



ETN SMART LAB

FOR STUDENTS

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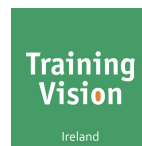
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3D PRINTING

CREATE, INNOVATE, AND PRINT

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

The world of 3D modeling and 3D printing is revolutionizing design, art, education, and industry. With this course, students will acquire practical skills to design, optimize, and transform ideas into physical objects, exploring the infinite possibilities of digital fabrication. From modeling to printing, to learn how to use advanced tools and to solve technical problems, developing creativity and innovation skills.

General learning goals

- Fundamentals of Digital Fabrication:** Acquire a solid understanding of the principles governing the entire digital fabrication process, from the conception of an idea to its transformation into a physical object through 3D modeling and printing.
- Advanced Skills in Modeling Software Usage:** Develop practical skills in using professional and industry-standard 3D modeling software such as Tinkercad, Fusion 360, and Blender, to create complex and detailed models.
- Innovation and Problem Solving through 3D Design:** Explore how 3D modeling and printing can be used to innovate, develop prototypes, and solve problems creatively and efficiently in industrial, artistic, and educational fields.
- Knowledge of Printing Technologies and Materials:** Provide students with in-depth knowledge of different 3D printing technologies (FDM, SLA, SLS) and materials (PLA, ABS, resins), to be able to choose the most suitable solution for each specific project.
- Preparation for a Future in Digital Design:** Provide the technical and creative skills to anticipate and guide change in the design and production sectors, preparing students for innovative careers in a constantly evolving global market.

Specific learning goals

- Mastery of 3D Modeling Software:** Achieve practical competence in creating 3D models, using the tools and features of professional software to translate a concept into a detailed digital file.
- Practical Application of Optimization Techniques:** Apply theoretical knowledge to optimize 3D models for printing, using slicing techniques and adjusting parameters to ensure efficient, high-quality production.
- Direct Experience in the Printing and Finishing Process:** Gain direct experience in the entire 3D printing workflow, from file preparation and printer management to the manual finishing of the customized physical object.
- Effective Resolution of Technical Problems:** Develop the ability to diagnose and resolve common problems and errors that occur during the 3D printing process, improving the reliability and quality of the results.
- Professional Presentation of Completed Projects:** Develop the ability to clearly and professionally present one's own 3D printed project, explaining the design choices, the modeling process, and the technical solutions adopted.

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AI AND MECHATRONICS

CREATING AN INTELLIGENT ROBOT WITH AI, TINKERCAD & BLOCKLY

KEY COMPETENCE > 3: MATHEMATICAL COMPETENCE AND COMPETENCE IN SCIENCE, TECHNOLOGY AND ENGINEERING

KEY COMPETENCE > 4: DIGITAL COMPETENCE

Abstract

The AI and Mechatronics course is a practical and innovative experience designed to guide students in exploring the world of mechatronics and artificial intelligence. Participants will not only learn to design, assemble, and program an autonomous light-following robot, but they will also discover how artificial intelligence can be leveraged to improve the robot's performance by optimizing code in real-time. Using accessible no-code tools like TinkerCAD and Blockly, and taking advantage of AI like ChatGPT and GitHub Copilot, students will engage in an interactive learning path. Working in teams, they will test and improve their projects with a data-driven iterative approach, and then present the working prototype in a final event, demonstrating the skills acquired.

General learning goals

1. **Practical and Interactive Learning:** Build and program a real robot, experimenting directly with sensors, motors, and software.
2. **Problem Solving:** Develop and refine analytical and complex problem-solving skills in technological contexts.
3. **Teamwork:** Work effectively in a team, collaborating to achieve a common goal and valuing each member's contributions.
4. **Skills for the Future:** Acquire the foundations of mechatronics and automation, key sectors for Industry 4.0.
5. **No-Code & AI Coding:** Learn to use no-code programming tools (Blockly, TinkerCAD) and artificial intelligence for automated code generation and optimization.
6. **Robotic Design:** Develop skills in building intelligent circuits that react in real-time to environmental stimuli.
7. **Analysis & Optimization:** Learn to use AI to analyze collected data and systematically improve the robot's performance.
8. **Mechanics and Automation:** Understand the principles of component selection, advanced design, and the development of adaptive systems.
9. **Effective Communication:** Develop public speaking and technical presentation skills to clearly and professionally showcase one's project.

AI AND MECHATRONICS

CREATING AN INTELLIGENT ROBOT WITH AI, TINKERCAD & BLOCKLY

**KEY COMPETENCE > 3: MATHEMATICAL COMPETENCE AND COMPETENCE IN SCIENCE,
TECHNOLOGY AND ENGINEERING**

KEY COMPETENCE > 4: DIGITAL COMPETENCE

Specific learning goals

- 1. Design and Construction:**
 - Design and physically build a Light-Following Robot.
 - Learn to integrate mechanical, electronic, and software components into a single functioning system.
- 2. Programming and AI Integration:**
 - Use no-code tools like TinkerCAD and Blockly to make programming accessible.
 - Leverage Artificial Intelligence (ChatGPT, GitHub Copilot) to generate, optimize, and improve the robot's code.
- 3. Channels:**
 - Select the most appropriate distribution channels for the value proposition.
 - Optimize channels based on market coverage, costs, and effectiveness.
 - Adapt to changes in customer channel preferences.
- 4. Testing and Iterative Improvement:**
 - Actively test the project to identify areas for improvement.
 - Adopt an iterative, data-driven approach to enhance the robot's performance.
- 5. Project Presentation:**
 - Present the final robot prototype at a concluding event.
 - Demonstrate the technical skills acquired and the added value of artificial intelligence applied to robotics.

