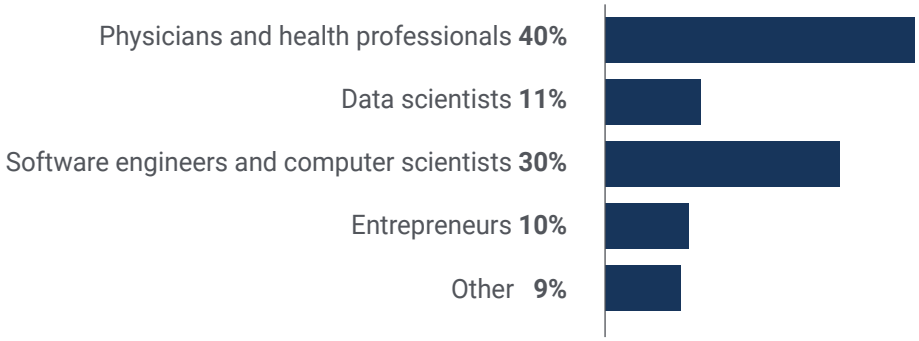
Years of Experience



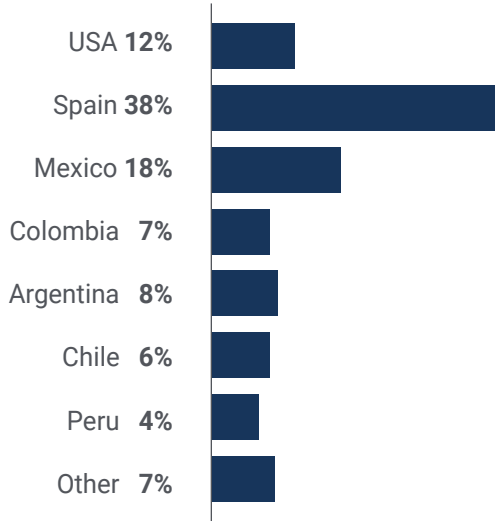
Training



Academic Profile



Geographical Distribution



Cintia Herrera

CEO of a pharmaceutical institution

"I am very satisfied by the Advanced Master's Degree MBA in Artificial Intelligence in Clinical Research. I feel that this educational experience has strengthened my passion for this field and prepared me to face the emerging challenges in this field. I am ready to develop the efficient solutions for the company I work for!"

09

Course Management

In its commitment to provide top quality educational itineraries, TECH has a teaching staff made up of experts in Artificial Intelligence for this university program. In this sense, these experts are characterized by their extensive professional background in the area of Clinical Research. Therefore, they have provided innovative solutions to renowned entities in the health sector. In addition, these specialists remain at the forefront of technology, incorporating the most avant-garde techniques to their daily practice. This is an endorsement for students, who will update their knowledge and increase their skills through an immersive learning experience.

Upgrade your skills in Deep Neural Network Training with the best experts in this field. Launch your professional career with TECH!"

International Guest Director

With over 20 years of experience in designing and leading global **talent acquisition teams**, Jennifer Dove is an expert in **technology recruitment** and **strategy**. Throughout her career, she has held senior positions in several technology organizations within Fortune 50 companies such as NBCUniversal and Comcast. Her track record has allowed her to excel in competitive, high-growth environments

As **Vice President of Talent Acquisition** at **Mastercard**she is responsible for overseeing talent onboarding strategy and execution, collaborating with business leaders and **HR Managers** to meet operational and strategic hiring objectives. In particular, she aims to **build diverse**, **inclusive** and **high-perfoming teams** that drive innovation and growth of the company's products and services. In addition, she is adept at using tools to attract and retain the best people from around the world. She is also responsible for **amplifying** Mastercard's **employer brand** and value proposition through publications, events and social media

Jennifer Dove has demonstrated her commitment to continuous professional development by actively participating in networks of HR professionals and contributing to the onboarding of numerous employees at different companies. After earning her bachelor's degree in **Organizational Communication** from the University of Miami, she is now a graduate of the University of Miami

