Hybrid Master's Degree
Mechanical Engineering

TECH is a member of:

ASEE

tech global university

tech global university

Hybrid Master's Degree
Mechanical Engineering

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Credits: **60 + 4 ECTS**
Website: **www.techtitute.com/us/engineering/hybrid-master-degree/hybrid-master-degree-mechanical-engineering**

Index

01

Introduction to the Program

Mechanical Engineering is a fundamental discipline in the evolution of technologies that impact a wide variety of sectors, from automotive to energy. With the increasing demand for sustainable solutions and optimization of industrial processes, mechanical engineering plays a key role in improving efficiency and innovation. In this scenario, professionals need to stay ahead of current trends in the design, manufacturing and maintenance of mechanical systems, focusing on the application of new technologies and materials. With this idea in mind, TECH launches an innovative university program focused on Mechanical Engineering.

Thanks to this Hybrid Master's Degree, you will optimize mechanical systems using state-of-the-art technological tools and simulation techniques"

In the context of a world undergoing an accelerated technological transition, Mechanical Engineering is a key pillar for the advancement of industry. According to a new report by the United Nations, the global industry is projected to grow at a rate of 6% per year in the coming years, which implies an increasing demand for more efficient and sustainable equipment. In this scenario, professionals need to incorporate the latest strategies to optimize their manufacturing processes into their daily practice.

Within this framework, TECH presents an exclusive Hybrid Master's Degree in Mechanical Engineering. Conceived by leaders in this field, the academic itinerary will delve into subjects ranging from the design of mechanical elements or the selection of materials for constructions to the use of cutting-edge technological tools. In this way, students will acquire advanced skills to solve technical challenges and optimize processes in various industrial sectors. In addition, they will be able to implement innovative solutions in the design and manufacture of machinery, adapting to market demands and using state-of-the-art technologies.

On the other hand, the methodology of this program consists of two stages. The first consists of a theoretical phase, which is taught in a convenient 100% online format. In addition, TECH uses its disruptive Relearning system to guarantee a progressive and natural learning, which does not require investing extra efforts like the traditional memorization. After this, the program includes a practical stay of 3 weeks in a reference entity in the field of Mechanical Engineering. This will allow graduates to take what they have learned to the practical field, in a real work scenario in the company of a team of experienced professionals in this area.

This **Hybrid Master's Degree in Mechanical Engineering** contains the most complete and up-to-date program on the market. The most important features include:

- Development of more than 100 case studies presented by Mechanical Engineering professionals
- Its graphic, schematic and practical contents provide essential information on those disciplines that are indispensable for professional practice
- All of this will be complemented by theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection
- Furthermore, you will be able to carry out an internship in one of the best companies

You will manage mechanical engineering projects, ensuring compliance with deadlines, budgets and technical specifications"

You will spend an intensive 3-week stay in a prestigious center and acquire all the knowledge you need to grow personally and professionally"

This Hybrid Master's Degree allows you to exercise in simulated environments, which provide immersive learning programmed to train in real situations.

You will apply improvements in production processes through the use of new technologies and design methodologies.

In this Master's proposal, of a professionalizing nature and blended learning modality, the program is aimed at updating Mechanical Engineering professionals. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge into everyday practice.

Thanks to its multimedia content elaborated with the latest educational technology, it will allow the Mechanical Engineering professional a situated and contextual learning, that is to say, a simulated environment that will provide an immersive learning programmed to train in real situations. The design of this program is based on Problem-Based Learning, by means of which the student must try to solve the different professional practice situations that arise during the program. For this purpose, students will be assisted by an innovative interactive video system created by renowned experts.

02

Why Study at TECH?

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

Study at the world's largest online university and guarantee your professional success. The future starts at TECH"

The world's best online university, according to FORBES

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

The best top international faculty

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

The world's largest online university

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

The most complete syllabuses on the university scene

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

A unique learning method

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

The official online university of the NBA

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

Leaders in employability

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

Google Premier Partner

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

The top-rated university by its students

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

03

Syllabus

The teaching materials that make up this Hybrid Master's Degree have been developed by authentic references in Mechanical Engineering. Therefore, the syllabus will delve into issues ranging from the design of mechanical elements or the use of thermal machines to the use of state-of-the-art technological tools. In this way, graduates will develop key skills in the optimization of industrial processes, structural analysis and technological innovation, which will allow them to lead projects and contribute to the advancement of engineering in highly competitive and constantly evolving sectors.

You will delve into the regulations and quality standards in Mechanical Engineering, ensuring the reliability of the designed systems"

Module 1. Project Management in Mechanical Engineering

1.1. Design Process
1.2. Research and Innovation
  1.2.1. Technological Creativity
  1.2.2. Fundamentals of Design Thinking
1.3. Modeling and Simulation
  1.3.1. 3D Design
  1.3.2. BIM Methodology
  1.3.3. Finite Elements
  1.3.4. 3D Printing
1.4. Project Management
  1.4.1. Start
  1.4.2. Planning
  1.4.3. Implementation
  1.4.4. Control
  1.4.5. Closure
1.5. Problem Solving
  1.5.1. 8D Methodology
1.6. Leadership and Conflict Resolution
1.7. Organization and Communication
1.8. Project Drafting
1.9. Regulations
1.10. Intellectual Property
  1.10.1. Patents
  1.10.2. Utility Models
  1.10.3. Industrial Design

Module 2. Mechanical Component Design

2.1. Failure Theories
  2.1.1. Static Failure Theories
  2.1.2. Dynamic Failure Theories
  2.1.3. Fatigue
2.2. Tribology and Lubrication
  2.2.1. Friction
  2.2.2. Wear
  2.2.3. Lubricants
2.3. Design of Shafts and Axles
  2.3.1. Shafts and Axles
  2.3.2. Keys and Spline Shafts
  2.3.3. Flywheels
2.4. Design of Rigid Transmissions
  2.4.1. Camshafts
  2.4.2. Spur Gears
  2.4.3. Bevel Gears
  2.4.4. Helical Gears
  2.4.5. Worm Screws
2.5. Design of Flexible Transmissions
  2.5.1. Chain Drives
  2.5.2. Belt Drives
2.6. Design of Bearings and Bushings
  2.6.1. Friction Bearings
  2.6.2. Rolling Bearings
2.7. Design of Brakes, Clutches and Couplings
  2.7.1. Brakes
  2.7.2. Clutches
  2.7.3. Couplings
2.8. Design of Mechanical Springs
2.9. Design of Non-Permanent Joints
  2.9.1. Bolted Joints
  2.9.2. Riveted Joints