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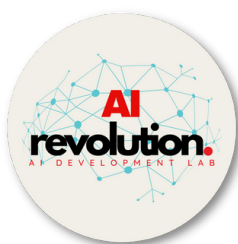


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AI REVOLUTION

GENERATIVE AI PROJECTS

KEY COMPETENCE > 1: LITERACY COMPETENCE

KEY COMPETENCE > 4: DIGITAL COMPETENCE

Abstract

The **AI Revolution: Generative AI Projects** course represents a deep dive into the universe of generative artificial intelligence, exploring its applications through the development of practical projects. Using cutting-edge tools like ChatGPT, MidJourney, Stable Diffusion, and DALL-E, the program aims to unveil the potential of AI in creating innovative textual, graphic, and multimedia content. Through a laboratory-based approach, participants will be guided in understanding the dynamics behind AI-assisted content generation, learning to navigate the technical and ethical challenges this technology entails. The objective is the development of skills that enable students to integrate generative AI into various professional and personal fields, promoting a new era of creative and technological solutions.

General learning goals

The general training objectives for the "AI Revolution: Generative AI Projects" course are:

- 1. Understanding Generative AI Technologies:** Providing a comprehensive overview of generative artificial intelligence, highlighting its potential and limitations.
- 2. Development of Practical Skills:** Learning to use tools like ChatGPT, MidJourney, Stable Diffusion, and DALL-E to create innovative content.
- 3. Critical Reflection on AI Ethics:** Stimulating critical thinking about the ethical implications of using generative AI.
- 4. Interdisciplinary Application:** Promoting the integration of generative AI into various sectors, demonstrating its versatility and applicability.
- 5. Innovation and Creativity:** Encouraging the use of generative AI to explore new frontiers of creativity and problem-solving.

Specific learning goals

The specific training objectives for the "AI Revolution: Generative AI Projects" course include:

- 1. Mastery of Generative AI Tools:** Acquire advanced skills in using ChatGPT, MidJourney, Stable Diffusion, and DALL-E.
- 2. AI Project Design and Development:** Learn to conceptualize, develop, and complete innovative projects by leveraging generative AI.
- 3. Creative Problem-Solving and Analysis:** Use generative AI to analyze complex situations and generate creative solutions.
- 4. Ethics and Social Impact of AI:** Understand the ethical issues related to the use of generative AI and evaluate its social impact.
- 5. Integration of AI in Diverse Fields:** Explore the applications of generative AI in various sectors, from artistic production to marketing, and from education to research.

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AI AND VIDEOGAMING

ARTIFICIAL INTELLIGENCE IN VIDEO GAMES

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

Artificial Intelligence is transforming the world of gaming, making characters more realistic, environments more immersive, and gaming experiences more personalized. With this course, participants will discover how AI is applied in video games and will learn to develop intelligent virtual worlds, experimenting with advanced tools for creating dynamic and interactive games.

General learning goals

- Fundamentals of AI in Gaming:** Acquire a solid understanding of the theoretical principles and practical applications of Artificial Intelligence in the video game industry, highlighting its impact on realism, immersion, and personalization.
- Development Skills with Professional Tools:** Develop practical skills in using industry-standard game engines like Unity, Unreal Engine, and Godot for designing and implementing AI-based game mechanics.
- Innovation in Game Dynamics:** Explore how AI can be used to overcome traditional game logic, creating innovative experiences, dynamic game worlds, and non-player characters (NPCs) with complex behaviors.
- Development of Creative Thinking and Problem Solving:** Provide students with the skills to address and solve complex design problems, using AI as a tool to design engaging and original game dynamics.
- Preparation for a Future in the Video Game Industry:** Provide the knowledge and technical skills to prepare students for innovative careers in a constantly evolving sector, where mastery of AI is an increasingly required qualification.

Specific learning goals

- Mastery of Game Engines for AI:** Achieve practical competence in using professional tools for video game development, aimed at integrating Artificial Intelligence scripts and logic.
- Practical Application in Creating Intelligent NPCs:** Apply theoretical knowledge to program Non-Player Characters (NPCs) capable of analyzing the environment, making decisions, and adapting their actions based on the player's behavior.
- Direct Experience with Procedural Generation:** Gain practical experience in using procedural generation algorithms to create dynamic levels, objects, and game environments that change and adapt with each game session.
- Development of Gameplay Personalization Systems:** Design and implement AI-based systems capable of analyzing game data to dynamically personalize and adapt the difficulty, challenges, and content offered to the player.
- Creation and Presentation of a Game Prototype:** Develop and present a working video game prototype that integrates the learned AI mechanics, demonstrating the skills acquired in game design and programming.

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AI AND ART

CREATIVITY AND ARTIFICIAL INTELLIGENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Abstract

Artificial Intelligence is transforming the world of art, opening up new possibilities for generating images, music, text, and video. With this course, participants will discover how AI tools can amplify human creativity, helping you create unique works and experiment with new forms of digital art. Through a practical journey, they will learn to create content with AI, analyze its impact, and discuss the ethical and legal aspects of this artistic revolution.

General learning goals

- Fundamentals of Generative Art:** Acquire an in-depth understanding of how Artificial Intelligence is redefining the paradigms of artistic creation, analyzing its impact on various disciplines such as visual arts, music, writing, and video.
- Development of Hybrid Creativity:** Develop a creative approach that integrates human intuition and the computational power of AI, learning to use algorithms as partners in the artistic process to explore new expressive forms.
- Skills in Using AI Multimedia Tools:** Provide practical and versatile skills in using a suite of advanced AI tools for generating and manipulating multimedia content, from conception to the final creation of the work.
- Critical and Ethical Awareness:** Promote deep reflection on the ethical, legal, and cultural implications of AI-generated art, developing the ability to analyze and debate topics such as copyright, authorship, and originality.
- Preparation for the Future of Creative Industries:** Provide students with the skills to anticipate and integrate into the evolutions of the artistic and multimedia sector, preparing them for careers where collaboration between humans and AI is increasingly central.