On the other hand, it has been recognized for its ability to lead organizational transformations, **integrate technologies** into **recruitment processes** and develop leadership programs that prepare institutions for future challenges. She has also successfully implemented **wellness programs** that have significantly increased employee satisfaction and retention

Ms. Dove, Jennifer

- Vice President of Talent Acquisition at Mastercard, New York, United States
- Director of Talent Acquisition at NBCUniversal, New York, USA
- Head of Recruitment at Comcast
- Director of Recruiting at Rite Hire Advisory, New York, USA
- Executive Vice President of the Sales Division at Ardor NY Real Estate
- Director of Recruitment at Valerie August & Associates
- Account Executive at BNC
- Account Executive at Vault
- Graduated in Organizational Communication from the University of Miami.

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

International Guest Director

A technology leader with decades of experience in **major technology multinationals**, Rick Gauthier has developed prominently in the field of **clouds**services **and** end-to-end process improvement. He has been recognized as a leader and manager of highly efficient teams, showing a natural talent for ensuring a high level of engagement among his employees.

He possesses innate gifts in strategy and executive innovation, developing new ideas and backing his success with quality data. His background at **Amazon** has allowed him to manage and integrate the company's IT services in the United States. At **Microsoft** he has led a team of 104 people, responsible for providing corporate-wide IT infrastructure and supporting product engineering departments across the company.

This experience has allowed him to stand out as a high-impact manager with remarkable abilities to increase efficiency, productivity and overall customer satisfaction.

D. Gauthier, Rick

- Regional IT Director at Amazon, Seattle, USA
- Senior Program Manager at Amazon
- Vice President of Wimmer Solutions
- Senior Director of Productive Engineering Services at Microsoft
- Degree in Cybersecurity from Western Governors University
- Technical Certificate in Commercial Diving from Divers Institute of Technology
- B.S. in Environmental Studies from The Evergreen State College

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

International Guest Director

Romi Arman is a renowned international expert with more than two decades of experience in **Digital Transformation**, **Marketing, Strategy** and **Consulting**. Through that extended trajectory, he has taken different risks and is a permanent **advocate** for **innovation** and **change** in the business environment. With that expertise, he has collaborated with CEOs and corporate organizations from all over the world, pushing them to move away from traditional business models. In this way, he has helped companies such as Shell Energy become **true market leaders,** focused on their **customers** and the **digital world.**

The strategies designed by Arman have a latent impact, as they have enabled several corporations **to improve the experiences of consumers, staff** and **shareholders** alike. The success of this expert is quantifiable through tangible metrics such as **CSAT**, **employee engagement** in the institutions where he has practiced and the growth of the **EBITDA financial indicator** in each of them.

Also, in his professional career, he has nurtured and **led high-performance teams** that have even received awards for their **transformational potential**. With Shell, specifically, the executive has always set out to overcome three challenges: meeting **customers'** complex **decarbonization** demands **supporting** a "**cost-effective decarbonization**" and **overhauling** a fragmented **data, digital and technology landscape**. Thus, his efforts have shown that in order to achieve sustainable success, it is essential to start from the needs of consumers and lay the foundations for the transformation of processes, data, technology and culture.

In addition, the executive stands out for his mastery of the **business applications** of **Artificial Intelligence,** a subject in which he holds a postgraduate degree from the London Business School. At the same time, he has accumulated experience in **IoT** and **Salesforce.**

Mr. Arman, Romi

- Digital Transformation Director (CDO) at Shell Energy Corporation, London, UK
- Global Director of E-Commerce and Customer Service at Shell Energy Corporation
- National Key Account Manager (OEM and automotive retailers) for Shell in Kuala Lumpur, Malaysia
- Senior Management Consultant (Financial Services Sector) for Accenture based in Singapore
- Graduate of the University of Leeds
- Graduate Diploma in Business Applications of AI for Senior Executives from London Business School
- CCXP Customer Experience Professional Certification
- IMD Executive Digital Transformation Course