2.10. Design of Permanent Joints
- 2.10.1. Welded Joints
- 2.10.2. Adhesive Joints

Module 3. Thermal, Hydraulic and Pneumatic Machines

3.1. Principles of Thermodynamics
3.2. Heat Transfer
3.3. Thermodynamic Cycles
- 3.3.1. Steam Cycles
- 3.3.2. Air Cycles
- 3.3.3. Refrigeration Cycles

3.4. Combustion Processes
3.5. Thermal Machines
- 3.5.1. Steam Turbine
- 3.5.2. Combustion Engines
- 3.5.3. Gas Turbines
- 3.5.4. Stirling Engine

3.6. Fluid Mechanics
- 3.6.1. Multidimensional Fluid Mechanics
- 3.6.2. Laminar Flow
- 3.6.3. Turbulent Flow

3.7. Hydraulic Systems and Hydrostatics
- 3.7.1. Distribution Networks
- 3.7.2. Hydraulic System Elements
- 3.7.3. Cavitation and Water Hammer

3.8. Hydraulic Machines
- 3.8.1. Positive Displacement Pumps
- 3.8.2. Rotary Pumps
- 3.8.3. Cavitation
- 3.8.4. Coupling of Hydraulic Installations

3.9. Turbomachines
- 3.9.1. Action Turbines
- 3.9.2. Reaction Turbines

3.10. Pneumatics
- 3.10.1. Compressed Air Production
- 3.10.2. Compressed Air Preparation
- 3.10.3. Elements of a Pneumatic System
- 3.10.4. Vacuum Generators
- 3.10.5. Actuators

Module 4. Structures and Installations

4.1. Structural Calculations
- 4.1.1. Beam Calculations
- 4.1.2. Column Calculations
- 4.1.3. Frame Calculation
- 4.1.4. Foundations
- 4.1.5. Preloaded Structures

4.2. Low Voltage Electrical Installations
4.3. Heating, Ventilation, and Air Conditioning Installations
- 4.3.1. Heating Installations
- 4.3.2. Air Conditioning Installations
- 4.3.3. Ventilation Installations

4.4. Sanitary Water and Sewerage Systems
- 4.4.1. Water Installations
- 4.4.2. Domestic Hot Water Systems - DHW
- 4.4.3. Sewer Networks

4.5. Fire Safety Installations
- 4.5.1. Portable Extinguishing Systems
- 4.5.2. Detection and Alarm Systems
- 4.5.3. Automatic Extinguishing Systems
- 4.5.4. Fire Hydrants, Dry Columns, and BIEs

4.6. Communication, Home Automation and Security Installations
4.7. Thermal and Acoustic Insulation

4.8. Steam, Compressed Air and Medical Gases Installations
- 4.8.1. Steam Installations
- 4.8.2. Compressed Air Installations
- 4.8.3. Medical Gas Installations

4.9. Gas and Liquid Fuels Installations
- 4.9.1. Natural Gas Installations
- 4.9.2. Liquefied Petroleum Gas Installations
- 4.9.3. Liquid Hydrocarbon Facilities

4.10. Energy Certifications
- 4.10.1. Energy Demand Control
- 4.10.2. Renewable Energy Contribution
- 4.10.3. Energy Audits
- 4.10.4. ISO 50001 Energy Certification

Module 5. Advanced Dynamics

5.1. Advanced Machine Dynamics

5.2. Vibrations and Resonance

5.3. Longitudinal Vehicle Dynamics
- 5.3.1. Vehicle Performance
- 5.3.2. Vehicle Braking

5.4. Transverse Vehicle Dynamics
- 5.4.1. Steering Geometry
- 5.4.2. Circulation in Curves

5.5. Railroad Dynamics
- 5.5.1. Traction Efforts
- 5.5.2. Braking Efforts

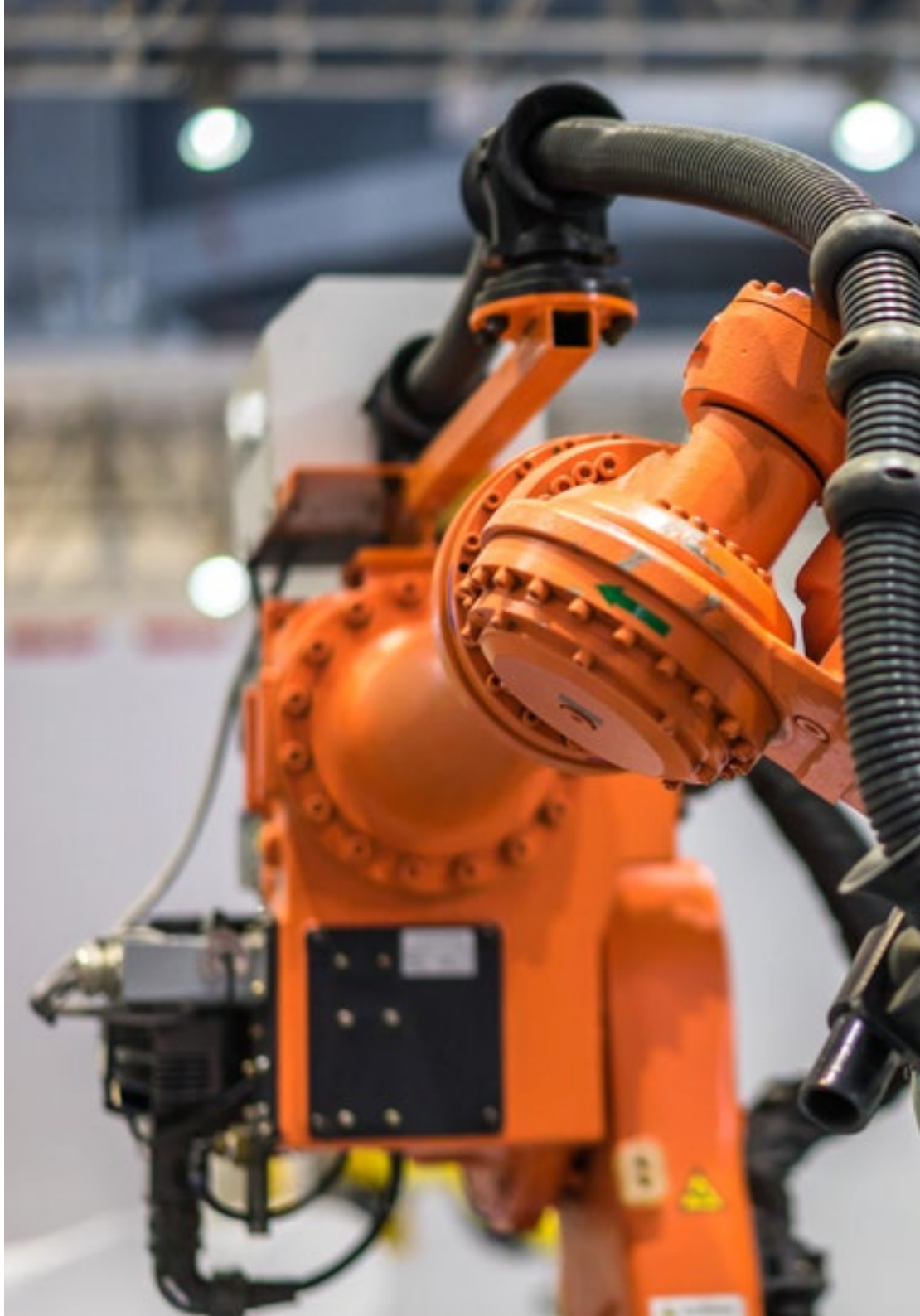
5.6. Dynamics of Mechanical Microsystems