Specific learning goals

- Mastery of Prompt Design Techniques:** Achieve advanced competence in writing effective prompts ("prompt design") to precisely guide generative AI tools (e.g., Midjourney, DALL·E) toward the desired visual result.
- Practical Application in Multimedia Creation:** Apply acquired skills to create a complete artistic project, such as a short film integrating AI-generated video (e.g., Runway ML, Pika Labs), an AI-assisted soundtrack (e.g., AIVA), and creative texts.
- Direct Experience in AI-Powered Creative Writing:** Gain practical experience in using language models to generate and co-create literary works such as poems, short stories, and scripts, experimenting with different styles and tones.
- Use of AI Music Composition Platforms:** Develop the ability to use AI-assisted music composition software to create original pieces, defining genre, mood, and instrumentation.
- Case Study Analysis of Ethics and Copyright:** Develop the ability to analyze AI-generated artworks and debate informatively on copyright issues, correctly attributing authorship and using the tools ethically and responsibly.

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AI AND PODCAST

INTELLIGENT CREATION, EDITING, AND DISTRIBUTION

KEY COMPETENCE > 4. **DIGITAL COMPETENCE**

KEY COMPETENCE > 7. **ENTREPRENEURSHIP COMPETENCE**

Abstract

Artificial Intelligence is revolutionizing the world of podcasting, making audio production more accessible, faster, and more creative. With this course, participants will discover how to use AI tools to generate voice, write scripts, enhance audio, and optimize distribution. Through a practical journey, they will learn to create a high-quality podcast efficiently, leveraging the best available technologies.

General learning goals

- Fundamentals of AI-Driven Podcasting:** Acquire a comprehensive understanding of how Artificial Intelligence is transforming the entire podcast production workflow, from content writing to distribution and promotion.
- Development of Integrated Technical Skills:** Develop practical skills in using a suite of advanced AI tools to automate creation, improve audio quality, and optimize content management efficiently and professionally.
- Innovation in Audio Content Creation:** Explore how AI can be used not only to simplify production but also to experiment with new narrative formats, customize voices, and create more engaging listening experiences.
- Strategic Thinking for Distribution and Marketing:** Provide students with the skills to apply AI-based marketing and SEO strategies to maximize the podcast's visibility and reach a wider audience.
- Preparation for the Future of Content Creation:** Provide the necessary knowledge to face the evolutions of the media and digital communication sector, preparing students for careers where AI-assisted content production is a standard.

Specific learning goals

- Mastery of Voice Synthesis and Editing Tools:** Achieve practical competence in using AI platforms for synthetic voice generation (e.g., Murf AI, ElevenLabs) and automatic audio editing (e.g., Descript, Adobe Podcast Enhance).
- Practical Application in AI Scriptwriting:** Apply artificial intelligence tools to generate, optimize, and structure episode content, including outlines, complete scripts, and descriptions for listening platforms.
- Direct Experience in Audio Optimization:** Gain practical experience in the audio quality improvement process, using AI software for background noise removal, volume normalization, and track balancing.
- Implementation of Automated Workflows:** Develop the ability to create an automated workflow for post-production, including automatic episode transcription, summary generation, and keyword identification for SEO.
- Using AI for Distribution and Promotion:** Develop the ability to use AI tools to automate the publication of an episode on various platforms and to create promotional content (e.g., social media posts, audiograms) from the recorded audio.

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AI AND VIDEO

PRODUCTION, EDITING, AND VISUAL CREATION WITH ARTIFICIAL INTELLIGENCE

KEY COMPETENCE > 4. **DIGITAL COMPETENCE**

KEY COMPETENCE > 7. **ENTREPRENEURSHIP COMPETENCE**

Abstract

L'Intelligenza Artificiale sta trasformando il mondo della produzione video, semplificando il montaggio, la creazione di animazioni e l'ottimizzazione della qualità visiva e sonora. Con questo corso, i partecipanti scopriranno come sfruttare l'AI per realizzare video professionali in modo più rapido ed efficace, automatizzando processi creativi e tecnici. Attraverso esercitazioni pratiche, impareranno a utilizzare strumenti avanzati per rendere i tuoi contenuti più innovativi e accattivanti.

General learning goals

- Fundamentals of AI-Driven Video Production:** Acquire a comprehensive understanding of how Artificial Intelligence is revolutionizing the entire video production workflow, from content generation to editing and distribution.
- Development of Technical Skills for Creative Automation:** Develop practical skills in using a suite of advanced AI tools to automate technical and repetitive processes, freeing up time for experimentation and creative innovation.
- Innovation in Visual and Narrative Language:** Explore how AI can be employed to create new forms of visual expression, generating complex animations and unique visual styles without the need for traditional technical skills.
- Strategic Thinking for Video Content Creation:** Provide students with a strategic approach to video production, learning to use AI not only to create but also to optimize content based on the audience and distribution platforms.
- Preparation for the Future of Multimedia Production:** Provide the necessary knowledge to face the evolutions of the audiovisual sector, preparing students for careers where the speed of execution and efficiency guaranteed by AI are a competitive advantage.

Specific learning goals

- Mastery of Video Generation and Editing Tools:** Achieve practical competence in using AI platforms for generating video from text or images (e.g., Runway ML, Pika Labs) and for automatic editing (e.g., Adobe Premiere AI, Descript).
- Practical Application in Creating AI-Driven Animations:** Apply artificial intelligence tools (e.g., D-ID, DeepMotion) to create character animations and motion graphics automatically, starting from simple inputs.
- Direct Experience in Audio/Video Quality Enhancement:** Gain practical experience in using AI functions to improve footage quality through automatic image stabilization, color correction, and audio cleanup.
- Implementation of Automated Dubbing and Subtitling:** Develop the ability to use AI to generate synthetic voices for dubbing, create automatic subtitles, and perform lip-sync synchronization in different languages.
- Using AI to Optimize Distribution:** Develop the ability to use AI tools to analyze the video and suggest the best formats, titles, descriptions, and hashtags to maximize visibility on various social media and video-sharing platforms.

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PHOTOGRAPHY AND AI

TECHNIQUES, EDITING, AND IMAGE GENERATION

KEY COMPETENCE > 4. DIGITAL COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Abstract

Artificial Intelligence is transforming the world of photography, offering advanced tools for image creation, editing, and optimization. With this course, participants will discover how to combine traditional and AI-driven photography techniques, learning to capture and enhance images using innovative software. Through practical sessions and photography contests, they will develop creativity, technical skills, and a modern artistic vision.