Do you want to update your knowledge with the highest educational quality? TECH offers you the most updated content in the academic market, designed by authentic experts of international prestige"

International Guest Director

Manuel Arens is an **experienced data management professional** and leader of a highly qualified team. In fact, Arens holds the position of **global purchasing manager** in Google's Technical Infrastructure and Data Center division, where he has spent most of his professional career. Based in Mountain View, California, he has provided solutions for the tech giant's operational challenges, such as master **data integrity, vendor data updates** and vendor **prioritization** . He has led data center supply chain planning and vendor risk assessment, generating improvements in vendor risk assessment, resulting in process improvements and workflow management that have resulted in significant cost savings.

With more than a decade of work providing digital solutions and leadership for companies in diverse industries, he has extensive experience in all aspects of strategic solution delivery, including **marketing, media analytics, measurement** and **attribution.** In fact, he has received a number of accolades for his work, including the **BIM Leadership Award**, the **Search Leadership Award**, the **Lead Generation Export Program Award** and the **Export Lead Generation Program Award and the EMEA Best Sales Model Award.**

Arens also served as **Sales Manager** in Dublin, Ireland. In this role, he built a team of 4 to 14 members over three years and led the sales team to achieve results and collaborate well with each other and cross-functional teams. He also served as **Senior Industry Analyst,** Hamburg, Germany, creating storylines for over 150 clients using internal and third party tools to support analysis. He developed and wrote in-depth reports to demonstrate his mastery of the subject matter, including understanding the **macroeconomic and political/regulatory factors** affecting technology adoption and diffusion.

He has also led teams at companies such as Eaton, Airbus and Siemens, where he gained valuable account management and supply chain experience. He is particularly noted for continually exceeding expectations by **building valuable customer relationships** and **working seamlessly with people at all levels of an organization**, including stakeholders, management, team members and customers. His data-driven approach and ability to develop innovative and scalable solutions to industry challenges have made him a prominent leader in his field.

Mr. Arens, Manuel

- Global Procurement Manager at Google, Mountain View, USA
- Senior Manager, B2B Analytics and Technology, Google, USA
- Sales Director - Google, Ireland
- Senior Industry Analyst at Google, Germany
- Accounts Manager - Google, Ireland
- Accounts Payable at Eaton, UK
- Supply Chain Manager at Airbus, Germany

Bet on TECH! You will have access to the best didactic materials, at the forefront of technology and education, implemented by internationally renowned specialists in the field"

International Guest Director

Andrea La Sala is an **experienced Marketing executive** whose projects have had a **significant impact** on the **Fashion environment**. Throughout his successful career he has developed different tasks related to **Products**, **Merchandising** and **Communication**. All of this linked to with prestigious brands such as **Giorgio Armani**, **Dolce&Gabbana**, **Calvin Klein**, among others.

The results of this **high-profile international executive** have been linked to his proven ability to **synthesize information** in clear frameworks and execute **concrete actions** aligned to **specific business objectives**. In addition, he is recognized for his **proactivity** and **adaptability to fast-paced** work rhythms. To all this, this expert adds a **strong commercial awareness, market vision** and a **genuine passion** for **products**.

As **Global Brand and Merchandising Director** at **Giorgio Armani**, he has overseen a variety of **Marketing strategies** for **apparel** and **accesories**. His tactics have also focused on the **retail environment** and **consumer needs** and **behavior**. In this
La Sala has also been responsible for shaping the commercialization of products in different markets, acting as **team leader** in the **Design**, **Communication** and **Sales departments**..

On the other hand, in companies such as **Calvin Klein** or **Gruppo Coin**, he has undertaken projects to boost the **structure**, and **development** of **different collections**. He has been in charge of creating **effective calendars** for buying and selling **campaings.**
He has also been in charge of the **terms**, **costs**, **processes** and **delivery times** of different operations.

These experiences have made Andrea La Sala one of the main and most qualified **corporate leaders** in **Fashion** and **Luxury**. A high managerial capacity with which he has managed to effectively **implement the positive positioning** of **different brands** and redefine their key performance indicators (KPIs).