5.7. Robot Kinematics
- 5.7.1. Direct Kinematic Problem
- 5.7.2. Inverse Kinematic Problem

5.8. Robot Dynamics

5.9. Biomimicry

5.10. Dynamics of Human Movement



Module 6. Design for Manufacturing

6.1. Design for Manufacturing and Assembly
6.2. Forming by Molding
  6.2.1. Casting
  6.2.2. Injection Molding
6.3. Forming by Deformation
  6.3.1. Plastic Deformation
  6.3.2. Stamping
  6.3.3. Forging
  6.3.4. Extrusion
6.4. Forming by Material Removal
  6.4.1. Abrasive Loss
  6.4.2. Chip Removal
6.5. Heat Treatment
  6.5.1. Hardening
  6.5.2. Tempering
  6.5.3. Annealing
  6.5.4. Normalizing
  6.5.5. Thermochemical Treatments
6.6. Application of Paints and Coatings
  6.6.1. Electrochemical Treatments
  6.6.2. Electrolytic Treatments
  6.6.3. Paints, Lacquers and Varnishes
6.7. Polymer and Ceramic Material Forming
6.8. Composite Material Part Manufacturing
6.9. Additive Manufacturing
  6.9.1. Powder Bed Fusion
  6.9.2. Direct Energy Deposition
  6.9.3. Binder Jetting
  6.9.4. Bound Extrusion Power
6.10. Robust Engineering
  6.10.1. Taguchi Method
  6.10.2. Design of Experiments
  6.10.3. Statistical Process Control

Module 7. Materials

7.1. Material Properties
- 7.1.1. Mechanical Properties
- 7.1.2. Electrical Properties
- 7.1.3. Optical Properties
- 7.1.4. Magnetic Properties

7.2. Metallic Materials I - Ferrous

7.3. Metallic Materials II - Non-ferrous

7.4. Polymeric Materials
- 7.4.1. Thermoplastics
- 7.4.2. Thermosetting Plastics

7.5. Ceramic Materials

7.6. Composite Materials

7.7. Biomaterials

7.8. Nanomaterials

7.9. Corrosion and Degradation of Materials
- 7.9.1. Types of Corrosion
- 7.9.2. Oxidation of Metals
- 7.9.3. Corrosion Control

7.10. Non-Destructive Testing
- 7.10.1. Visual Inspections and Endoscopies
- 7.10.2. Ultrasound
- 7.10.3. X-Rays
- 7.10.4. Eddy Currents (Eddy)
- 7.10.5. Magnetic Particles
- 7.10.6. Penetrating Liquids
- 7.10.7. Infrared Thermography

Module 8. Mechanics 4.0

8.1. Introduction to Industry 4.0

8.2. Principles of Mechatronics

8.3. Sensorization and Detection
- 8.3.1. Range Detection
- 8.3.2. Proximity Detection
- 8.3.3. Contact Sensors
- 8.3.4. Force Detection

8.4. Actuators

8.5. Control Systems

8.6. Computer Vision
- 8.6.1. Vision Sensors
- 8.6.2. Integrated Vision Systems
- 8.6.3. Advanced Vision Systems

8.7. Digital Twins

8.8. The Internet of Things
- 8.8.1. Hardware
- 8.8.2. Software and Connectivity
- 8.8.3. Rules
- 8.8.4. Services

8.9. Cloud Computing and Big Data
- 8.9.1. Storage Technology
- 8.9.2. Analysis Techniques

8.10. Machine Learning and Artificial Intelligence

Module 9. Design for Reliability, Safety and Environment

9.1. RAMS Engineering Fundamentals
- 9.1.1. Reliability, Maintainability and Availability Functions
- 9.1.2. Failure Curves
- 9.1.3. Statistical Distributions

9.2. Reliability of Elements

9.3. System Reliability
- 9.3.1. Reliability Block Diagrams-RBD

9.4. Reliability Analysis I-Qualitative Methods
- 9.4.1. Failure Mode and Effects Analysis-FMEA

9.5. Reliability Analysis II- Quantitative Methods
- 9.5.1. Fault Tree Analysis-FTA

9.6. Improved Reliability and Accelerated Life Testing
- 9.6.1. Reliability Improvement Plans
- 9.6.2. Accelerated Life Assays-HASS/HALT

9.7. Machine Safety
- 9.7.1. Security Management Programs

9.8. Risk Analysis
- 9.8.1. Risk Matrix
- 9.8.2. ALARP
- 9.8.3. Operational Hazard Studies-HAZOP
- 9.8.4. Safety Level-SIL
- 9.8.5. Event Tree Analysis-ETA
- 9.8.6. Root Cause Analysis-RCA