General learning goals

1. **Fundamentals of Modern Photography:** Acquire a solid understanding of the fundamental principles of traditional photography (exposure, composition, lighting) and how Artificial Intelligence is transforming these disciplines.
2. **Development of an Integrated Artistic Vision:** Explore how the integration of traditional shooting techniques and generative AI tools can be used to develop a unique and innovative artistic vision, overcoming the limits of conventional creativity.
3. **Advanced Skills in AI-Driven Editing:** Develop practical and advanced skills in using innovative software for photo retouching and post-production, leveraging the automation and power of AI to optimize images.
4. **Technical Versatility across Different Photographic Genres:** Provide students with the skills to apply photographic and editing techniques to a wide range of genres, including fashion, portraiture, landscape, industrial, and reportage.
5. **Preparation for the Future of Photography:** Provide the necessary knowledge to anticipate and guide change in the professional photography sector, preparing students for a market where digital and AI skills are increasingly in demand.
6. **Practical and Experimental Approach:** Encourage learning based on direct experimentation through practical sessions, workshops, and contests to consolidate technical skills and stimulate creativity.
7. **Building a Professional Identity:** Guide students through the process of creating and promoting a professional photography portfolio that demonstrates mastery of both shooting techniques and new AI technologies.

PHOTOGRAPHY AND AI

TECHNIQUES, EDITING, AND IMAGE GENERATION

KEY COMPETENCE > 4. DIGITAL COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Specific learning goals

- 1. Mastery of AI Editing and Generation Software:** Achieve advanced competence in using specific software for photo editing (Adobe Photoshop, Lightroom, Topaz AI) and image generation (DALL-E, Midjourney, Stable Diffusion).
- 2. Application of AI Photo Editing Techniques:** Practically apply artificial intelligence tools to perform complex image enhancement operations, such as advanced color correction, removal of imperfections and objects, and high-resolution upscaling.
- 3. Practical Experience in Creating Generative Images:** Gain direct experience in generating artistic and creative images from scratch using AI platforms, learning to guide the creative process via specific prompts and parameters.
- 4. Use of Compositional Rules in Real-World Scenarios:** Develop the ability to apply the rules of photographic composition and aesthetics during shooting sessions, to produce professional and visually effective images.
- 5. Implementation of an Advanced Post-Production Workflow:** Design and implement a complete post-production workflow that efficiently integrates AI tools for color grading, detail enhancement, and final image optimization.
- 6. Creation of Photographic Projects by Genre:** Create complete photographic projects for at least three different genres (e.g., portrait, landscape, reportage), managing the entire process from the shooting phase to final post-production.
- 7. Organization and Selection of a Professional Portfolio:** Develop the ability to select, organize, and present one's best work in a coherent and professional photography portfolio, integrating real shots and AI-generated images.

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ARDUINO AND AI

SMART PROGRAMMING WITH CHATGPT

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

Artificial Intelligence is revolutionizing programming, making it simpler and more accessible to develop projects with Arduino. With this course, participants will learn to write code quickly and effectively, leveraging ChatGPT to generate scripts, resolve errors, and optimize the program. Through practical exercises and a final project, they will acquire concrete skills to develop interactive applications with Arduino and AI.

General learning goals

- Fundamentals of AI-Assisted Programming:** Acquire a comprehensive understanding of how generative Artificial Intelligence can be integrated into the software development lifecycle for programmable electronics, revolutionizing the approach to writing code for Arduino.
- Development of an Effective Coding Methodology:** Develop a hybrid programming method that combines human logic with the computational speed of ChatGPT to optimize code writing, problem-solving, and overall efficiency.
- Innovation in Human-Machine Interaction:** Explore how the synergy between AI and IoT platforms like Arduino allows for the creation of more complex and intelligent interactive prototypes and applications in less time.
- Critical Thinking and Intelligent Problem Solving:** Provide students with the skills to use AI not as a substitute, but as a powerful support tool for debugging and optimization, strengthening their analytical and problem-solving abilities.
- Preparation for the Future of Technological Development:** Provide the necessary knowledge to face evolutions in the field of the Internet of Things (IoT) and rapid prototyping, preparing students for a future where AI is an integral part of hardware and software development.

Specific learning goals

- Mastery of the Interaction between Arduino IDE and ChatGPT:** Achieve practical competence in the combined use of the Arduino development environment (IDE) and ChatGPT to write, compile, and test code smoothly and effectively.
- Practical Application in Code Generation:** Apply the use of ChatGPT to automatically generate functional Arduino scripts from a natural language description of a desired feature.
- Direct Experience in AI-Driven Debugging:** Gain practical experience in providing ChatGPT with compilation errors and logical bugs to receive detailed explanations, corrected code, and optimization suggestions.
- Creation of Complex Interactive Programs:** Develop the ability to design and create a complete Arduino application that responds intelligently to external inputs (e.g., sensors, buttons), with control logic generated or refined via AI.
- Completion and Presentation of a Final Project:** Develop the ability to manage a technological project from ideation to a working prototype, using AI to accelerate development and professionally presenting the final result.

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THE GAME OF BUSINESS

BUSINESS STRATEGY SIMULATION

KEY COMPETENCE > 7: ENTREPRENEURSHIP COMPETENCE
KEY COMPETENCE > 6: CIVIC COMPETENCE

Abstract

The Game of Business is an innovative business simulation designed to guide students through the process of developing and managing an emerging company. The game takes place in the fictitious Canvas City, the ideal setting where businesses are born and compete using the Business Model Canvas (BMC).

In the dynamic metropolis of Canvas City, students take on the challenge of founding and managing emerging start-ups. The game offers a deep immersion into the entrepreneurial world, using the Business Model Canvas (BMC) as a compass.

Students are introduced to the game and the BMC, then they are divided into teams and begin their journey by choosing the type of business to found.

From there, using the BMC as a guide, they will navigate the challenges of developing a value proposition, identifying customer segments, managing distribution channels, building customer relationships, generating revenue streams, managing key resources, orchestrating key activities, establishing partnerships, and finally, organizing the cost structure.