Ms. La Sala, Andrea

- Global Brand & Merchandising Director Armani Exchange at Giorgio Armani, Milan, Italy
- Merchandising Director at Calvin Klein
- Brand Manager at Gruppo Coin
- Brand Manager at Dolce&Gabbana
- Brand Manager at Sergio Tacchini S.p.A.
- Market Analyst at Fastweb
- Graduate of Business and Economics at Università degli Studi del Piemonte Orientale

The most qualified and experienced professionals at international level are waiting for you at TECH to offer you a first class teaching, updated and based on the latest scientific evidence. What are you waiting for to enroll?"

International Guest Director

Mick Gram is synonymous with innovation and excellence in the field of **Business Intelligence** internationally. His successful career is linked to leadership positions in multinationals such as **Walmart** and **Red Bull.** Likewise, this expert stands out for his vision to **identify emerging technologies** that, in the long term, achieve an everlasting impact in the corporate environment.

On the other hand, the executive is considered a **pioneer** in the **use of data visualization techniques** that simplified complex sets, making them accessible and facilitating decision making. This ability became the pillar of his professional profile, transforming him into a desired asset for many organizations that bet on **gathering information** and **generating concrete actions** from them.

One of his most outstanding projects in recent years has been the **Walmart Data Cafe platform**, the largest of its kind in the world that is anchored in the **cloud** aimed at ***Big Data***analysis. In addition, he has held the position of **Director** of **Business Intelligence** at **Red Bull,** covering areas such as **Sales, Distribution, Marketing and Supply Chain Operations**. His team was recently recognized for its constant innovation regarding the use of Walmart Luminate's new API for Shopper and Channel insights.

As for his training, the executive has several Masters and postgraduate studies at prestigious centers such as the **University of Berkeley,**in the United States, and the **University of Copenhagen**, in Denmark. Through this continuous updating, the expert has attained cutting-edge competencies. Thus, he has come to be considered a **born leader** of the **new global economy**, centered on the drive for data and its infinite possibilities.

Mr. Gram, Mick

- Director of Business Intelligence and Analytics at Red Bull, Los Angeles, United States
- Business Intelligence Solutions Architect for Walmart Data Cafe
- Independent Business Intelligence and Data Science Consultant
- Director of Business Intelligence at Capgemini
- Senior Analyst at Nordea
- Senior Business Intelligence Consultant at SAS
- Executive Education in AI and Machine Learning at UC Berkeley College of Engineering
- Executive MBA in e-commerce at the University of Copenhagen
- B.Sc. and M.Sc. in Mathematics and Statistics at the University of Copenhagen

Study at the best online university in the world according to Forbes! In this MBA you will have access to an extensive library of multimedia resources, developed by internationally renowned professors"

International Guest Director

Scott Stevenson is a distinguished expert in the **Digital Marketing** sector who, for more than 19 years, has been linked to one of the most powerful companies in the entertainment industry, **Warner Bros. Discovery.** In this role, he has played a fundamental role in **overseeing logistics** and **creative workflows** across various digital platforms, including social media, search, display and linear media.

This executive's leadership has been crucial in driving in **production strategies** in **paid media**, resulting in a **marked improvement** which has resulted in **company's conversion** rates. At the same time, he has assumed other roles, such as Director of Marketing Services and Traffic Manager at the same multinational during his former management.

Stevenson has also been involved in the global distribution of video games and **digital property campaigns**. He was also responsible for introducing operational strategies related to the formation, completion and delivery of sound and image content for t**elevision commercials** and ***trailers***.