9.9. Environment and Circular Economy
- 9.9.1. Environmental Management
- 9.9.2. Fundamentals of Circular Economy

9.10. Reliability Centered Maintenance-RCM
- 9.10.1. SAE Standard JA1011
- 9.10.2. Failure Management Policies

Module 10. Continuous Improvement of Operations

10.1. Development of Continuous Improvement Processes
- 10.1.1. Overall Equipment Efficiency (OEE)
- 10.1.2. The 7 Wastes
- 10.1.3. Value Stream Mapping (VSM)
- 10.1.4. Kaizen Events

10.2. Standardization of Processes

10.3. Visual Management
- 10.3.1. Kanban
- 10.3.2. Andon

10.4. Leveled Production - Heijunka
- 10.4.1. Takt-Time

10.5. Just-in-Time (JIT)
- 10.5.1. 5S
- 10.5.2. Single-Minute Exchange of Dies (SMED)

10.6. Quality at the Source - Jidoka
- 10.6.1. Poka-Yokes

10.7. Total Productive Maintenance (TPM)
- 10.7.1. The 16 Major Losses
- 10.7.2. TPM Pillars

10.8. Development of Excellent People
- 10.8.1. Theory X and Theory Y
- 10.8.2. Teal Organizations
- 10.8.3. Spotify Model

10.9. Other Continuous Improvement Theories
- 10.9.1. Six Sigma
- 10.9.2. World Class Manufacturing WCM
- 10.9.3. Theory of Constraints (ToC)

10.10. Change Management

04

Teaching Objectives

The program design of this Hybrid Master's Degree in Mechanical Engineering will allow students to update their skills by analyzing the key aspects in the design, optimization and management of mechanical systems. The curriculum will enable the professional to address technological challenges, improving their ability to adapt to a global industrial sector and in constant innovation, ensuring excellence in Mechanical Engineering.

You will be highly qualified to identify, analyze and solve complex problems related to mechanical engineering in industrial systems"

General Objective

- The overall objective of the Hybrid Master's Degree in Mechanical Engineering is to update professionals in the most advanced procedures in design, analysis and optimization of mechanical systems. Through a practical stay in high-tech industrial environments, students will work with experts in the field, perfecting their skills and acquiring essential knowledge for the improvement of processes and the management of complex mechanical projects, raising their professional competence.

This Hybrid Master's Degree has a wide range of multimedia resources such as videos and infographics, allowing a more didactic learning"

Specific Objectives

Module 1. Project Management in Mechanical Engineering

- Master all aspects of Mechanical Engineering design
- Manage projects, following the steps accepted by international standards
- Apply the Soft Skills necessary for the successful management of engineering projects
- Analyze the regulations required to carry out engineering projects

Module 2. Mechanical Component Design

- Evaluate the different failure theories, for their application to each machine element
- Analyze the performance of different lubricants in specific machine applications
- Design, analyze and evaluate machine components, using state-of-the-art design tools
- Evaluate the different alternatives for the design of machine elements

Module 3. Thermal, Hydraulic and Pneumatic Machines

- Master the principles of thermodynamics necessary for the development of machines
- Create heat transfer systems capable of delivering energy
- Analyze and evaluate different combustion processes
- Design hydraulic and hydrostatic systems, capable of generating, transmitting and storing energy

Module 4. Structures and Installations

- Design, analyze and evaluate industrial and building structures
- Design, analyze and evaluate air conditioning, ventilation, sanitary water and sanitation installations in residential, industrial and tertiary buildings
- Design, analyze and evaluate fire safety installations in all types of buildings
- Design, analyze and evaluate special installations in all types of buildings
- Design, analyze and evaluate acoustic and thermal insulation installations in all types of buildings
- Design lighting, electrical power and control installations, which fall within the remit of mechanical engineers

Module 5. Advanced Dynamics

- Master the aspects of advanced machine dynamics
- Analyze and evaluate vibration and resonance phenomena in machine elements and structures
- Analyze and evaluate the dynamic behavior of vehicles
- Analyze and evaluate the dynamic behavior of electromechanical microsystems
- Analyze and evaluate the dynamic behavior of robots
- Analyze and evaluate the dynamic behavior of humans and other living beings

Module 6. Design for Manufacturing

- Design machine elements with optimized manufacturing and assembly processes
- Analyze and evaluate different mold forming processes
- Analyze and evaluate different plastic deformation forming processes
- Analyze and evaluate different material loss forming processes
- Analyze and evaluate the different heat treatments on machine elements
- Analyze and evaluate paint and coating application systems
- Analyze and evaluate the forming processes of polymers and ceramic materials
- Analyze and evaluate the manufacturing processes of complex materials
- Analyze and evaluate the different additive manufacturing processes
- Create, analyze and evaluate robust manufacturing processes to ensure the quality of the finished product

Module 7. Materials

- Analyze and evaluate materials used in engineering based on their properties
- Analyze and evaluate metallic materials, both ferrous and non-ferrous
- Analyze and evaluate polymeric, ceramic and composite materials
- Analyze and evaluate materials used in additive manufacturing
- Know the principles of nanomaterials
- Understand, analyze and evaluate the processes of corrosion and degradation of materials

Module 8. Mechanics 4.0

- Master the principles of Industry 4.0 and its applications in Mechanical Engineering
- Create, evaluate and analyze designs that combine mechanics and electronics
- Create, evaluate and analyze mechanical systems including sensing, detection, actuators, control systems and machine vision
- Evaluate and analyze applications of Internet of Things, Cloud Computing, Big Data, Machine Learning and Artificial Intelligence in Mechanical Engineering

Module 9. Design for Reliability, Safety and Environment

- Master the principles of reliability, availability, maintainability and safety (RAMS) engineering
- Evaluate and analyze the reliability of elements and systems, using both qualitative and quantitative systems
- Master the mathematics used in reliability analysis
- Design accelerated life testing and reliability improvement plans on mechanical components
- Analyze and evaluate safety risks in mechanical elements
- Analyze and evaluate risks to the environment in mechanical elements
- Apply the principles of circular economy to the design of mechanical systems
- Create maintenance plans based on the Reliability Centered Maintenance (RCM) methodology to ensure the safety and reliability of mechanical elements

Module 10. Continuous Improvement of Operations

- Master the principles of continuous operations improvement
- Create, analyze and evaluate production systems based on the Lean Manufacturing methodology
- Create standardized processes
- Create visual management systems
- Develop systems for level production, just-in-time processes and quality assurance at the source
- Create machine efficiency improvement plans based on the Total Productive Maintenance TPM methodology
- Develop work teams made up of excellent people.
- Create change management programs

Delve into the most relevant theory in this field, subsequently applying it in a real work environment"

05

Internship

After passing the online theoretical period, the program includes a period of practical training in a reference institution in the field of Mechanical Engineering. In turn, students will have at their disposal the support of a tutor specialized in this area who will accompany them throughout the process, both in the preparation and in the development of the internship.