Each day focuses on specific elements of the BMC, with daily challenges, unexpected events, and opportunities to earn points and virtual badges, stimulating competition and strategic thinking. In the end, the teams present their business models, celebrating successes and learning from feedback.

Canvas City is not just a game, but an educational journey through the heart of entrepreneurship.

General learning goals

- 1. Understanding the BMC:** Ensuring that students thoroughly understand each component of the Business Model Canvas and how they interact.
- 2. Strategic Thinking:** Developing students' ability to think strategically, planning and adapting to market challenges and opportunities.
- 3. Decision Making:** Strengthening students' ability to make informed and timely decisions based on data, feedback, and insights.
- 4. Teamwork and Collaboration:** Promoting students' ability to work effectively in teams, valuing the diverse skills and contributions of each member.
- 5. Problem Solving:** Honing students' problem-solving skills, particularly in identifying and responding to real-world business challenges.
- 6. Market Analysis:** Learning to gather, interpret, and apply market information, including competitor analysis and customer behavior.
- 7. Financial Management:** Developing skills in financial planning, budgeting, and profitability assessment.
- 8. Effective Communication:** Reinforcing students' ability to communicate ideas, strategies, and results, both within the team and to a wider audience.
- 9. Leadership:** Providing opportunities for students to take on leadership roles within their teams and guide them toward common goals.
- 10. Adaptability:** Training students to be resilient and adaptable, preparing them to respond flexibly to unexpected challenges and market changes.
- 11. Ethics and Integrity:** Promoting the understanding and application of ethical principles in the entrepreneurial context, ensuring decisions are made with integrity and responsibility.
- 12. Feedback and Reflection:** Encouraging students to seek and reflect on feedback, using it as a means to learn and continuously improve.

These training objectives aim to provide students with a solid foundation of entrepreneurial and managerial skills, preparing them for leadership roles in the real business world.



THE GAME OF BUSINESS

BUSINESS STRATEGY SIMULATION

KEY COMPETENCE > 7: ENTREPRENEURSHIP COMPETENCE
KEY COMPETENCE > 6: CIVIC COMPETENCE

Specific learning goals

- 1. Value Proposition:**
 - o Identify and develop products or services that meet specific market needs.
 - o Validate propositions through market tests and feedback.
 - o Modify and optimize the proposition based on test results and feedback received.
- 2. Customer Segments:**
 - o Effectively segment the target market.
 - o Understand and analyze the needs and behaviors of various customer segments.
 - o Design specific strategies to reach and serve each segment.
- 3. Channels:**
 - o Select the most appropriate distribution channels for the value proposition.
 - o Optimize channels based on market coverage, costs, and effectiveness.
 - o Adapt to changes in customer channel preferences.
- 4. Customer Relationships:**
 - o Develop and maintain positive relationships with customers through various touchpoints.
 - o Use tools and technologies to monitor and improve customer satisfaction.
 - o Resolve customer-related challenges and issues in a timely and effective manner.
- 5. Revenue Streams:**
 - o Create and optimize pricing models.
 - o Monitor and adapt pricing strategies based on market dynamics and customer needs.
 - o Identify new opportunities to generate revenue.
- 6. Key Resources:**
 - o Identify and manage the resources necessary for the business to operate.
 - o Optimize resource allocation based on operational needs and challenges.
 - o Monitor and adapt resource management in response to changes.
- 7. Key Activities:**
 - o Identify the main activities necessary to deliver the value proposition.
 - o Optimize and monitor the efficiency and effectiveness of these activities.
 - o Adapt activities in response to new challenges and opportunities.
- 8. Partnerships:**
 - o Establish beneficial partnerships for the business.
 - o Evaluate and monitor the contribution and effectiveness of partnerships.
 - o Manage and optimize relationships with partners.
- 9. Cost Structure:**
 - o Accurately plan and monitor the company budget.
 - o Identify the main sources of costs and seek opportunities to optimize them.
 - o Maintain a cost structure that supports the sustainability and growth of the business.

Each of these specific training objectives aims to provide students with practical, concrete skills in every area of the Business Model Canvas, preparing them to face real-world challenges in the business world.

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LEAN STARTUP ACCELERATOR

THINK, CREATE, AND GROW YOUR STARTUP

KEY COMPETENCE > 7: ENTREPRENEURSHIP COMPETENCE

KEY COMPETENCE > 5: PERSONAL, SOCIAL AND LEARNING TO LEARN COMPETENCE

Abstract

The ETN Smart Lab **Lean Startup Accelerator** is an intensive experience structured on a practical path aimed at creating a startup.

The objective is to develop transversal and specific skills that will enable students to successfully launch and manage a lean startup.

The lab covers topics such as problem validation, creating a minimum viable product (MVP), data interpretation, attracting investors, and managing growth. These topics allow students to acquire specific skills such as data analysis, product design, critical thinking, and customer-driven innovation.

The transversal skills developed include an entrepreneurial mindset, critical thinking, adaptability, resilience, and determination. These are enhanced through practical exercises, case studies, and group projects.

Students will familiarize themselves with specific startup terminology.

A distinctive element of the course will be visits to successful companies, namely startups located in the city where the course takes place.

This direct experience will offer a valuable opportunity for practical learning.

The final output will be a personalized action plan for launching a Lean Startup, which will also include the development of a Canvas business model, an MVP, and a marketing strategy.

In summary, "Lean Startup Accelerator: From Concept to Realization" offers a unique learning opportunity in entrepreneurship.

General learning goals

1. **Develop an entrepreneurial mindset:** Students will learn to think and act like entrepreneurs, seizing opportunities, managing risks, and innovating in contexts of uncertainty.
2. **Acquire transversal skills:** Students will develop skills such as critical thinking, adaptability, resilience, and determination, which are crucial in any professional field, but particularly in creating and managing startups.
3. **Improve communication skills:** Through the integrated language course, students will strengthen their communication skills, which are fundamental for presenting ideas, attracting investors, and managing a team.
4. **Gain practical insight into startups:** Thanks to visits to successful local companies, students will gain direct experience of how a startup works, including its successes and challenges.
5. **Create an action plan for a Lean Startup:** By the end of the course, students will have developed a comprehensive plan to launch a lean startup, which they can use as a springboard for their entrepreneurial career.