In addition, he holds a Bachelor's degree in Telecommunications from the University of Florida and a Master's Degree in Creative Writing from the University of California, which demonstrates his proficiency in **communication** and **storytelling**.. In addition, he has participated at Harvard University's School of Professional Development in cutting-edge programs on the use of **Artificial Intelligence** in **business**.. Therefore, his professional profile stands as one of the most relevant in the current field of **Marketing** and **Digital Media.**

Mr. Stevenson, Scott

- Director of Digital Marketing at Warner Bros. Discovery, Burbank, United States
- Traffic Manager at Warner Bros. Entertainment.
- M.A. in Creative Writing from the University of California
- B.S. in Telecommunications from the University of Florida

Achieve your academic and career goals with the best qualified experts in the world!
The faculty of this MBA will guide you through the entire learning process"

International Guest Director

Eric Nyquist, Ph.D., is a leading **international sports professional**who has built an impressive career, noted for his **strategic leadership** and ability to drive change and **innovation** in **world-class** sports organizations.

In fact, he has held senior roles such as **Director of Communications and Impact** at **NASCAR**,based in **Florida, USA.** With many years of experience behind him at NASCAR, Dr. Nyquist has also held several leadership positions, including **Senior Vice President of Strategic Development** and **General Manager of Business Affairs,** managing more than a dozen disciplines ranging from **strategic development** to **entertainment marketing.**

Nyquist has also made a significant mark on **Chicago's top** sports franchises. As **Executive Vice President** of the **Chicago Bulls** and **Chicago White Sox** franchises, he has demonstrated his ability to drive **business** and **strategic success** in the world of **professional sports.**.

Finally, it is worth noting that he began his career in **sports** while working in **New York** as a **senior strategic analyst** for **Roger Goodell** in the **National Football League (NFL)** and, prior to that, as a **Legal Intern** with the **United States Football Federation.**

Mr. Nyquist, Eric

- Director of Communications and Impact at NASCAR, Florida, USA
- Senior Vice President of Strategic Development at NASCAR, Florida, United States
- Vice President of Strategic Planning at NASCAR
- Senior Director of Business Affairs at NASCAR
- Executive Vice President at Chicago White Sox Franchises
- Executive Vice President at Chicago Bulls Franchises
- Manager of Business Planning at the National Football League (NFL)
- Business Affairs/Legal Intern with the United States Soccer Federation
- Juris Doctor from the University of Chicago
- Master's Degree in Business Administration-MBA from the University of Chicago Booth School of Business
- B.A. in International Economics from Carleton College.

Thanks to this university program, 100% online, you will be able to combine your studies with your daily obligations, under the guidance of the leading international experts in the field of your interest. Enroll now!"

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shephers GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- PhD. in Psychology from the University of Castilla La Mancha
- PhD in Economics, Business and Finance from the Camilo José Cela University
- PhD in Psychology from University of Castilla La Mancha
- Máster in Executive MBA por la Universidad Isabel I
- Master's Degree in Sales and Marketing Management, 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. Popescu Radu, Daniel Vasile

- Pharmacology, Nutrition and Diet Specialist
- Freelance Producer of Teaching and Scientific Content
- Nutritionist and Community Dietitian
- Community Pharmacist
- Researcher
- Master's Degree in Nutrition and Health at the Open University of Catalonia
- Master's Degree in Psychopharmacology from the University of Valencia
- Pharmacist from the Complutense University of Madrid
- Nutritionist-Dietitian by the European University Miguel de Cervantes

Professors

Dr. Carrasco González, Ramón Alberto

- Specialist in Computer Science and Artificial Intelligence
- Researcher
- Head of Business Intelligence (Marketing) at Caja General de Ahorros de Granada and Banco Mare Nostrum
- Head of Information Systems (Data Warehousing and Business Intelligence) at Caja General de Ahorros de Granada and Banco Mare Nostrum
- Doctor in Artificial Intelligence by the University of Granada
- Higher Engineering Degree in Computer Science from the University of Granada

10

Impact on Your Career

This university program will raise the professional horizons of graduates. Experts will have a solid understanding of the fundamentals of Artificial Intelligence, which will enable them to apply these technological tools to their Clinical Research projects to develop innovative solutions that increase the welfare of citizens (such as new drugs). In addition, students will gain technical skills to effectively manage instruments ranging from Machine Learning libraries to data analysis software and medical image processing platforms.