You will carry out a practical training in a reference institution in Mechanical Engineering"

The Internship Program of this Mechanical Engineering program consists of a practical internship in a reference institution in Mechanical Engineering, lasting 3 weeks, from Monday to Friday with 8 consecutive hours of practical training with an assistant specialist. This internship will allow students to work on projects of design, analysis, manufacturing and optimization of mechanical systems, reinforcing their practical skills and improving their ability to make decisions in a professional environment.

In this training proposal, completely practical in nature, the activities are aimed at developing and perfecting the skills necessary for the provision of Mechanical Engineering services in areas and conditions that require a high level of qualification, and which are oriented towards specific training for the exercise of the activity, in an environment of patient safety and high professional performance.

It is undoubtedly a unique opportunity to learn by working in one of the leading institutions in the field of mechanical engineering, where technological innovation and process optimization are at the center of the professional culture.

The practical part will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of the professors and other training partners that facilitate teamwork and multidisciplinary integration as transversal competences for the praxis of Mechanical Engineering (learning to be and learning to relate).

The procedures described below will be the basis of the practical part of the training, and its realization will be subject to the center's own availability and workload, being the proposed activities the following:

Module	Practical Activity
Project Coordination in Mechanical Engineering	Establish the project schedule, determining delivery times, intermediate deadlines and development stages
	Coordinate work teams with different specialties (mechanical, electrical, etc.)
	Supervise the assignment of tasks and responsibilities within the engineering team
	Identify potential risks related to the project, such as technical problems, machinery failures or material delivery delays
Conception of Mechanical Components	Identify customer needs and operating conditions of the mechanical component
	Analyze material properties suitable for mechanical components (strength, durability, weight, cost)
	Create initial solutions for the mechanical component, considering constraints and functional requirements
	Perform stress, strain and fatigue analysis of mechanical elements using simulation software
Environmentally Responsible Design	Conduct product and system reliability studies using methods such as failure mode and effects analysis (FMEA) or fault tree analysis
	Evaluate potential system failures and associated risks during the system life cycle (from design to operation) and establish strategies to mitigate them
	Incorporate safety features from the start of design, such as overload protection, short-circuit protection, emergency devices, etc.
	Design products that are robust and provide consistent performance over their lifetime, minimizing maintenance requirements and the likelihood of premature failure
Production-Oriented Design	Choose suitable materials for manufacturing based on their mechanical properties, cost and ease of workability with available manufacturing processes
	Determine the tolerances required for each component, balancing accuracy with manufacturing cost
	Use simulation software and CAD/CAM tools to predict the design behavior in the manufacturing processes
	Create detailed plans for the mass production of components, establishing schedules, required resources and possible bottlenecks

Civil Liability Insurance

The university's main concern is to guarantee the safety of the interns, other collaborating professionals involved in the internship process at the center. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, the university commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the stay at the internship center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the Internship Program period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.

General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

1. TUTOR: During the Hybrid Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

2. DURATION: The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

3. ABSENCE: If the students does not show up on the start date of the Hybrid Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

4. CERTIFICATION: Professionals who pass the Hybrid Master's Degree will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: the Hybrid Master's Degree shall not constitute an employment relationship of any kind.

6. PRIOR EDUCATION: Some centers may require a certificate of prior education for the Hybrid Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

7. DOES NOT INCLUDE: The Hybrid Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

06

Internship Centers

This Hybrid Master's Degree program includes in its itinerary a practical stay in a prestigious institution where the student will put into practice everything learned in Mechanical Engineering. In this sense, and to bring this university program to more professionals, TECH offers students the opportunity to study it in different centers geographically. In this way, this institution strengthens its commitment to quality and affordable education for all.

You will carry out a practical internship in a renowned institution, where you will delve into the latest advances in Mechanical Engineering"

The student will be able to complete the practical part of this Hybrid Master's Degree at the following centers:

Engineering

Talleres Alegría (Calle Peñasanta 7)

Country: Spain

City: Asturias

Address: Calle Peñasanta 7, Parque Empresarial Silvota, Llanera, 33192, Asturias

Talleres Alegría is a company dedicated exclusively to the manufacture of railway material and equipment

Related internship programs:

Mechanical Engineering

Talleres Alegría (Calle Peñasanta Parcela 10)

Country: Spain

City: Asturias

Address: Calle Peñasanta Parcela 10, Parque Empresarial Silvota, Llanera, 33192, Asturias

Talleres Alegría is a company dedicated exclusively to the manufacture of railway material and equipment

Related internship programs:

Mechanical Engineering

Talleres Alegría (Plaza del Aramo 104)

Country: Spain

City: Asturias

Address: Plaza del Aramo 104, Parque Empresarial Silvota, Llanera, 33192, Asturias

Talleres Alegría is a company dedicated exclusively to the manufacture of railway material and equipment

Related internship programs:

Mechanical Engineering

07

Career Opportunities

This Hybrid Master's Degree program in Mechanical Engineering from TECH offers a unique opportunity for industry professionals looking to upgrade their skills in advanced technologies. Through its practical and cutting-edge approach, graduates will be able to improve their ability to design, optimize and manage mechanical systems, which will significantly broaden their career prospects in a constantly evolving industry.