LEAN STARTUP ACCELERATOR

THINK, CREATE, AND GROW YOUR STARTUP

KEY COMPETENCE > 7: ENTREPRENEURSHIP COMPETENCE

KEY COMPETENCE > 5: PERSONAL, SOCIAL AND LEARNING TO LEARN COMPETENCE

Specific learning goals

1. **Validate a problem:** Students will learn how to identify and validate a problem worth solving that is worthy of an entrepreneurial venture.
2. **Create a minimum viable product (MVP):** Students will acquire skills on how to design and build an MVP, a fundamental element in the Lean Startup methodology.
3. **Interpret data:** Students will develop skills in data analysis to better understand their market and make informed decisions.
4. **Attract investors:** Students will gain knowledge on how to attract and engage investors, a crucial skill for ensuring the long-term success of a startup.
5. **Manage growth:** Students will learn strategies to manage and sustain a startup's growth, including hiring and managing the team, balancing resources, and adapting to emerging challenges and opportunities.

SMART WORK PLACEMENT

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URBAN MOSAIC

AN EDUCATIONAL EXPERIENCE THROUGH THE DISCOVERY OF THE CITY

KEY COMPETENCE > 6. CIVIC COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

EDUCATIONAL PATH OF DISCOVERY AND KNOWLEDGE

Rules of the educational path

The **Urban Mosaic** path involves the exploration of a European city (Malaga, Berlin, Sofia, Cork, Lisbon, Rhodes) for students to discover the multidisciplinary aspects of the various urban contexts. Each group will receive a series of Cards, which will provide clues and information to guide their discovery path. Each Card will represent a piece of the city's "mosaic" and must be completed to accumulate points.

- 1. Group Formation:** Students will be divided into groups. Each group will receive a set of random Cards, which will represent the clues to follow and the activities to perform.
- 2. Discovery Path:** Each group must follow its own unique path through the city, following the clues provided by the Cards. Each clue will lead participants to a specific location in the city, where they will have to observe, explore, and gather information relevant to the assigned aspect (historical, geographical, artistic, literary, architectural, sociological, gastronomic, innovation, etc.).
- 3. Output Processing:** Every time a group reaches a location and gathers information, they must process it to produce visual outputs, such as photos or videos, interviews, or create content for the training path's web blog. Time will be allocated for image processing and content creation on the Mighty platform, so that students can learn and apply the skills needed for digital content creation.
- 4. Competition and Scoring:** During the training path, groups will accumulate points based on the completion of the Cards, the quality of their outputs, and the presentation of content on the Mighty platform. Points will be awarded for the completeness of information, creativity, originality, and multidisciplinary depth. It will be possible to earn extra points for solving bonus challenges or completing extra activities.
- 5. Evaluation:** At the end of the path, all groups will present their outputs to the panel of judges. The judges will evaluate the content produced by the groups, considering the quality of the information, creativity, originality, and presentation. The points accumulated by the groups during the training path will be added to the points obtained from the content evaluation to determine the final winner.
- 6. Awarding:** The group with the highest score will be proclaimed the winner of the "Urban Mosaic" training path. A symbolic prize may be awarded, such as special recognition or a unique opportunity, to celebrate their success in completing the discovery path and their commitment to researching and exploring the city.

With **Urban Mosaic**, students will have the opportunity to develop a wide range of transversal skills, including problem-solving, critical thinking, teamwork, effective communication, creativity, adaptability, and autonomy. The training path promotes active learning, multidisciplinary exploration, and autonomous discovery, offering students an engaging and educational experience during their visit to the city.



URBAN MOSAIC

AN EDUCATIONAL EXPERIENCE THROUGH THE DISCOVERY OF THE CITY

KEY COMPETENCE > 6. CIVIC COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Learning Outcomes

The learning outcomes of the **Urban Mosaic** path are varied and cover different areas of competence. Here is a detailed description of the main learning outcomes that students will acquire by participating in the game:

- 1. Multidisciplinary knowledge:** Students will have the opportunity to acquire disciplinary or multidisciplinary knowledge about the city. They will explore different aspects, such as history, geography, art, literature, architecture, sociology, gastronomy, innovation, and other cultural dimensions. This multidisciplinary knowledge will allow them to have a more complete and in-depth view of the city.
- 2. Research skills:** During the training path, students will be challenged to conduct autonomous research to deepen their understanding of the information related to the places visited. They will have to find reliable sources, evaluate information, and select the most relevant findings for their discovery path. This research skill will be valuable for their future learning.
- 3. Critical thinking:** Students will need to apply critical thinking to solve clues, connect the collected information, and develop a deeper understanding of the city. They will be encouraged to make connections between different cultural aspects and to critically evaluate information to form informed conclusions and viewpoints.
- 4. Problem-solving skills:** During the training path, students will have to face various challenges and solve problems to progress on their discovery path. They will need to use their problem-solving skills to interpret clues, make informed decisions, and find creative solutions to the challenges they will encounter along the way.
- 5. Communication skills:** Students will have the opportunity to develop effective communication skills. They will need to communicate and collaborate within their working group, interact with local inhabitants to obtain information, and present their results via the web platform. They will be encouraged to communicate clearly, persuasively, and effectively.
- 6. Teamwork and collaboration:** The training path promotes teamwork and collaboration among students. They will have to work together, share ideas, delegate tasks, and make collective decisions to achieve the game's objectives. They will be encouraged to listen to each other, respect others' opinions, and work in synergy to face challenges.
- 7. Creativity and lateral thinking:** Students will be stimulated to think creatively and outside the box. They will be encouraged to find innovative solutions, explore different perspectives, and apply lateral thinking to tackle the challenges of the training path. Creativity will be encouraged in the production of visual outputs and in the way they present content on the Mighty platform.
- 8. Adaptability and time management:** During the training path, students will need to adapt to different situations, meet deadlines, and manage their time effectively. They will need to be flexible in modifying their plans based on the circumstances and the development of the game. This ability to adapt and manage time will be valuable in daily life and in their academic future.