Increase your confidence in decision making by updating your knowledge through this 100% online Advanced Master's Degree"

You will learn about the current situation of the labor market in Artificial Intelligence in Clinical Research and you will multiply your chances of success, thanks to this Advanced Master's Degree.

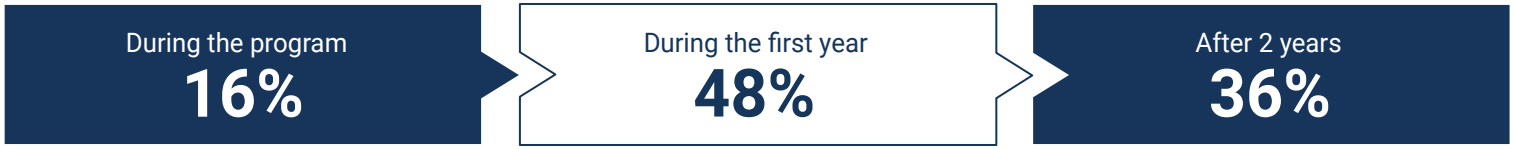
Are you ready to take the leap? Excellent professional development awaits you

The MBA in Artificial Intelligence in Clinical Research at TECH Global University is an intensive program that prepares students to face challenges and business decisions internationally, with the main objective of promoting personal and professional growth. Helping students achieve success.

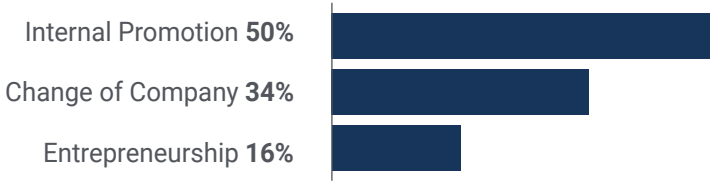
Therefore, those who wish to improve themselves, achieve a positive change at a professional level and interact with the best, will find their place at TECH.

TECH's exclusive Relearning system will allow you to update your knowledge and skills in the most rigorous way.

Time of Change



Type of change



Salary increase

This program represents a salary increase of more than **25.22%** for our students

11

Benefits for Your Company

This university program has not only been designed to meet the specialization needs of professionals in Clinical Research, but also with a view to what they will bring to their organizations. Therefore, graduates will master Artificial Intelligence algorithms to analyze large volumes of medical data (such as X-rays, laboratory tests or MRIs) to help physicians make more accurate diagnoses. In the same way, the use of these tools will enable clinicians to predict clinical outcomes, ranging from the risk of complications after surgery to the response to a specific treatment.

You will master the applications of Intelligence to Clinical Research and contribute to the design of new drugs that improve the quality of life of patients"

Developing and retaining talent in companies is the best long-term investment.

01

Growth of talent and intellectual capital

The professional will introduce the company to new concepts, strategies, and perspectives that can bring about significant changes in the organization.

02

Retaining high-potential executives to avoid talent drain

This program strengthens the link between the company and the professional and opens new avenues for professional growth within the company.

03

Building agents of change

You will be able to make decisions in times of uncertainty and crisis, helping the organization overcome obstacles.

04

Increased international expansion possibilities

Thanks to this program, the company will come into contact with the main markets in the world economy.

05

Project Development

The professional can work on a real project or develop new projects in the field of R & D or business development of your company.

06

Increased competitiveness

This program will equip students with the skills to take on new challenges and drive the organization forward.