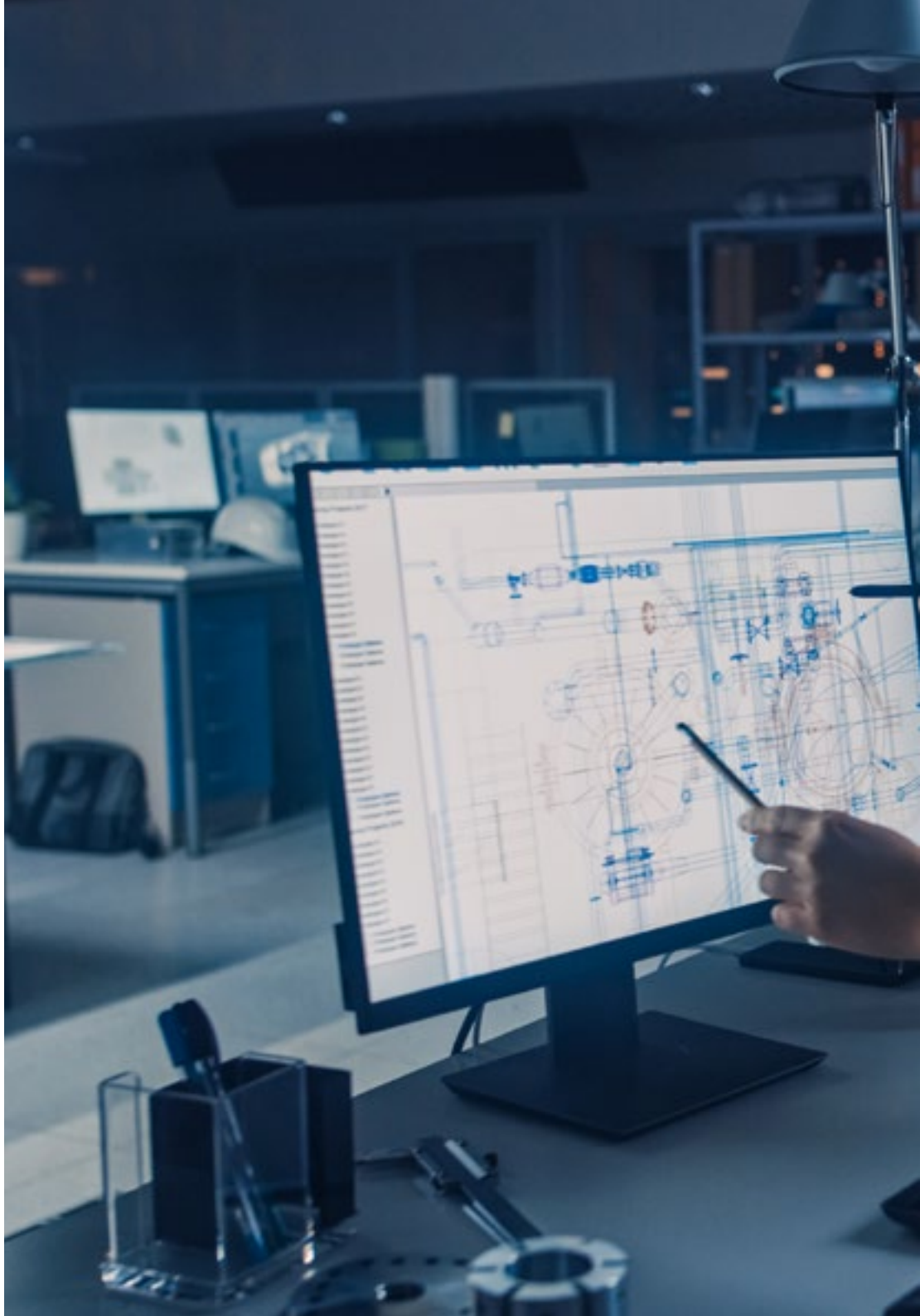
Do you want to work as an Industrial Machinery Maintenance and Management Engineer? This university program will give you the keys to achieve it in only 12 months"

Graduate Profile

Graduates of this comprehensive university program will be highly qualified to design, optimize and manage advanced mechanical systems. At the same time, students will have the skills to implement innovative technological solutions that improve industrial efficiency, optimize processes and ensure safety in manufacturing. In addition, you will be able to lead innovation projects and promote continuous improvement in the sector.

You will be able to manage comprehensive Mechanical Engineering projects, from planning to execution.

- **Technological Innovation in Mechanical Engineering:** Ability to integrate advanced technologies, such as automation, in the design and optimization of mechanical systems, improving the efficiency and sustainability of industrial processes
- **Technical Problem Solving:** Ability to apply critical thinking and simulation tools in the identification and resolution of complex problems in the design, manufacturing and maintenance of mechanical components
- **Commitment to Sustainability and Safety:** Responsibility for the implementation of sustainable practices and compliance with industrial safety regulations, ensuring reliability and environmental protection in the Engineering processes
- **Interdisciplinary Collaboration:** Aptitude to work effectively in multidisciplinary teams, collaborating with professionals from various areas (such as design, production and quality), integrating knowledge and achieving innovative solutions in Mechanical Engineering projects



After completing the program, you will be able to perform your knowledge and skills in the following positions:

1. **Engineer specialized in Design and Optimization of Mechanical Systems:** Responsible for developing, analyzing and optimizing advanced mechanical systems and components, ensuring their performance, efficiency and sustainability in industrial environments.
2. **Engineer in charge of Mechanical Engineering Project Management:** Responsible for managing mechanical engineering projects, from planning to execution, ensuring that deadlines, budgets and quality requirements are met.
3. **Engineer in Research and Development of New Mechanical Technologies:** Engaged in the research of new technologies and materials in the field of Mechanical Engineering, implementing innovations to improve manufacturing and product design.
4. **Automotive and Mechanical Engineering Consultant:** Advises companies on the implementation of Mechanical Engineering solutions in the automotive sector, helping to improve product efficiency, reliability and competitiveness.
5. **Industrial Machinery Management and Maintenance Engineer:** Responsible for the management and maintenance of industrial equipment and machinery, ensuring their reliability and prolonging their useful life through preventive maintenance programs.
6. **Production and Industrial Process Engineer:** Responsible for supervising and optimizing production processes in factories and industrial plants, ensuring that products are manufactured with maximum efficiency.