By participating in the **Urban Mosaic** training path, students will acquire a range of multidisciplinary, cognitive, and socio-emotional skills that will be useful for their learning, personal growth, and future development.

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THE CUSTOMER HAPPINESS

CUSTOMER SATISFACTION IN HOTEL MANAGEMENT WITH SERVQUAL AND NO-CODE PLATFORMS

KEY COMPETENCE > 5: PERSONAL, SOCIAL AND LEARNING TO LEARN COMPETENCE
KEY COMPETENCE > 6: CIVIC COMPETENCE

Abstract

The Customer Happiness is a training course that explores the importance of customer satisfaction in the hotel industry, using the ServQual model and No-Code tools to collect, analyze, and improve service quality. Through an interactive, laboratory-based approach, participants will learn how to identify discrepancies between customer expectations and the service actually received, transforming data into concrete actions for continuous improvement. The integration of Airtable and No-Code platforms will allow students to create service quality monitoring systems, optimizing customer experience management in an agile and innovative way.

General learning goals

- 1. Understanding the ServQual Model:** Acquire an in-depth understanding of the ServQual model and its applicability in the context of hotel management, highlighting the importance of service quality in customer satisfaction.
- 2. Skills with No-Code Platforms:** Develop practical skills in using No-Code platforms for collecting, analyzing, and managing customer feedback, promoting an agile and flexible approach to service quality assessment.
- 3. Continuous Service Improvement:** Train participants on methodologies to interpret customer feedback and implement continuous improvements in hotel service, aiming for service excellence and increased customer satisfaction.

Specific learning goals

- 1. Familiarization with Airtable and Other No-Code Platforms:** Learn to configure and use Airtable and other No-Code platforms to create customized data collection and customer feedback systems.
- 2. Analysis of the ServQual Dimensions:** Acquire skills in analyzing the five dimensions of ServQual (Reliability, Responsiveness, Assurance, Empathy, Tangibles) and apply them to evaluate hotel service quality.
- 3. Customer Data Management:** Develop skills in managing and analyzing customer data to identify trends, recurring problems, and areas of excellence in hotel service.
- 4. Implementation of Corrective Actions:** Learn to design and implement corrective actions based on the results of customer feedback analysis, using No-Code platforms to facilitate the process.
- 5. Communication and Presentation of Results:** Develop skills in effectively communicating analysis results and corrective actions to the hotel team, improving internal collaboration and customer orientation.

These objectives aim to equip participants with the necessary skills to evaluate and improve service quality in the hotel industry, using a data-driven approach and No-Code platforms for agile and responsive customer satisfaction management.

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DIGITAL MODELING MASTERY

DIGITAL MODELING FOR THE TEXTILE INDUSTRY

KEY COMPETENCE > 4: **DIGITAL COMPETENCE**

KEY COMPETENCE > 8: **CULTURAL AWARENESS AND EXPRESSION COMPETENCE**

Abstract

The **Digital Modeling Mastery** course focuses on the digital evolution in the textile sector, introducing students to the use of advanced digital modeling technologies, such as those offered by cutting-edge software. This program aims to equip participants with the skills needed to harness the power of digital transformation, increasing efficiency, precision, and promoting sustainability in textile design and production processes. Through a hands-on approach, students will learn to create digital prototypes, optimize production, and innovate in textile design, preparing themselves to become pioneers in the future of the textile industry.

General learning goals

- Fundamentals of Digital Modeling in Textiles:** Acquire a solid understanding of the basics of digital modeling specific to the textile sector, highlighting the importance of new technologies in the evolution of production processes.
- Advanced Skills in Modeling Software Usage:** Develop practical skills in using cutting-edge software for digital modeling in textiles, enabling students to translate design concepts into precise and detailed digital prototypes.
- Innovation and Sustainability in Textile Design:** Explore how digital modeling can be used to innovate in textile design and promote sustainable production practices, reducing waste and improving efficiency.
- Preparation for a Digital Future in Textiles:** Provide students with the knowledge and skills to anticipate and guide change in the textile sector, preparing them for innovative careers in a constantly evolving global market.

Specific learning goals

- Mastery of Digital Modeling Software:** Achieve advanced competence in using specific software for the textile sector, such as Gerber Technology, for the design, prototyping, and optimization of fabric cutting.
- Practical Application and Prototyping:** Apply theoretical knowledge to the creation of digital prototypes, experimenting with innovative designs and production techniques that reduce environmental impact and improve sustainability.
- Practical Experience with Process Digitization:** Acquire direct experience in the digitization of textile design and production processes, from design conception to the final product realization.
- Creative Problem Solving:** Develop the ability to use digital tools to address and solve design and production challenges creatively and efficiently.
- Ethical and Responsible Design:** Ensure that all developed projects take into account the ethical implications of digital modeling in textiles, promoting responsible practices that respect the environment and society.

This course is designed to transform students into experts in digital modeling for the textile sector, ready to leverage the opportunities offered by technology to innovate and lead the future of fashion and textile design.

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LEGO SPIKE AND CODING

DESIGNING AND PROGRAMMING INTELLIGENT ROBOTS

PERCORSI
PCTO

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

The Lego Spike and Coding course introduces high school students to educational robotics and programming, combining robot construction with Lego Spike Prime and programming in blocks and Python.

Through practical activities and project-based challenges, students will develop STEM skills applicable in fields such as engineering, computer science, and mechatronics, learning to design, program, and optimize autonomous robots.

The course provides a solid foundation for understanding the principles of robotics, automation, and artificial intelligence, preparing students for the digital and technological future.