12

Certificate

The MBA in Artificial Intelligence in Clinical Research 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 **MBA in Artificial Intelligence in Clinical Research** 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 MBA in Artificial Intelligence in Clinical Research**

Modality: **Online**

Duration: **2 years**

Accreditation: **120 ECTS**

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

Advanced Master's Degree MBA in Artificial Intelligence in Clinical Research

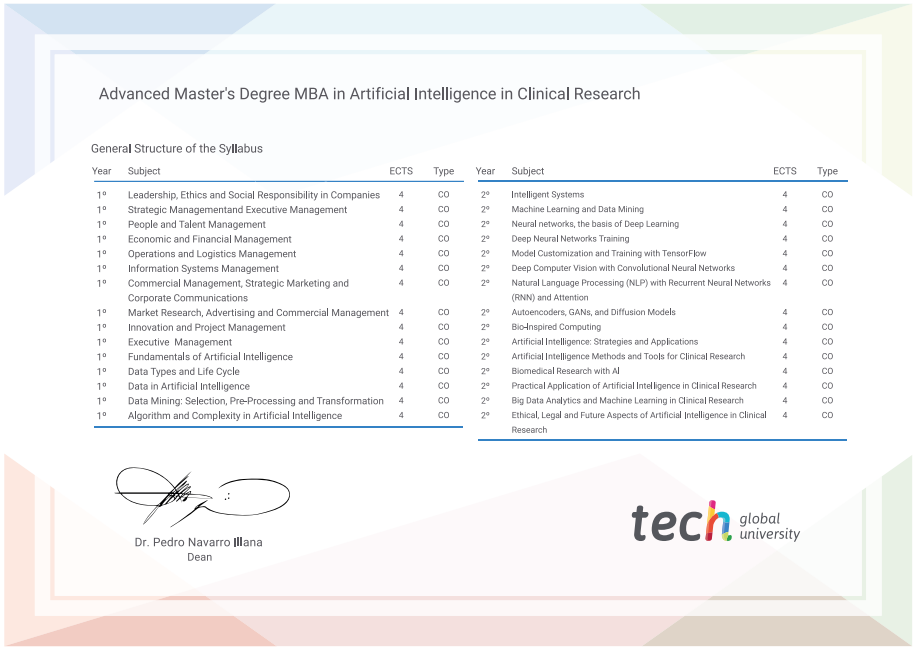
This is a private qualification of 3,600 hours of duration equivalent to 120 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

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 MBA in Artificial Intelligence in Clinical Research

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Leadership, Ethics and Social Responsibility in Companies	4	CO
1º	Strategic Managementand Executive Management	4	CO
1º	People and Talent Management	4	CO
1º	Economic and Financial Management	4	CO
1º	Operations and Logistics Management	4	CO
1º	Information Systems Management	4	CO
1º	Commercial Management, Strategic Marketing and Corporate Communications	4	CO
1º	Market Research, Advertising and Commercial Management	4	CO
1º	Innovation and Project Management	4	CO
1º	Executive Management	4	CO
1º	Fundamentals of Artificial Intelligence	4	CO
1º	Data Types and Life Cycle	4	CO
1º	Data in Artificial Intelligence	4	CO
1º	Data Mining: Selection, Pre-Processing and Transformation	4	CO
1º	Algorithm and Complexity in Artificial Intelligence	4	CO

Year	Subject	ECTS	Type
2º	Intelligent Systems	4	CO
2º	Machine Learning and Data Mining	4	CO
2º	Neural networks, the basis of Deep Learning	4	CO
2º	Deep Neural Networks Training	4	CO
2º	Model Customization and Training with TensorFlow	4	CO
2º	Deep Computer Vision with Convolutional Neural Networks	4	CO
2º	Natural Language Processing (NLP) with Recurrent Neural Networks (RNN) and Attention	4	CO
2º	Autoencoders, GANs, and Diffusion Models	4	CO
2º	Bio-Inspired Computing	4	CO
2º	Artificial Intelligence: Strategies and Applications	4	CO
2º	Artificial Intelligence Methods and Tools for Clinical Research	4	CO
2º	Biomedical Research with AI	4	CO
2º	Practical Application of Artificial Intelligence in Clinical Research	4	CO
2º	Big Data Analytics and Machine Learning in Clinical Research	4	CO
2º	Ethical, Legal and Future Aspects of Artificial Intelligence in Clinical Research	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

MBA in Artificial Intelligence in Clinical Research

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

Advanced Master's Degree

MBA in Artificial Intelligence in Clinical Research

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