08

Study Methodology

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

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

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

The student: the priority of all TECH programs

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

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

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

The most comprehensive study plans at the international level

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

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

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

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

Case Studies and Case Method

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

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

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

Relearning Methodology

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

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

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

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

A 100% online Virtual Campus with the best teaching resources

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

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

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

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

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

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

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

The university methodology top-rated by its students

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

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

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

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

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

Study Material

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

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

Practicing Skills and Abilities

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

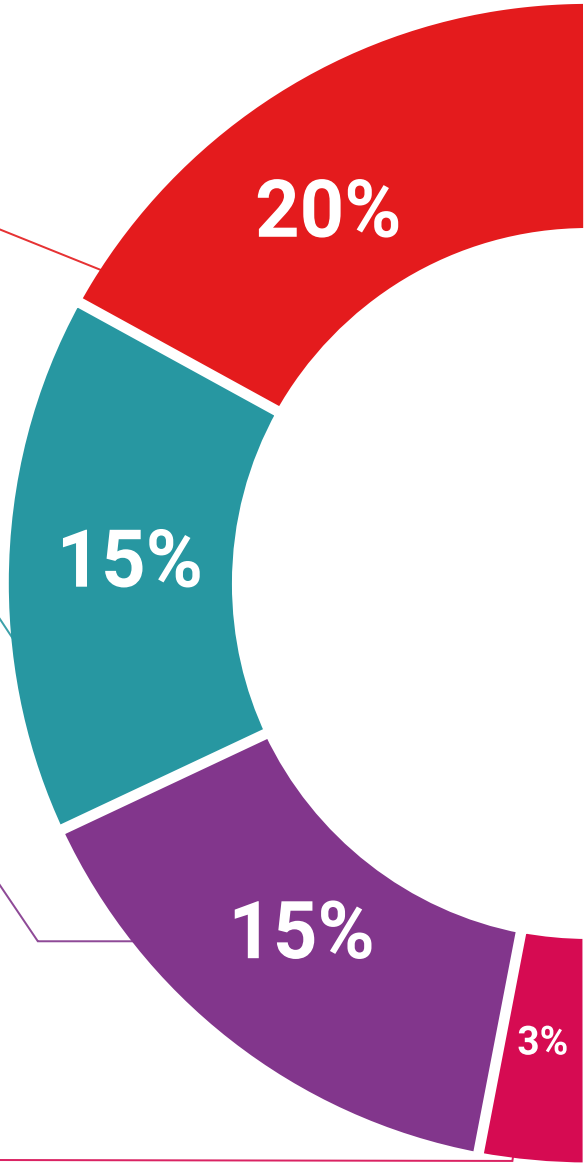
Interactive Summaries

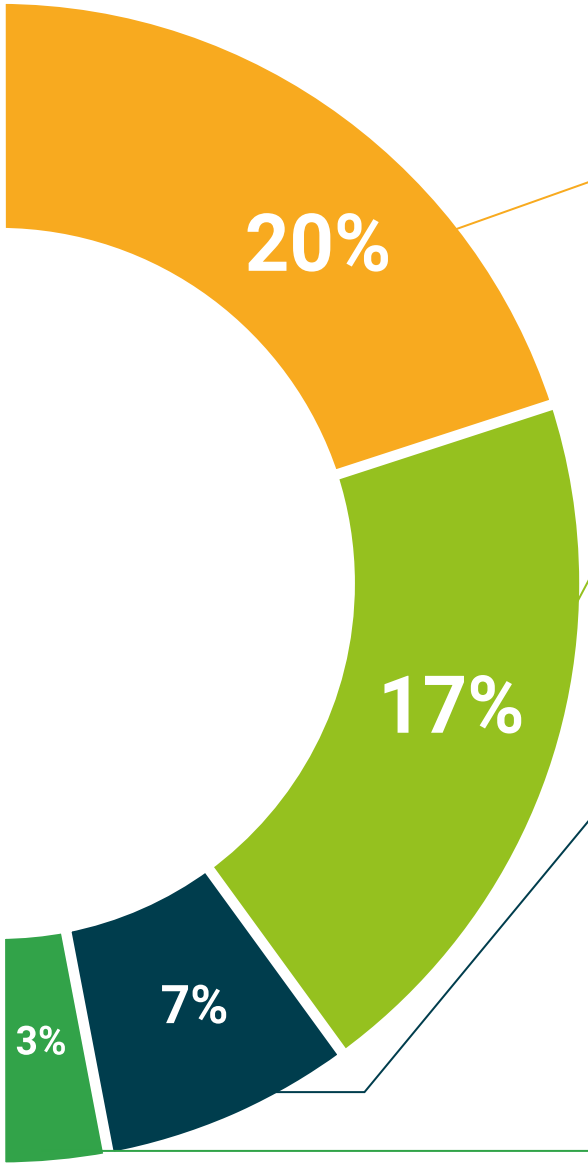
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

Additional Reading

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





Case Studies

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

Testing & Retesting

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

Classes

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

Learning from an expert strengthens knowledge and memory, and generates confidence for future difficult decisions.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical and effective way to help students progress in their learning.

09

Teaching Staff

Firm to its commitment to offer the most complete and renewed university programs in the academic panorama, TECH carries out a meticulous process to form its teaching staff. Thanks to this effort, this Hybrid Master's Degree has the participation of recognized experts in Mechanical Engineering. As a result, they have developed various teaching materials characterized by their excellent quality and full applicability to the demands of today's labor market. Therefore, students will enter into an immersive experience that will broaden their significant professional horizons.

You will have the support of the teaching staff, made up of authentic references in Mechanical Engineering"

Management

Mr. Asiain Sastre, Jorge

- Director of Asset Management at Aqualia
- Founder and Senior Mechanical Engineer at AlterEvo Ltd
- Technical Support Engineer at BP Oil Spain
- Technical Support Engineer at Mobil Oil S.A
- Project Engineer at Gomyl S.A
- Industrial Technical Engineer - Mechanics from the University of Salamanca
- Master's Degree in Automotive Engineering
- Master's Degree in Business Administration

Professors

Dr. De Lama Burgos, Carlos

- Industrial Engineer and Legal Technical Advisor
- Technical Consultant at the Official Association of Graduates and Industrial Technical Engineers of Madrid
- Qualification Director at INGECER
- Doctorate in Sciences from the National University of Distance Education
- Master's Degree in Renewable Energies from CEU San Pablo University
- Industrial Technical Engineer by the Polytechnic University of Madrid
- Superior Technician in Occupational Risk Prevention, Occupational Safety, Industrial Hygiene, Ergonomics and Applied Psychosociology by Les Heures of the University of Barcelona

Mr. Berdún Barbero, Daniel

- Technical Office Manager at INSTER
- Mechanical Engineer at Anta
- Head of Mechanical Engineering at IBETOR
- R+D Mechanical Engineer at SEDECAL
- Industrial Engineer by the Advanced Technical School of Industrial Engineering

Mr. Panero, David

- Electrical Engineer at Jaguar Land Rover
- Mechanical Engineer in the Mechanical Design Department of Horiba Automotive Test Systems in Madrid
- R&D Engineer at Scania Group
- Degree in Industrial Technologies Engineering with specialization in Mechanics from the Polytechnic University of Madrid
- Double Master's Degree in Mechatronics Engineering and Industrial Technologies Engineering from the Polytechnic University of Turin
- Member of: UPM Racing in the Engine Division

Mr. Iglesias Alonso, Luis

- Director of Engineering at Avia Engineering & Design
- President of the Technical Commission of Production and Launching of New Products in the Spanish Association of Automotive Professionals (ASEPA)
- Certification Engineer responsible for Electrical Safety, Batteries and Electromagnetic Compatibility at SCANIA
- Degree in Engineering from the University of Salamanca

Ms. Prieto Díaz, Beatriz

- Mechanical Engineer with Specialization in Electrical Risks
- Mechanical Engineer at Riesgos y Electricidad Salamanca SL
- Master's Degree in Industrial Mechanics from Carlos III University
- Degree in Mechanical Engineering from the University of Salamanca

10

Certificate

This Hybrid Master's Degree in Mechanical Engineering guarantees students, in addition to the most rigorous and up-to-date education, access to a diploma for the Hybrid Master's Degree 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 **Hybrid Master's Degree in Mechanical Engineering** 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.

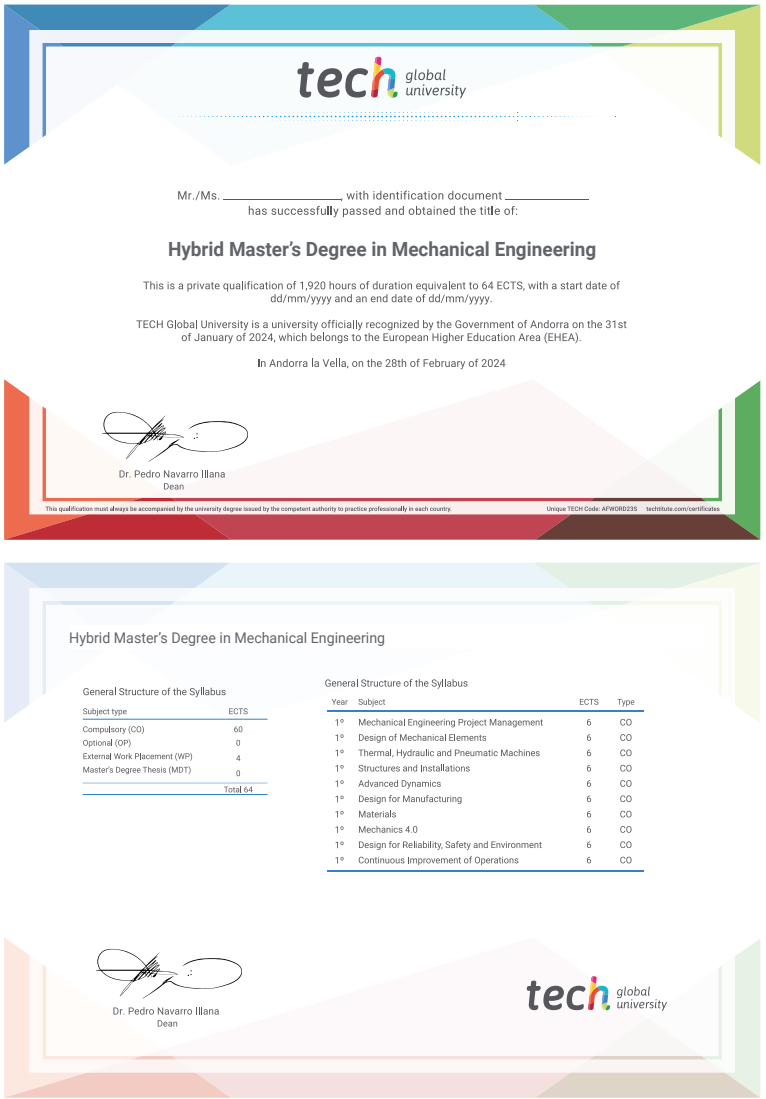
TECH is a member of the American Society for Engineering Education (ASEE), a society made up of the greatest international engineering experts in the private sector. The ASEE provides students with multiple tools for their professional development, such as workshops, access to exclusive scientific publications, conference archives and opportunities for professional growth.
TECH is a member of:

Title: **Hybrid Master's Degree in Mechanical Engineering**

Modality: **online**

Duration: **12 months**

Accreditation: **60 + 4 ECTS**



tech global university

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

Hybrid Master's Degree in Mechanical Engineering

This is a private qualification of 1,920 hours of duration equivalent to 64 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

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

Hybrid Master's Degree in Mechanical Engineering

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	4
Master's Degree Thesis (MDT)	0
Total 64	

General Structure of the Syllabus

Year	Subject	ECTS	Type
1°	Mechanical Engineering Project Management	6	CO
1°	Design of Mechanical Elements	6	CO
1°	Thermal, Hydraulic and Pneumatic Machines	6	CO
1°	Structures and Installations	6	CO
1°	Advanced Dynamics	6	CO
1°	Design for Manufacturing	6	CO
1°	Materials	6	CO
1°	Mechanics 4.0	6	CO
1°	Design for Reliability, Safety and Environment	6	CO
1°	Continuous Improvement of Operations	6	CO

Dr. Pedro Navarro Illana
Dean

tech global university

*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.

tech global university

Hybrid Master's Degree
Mechanical Engineering

Modality: **Hybrid (Online + Internship)**
Duration: **12 months**
Certificate: **TECH Global University**
Credits: **60 + 4 ECTS**

Hybrid Master's Degree
Mechanical Engineering

TECH is a member of:

ASEE

tech global university