General learning goals

- Fundamentals of Educational Robotics:** Acquire a solid understanding of the fundamental principles of robotics, programming, and automation, using the Lego Spike Prime platform as a practical learning tool.
- Development of Computational Thinking and Problem Solving:** Develop a logical and structured approach to problem-solving, applying computational thinking to design, build, and program solutions to complex challenges.
- Versatile Programming Skills:** Provide students with flexible programming skills, guiding them through the transition from visual block-based programming to text-based coding with Python, a key language in the technology industry.
- Practical Application of STEM Skills:** Demonstrate how theoretical concepts from STEM disciplines (Engineering, Computer Science, Mechatronics) translate into practical applications, through the design and optimization of autonomous robots.
- Preparation for the Technological Future:** Provide a solid foundation of skills in robotics and coding that prepares students for future academic and professional paths in the sectors of technological innovation, automation, and artificial intelligence.

Specific learning goals

- Mastery of the Lego Spike Prime Platform:** Achieve practical competence in building mechanically stable robotic models and in using the Spike programming environment to implement operating logic.
- Implementation of Navigation and Interaction Algorithms:** Apply the use of advanced sensors (color, distance, force) to write algorithms that allow the robot to navigate autonomously, recognize objects, and interact with the surrounding environment.
- Transition from Block-Based Programming to Python:** Gain practical experience in translating a program created with a block-based language into equivalent Python code, understanding the syntactic and structural differences.
- Debugging and Optimization of Code and Mechanics:** Develop the ability to identify, diagnose, and resolve problems at both the software level (errors in the code) and hardware level (mechanical defects), to improve the robot's performance.
- Teamwork for Solving Complex Challenges:** Develop the ability to collaborate effectively in a team to design, build, and program a robot capable of completing a specific mission or challenge within defined deadlines.

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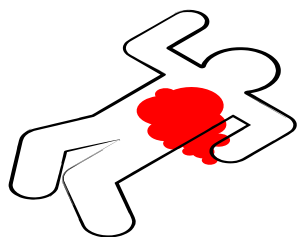
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GENOMICS AND BIOINFORMATICS LABORATORY CRIME SCENE EDITION

KEY COMPETENCE > 3: SCIENCE, TECHNOLOGY AND ENGINEERING
KEY COMPETENCE > 4: DIGITAL COMPETENCE

Abstract

The **Genomics and Bioinformatics Laboratory - Crime Scene Edition** is an innovative educational path designed for high school students with an interest in genomics and biotechnology. This unique laboratory combines elements of gaming, narrative adventure, and rigorous scientific investigation to provide an interactive and engaging approach to the study of genomics.

In this edition, students step into the role of forensic investigators immersed in a compelling narrative, with the goal of solving a complicated criminal case. Their mission will lead them through evidence collection at a virtually simulated crime scene, where they will have to use intuitive bioinformatics tools, such as Galaxy, for the analysis of DNA traces. This process involves identifying the culprit by comparing genetic profiles using cutting-edge genetic analysis techniques to unveil the mystery.

The laboratory is enhanced by gamified elements such as missions, challenges, and progression through various levels, transforming the learning process into an exhilarating experience. This methodology promotes active engagement, stimulating curiosity and improving problem-solving skills in intriguing scientific contexts.

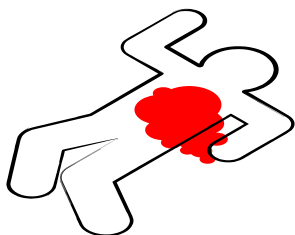
Upon concluding this laboratory, students will not only have gained a deep understanding of bioinformatics and genomics techniques, but they will also have been guided toward a scientific learning method that emphasizes critical thinking and collaboration. This experience will effectively guide them toward further educational or professional paths in the various fields of biotechnology, genetics, medicine, or research, equipping them with the essential knowledge and skills to successfully navigate these sectors.

General learning goals

The general training objectives of the **Genomics and Bioinformatics Laboratory - Crime Scene Edition** are designed to offer high school students comprehensive and engaging training in the field of genomics and bioinformatics, with an innovative approach that integrates elements of gaming and narrative. These objectives aim to develop both the theoretical and practical skills of students, preparing them for future advanced studies or careers in the biological and biotechnological sciences:

- 1. Understanding the Foundations of Genomics and Bioinformatics:** Students will acquire a solid understanding of the fundamental principles and techniques of genomics and bioinformatics, including DNA sequencing, sequence analysis, comparative genomics, and gene expression.
- 2. Skills in Genomic Data Analysis:** Through the use of no-code bioinformatics tools like Galaxy, students will develop practical skills in analyzing genomic data, performing analyses such as sequence alignment, gene expression analysis, and genomic comparison.
- 3. Critical Thinking and Problem Solving:** Students will be encouraged to develop critical thinking and problem-solving skills as they navigate the unique challenges presented by forensic-themed case studies, interpreting complex data and forming evidence-based conclusions.
- 4. Application of Knowledge in Realistic Contexts:** Through game scenarios that simulate forensic investigations, students will have the opportunity to apply theoretical knowledge and technical skills in realistic contexts, enhancing their understanding of scientific concepts and their practical applications.
- 5. Future Orientation:** The laboratory aims to provide students with a solid and practical introduction to the field of biotechnology, genomics, and bioinformatics, offering them a glimpse of the skills and knowledge required in these sectors. Through this experience, students will be better oriented to evaluate their interest and potential career or advanced study opportunities in these areas, encouraging them to explore further and make informed decisions about their future educational and professional path.
- 6. Collaboration and Teamwork:** Through group activities and collaborative projects, students will learn the importance of collaboration and teamwork in the scientific field, developing interpersonal and communication skills that are essential for success in academic and professional environments.

These objectives are designed to ensure that, by the end of the laboratory, students will not only have acquired an in-depth understanding of genomics and bioinformatics but will also be capable of applying this knowledge creatively and critically, effectively preparing them for the future.



GENOMICS AND BIOINFORMATICS

LABORATORY

CRIME SCENE EDITION

KEY COMPETENCE > 3: SCIENCE, TECHNOLOGY AND ENGINEERING
KEY COMPETENCE > 4: DIGITAL COMPETENCE

Specific learning goals

- **DNA Sequence Mapping and Analysis:** Students will be able to map DNA sequences to known sequence databases and identify genomic regions of interest, using bioinformatics tools like Galaxy. This will include learning how to set up and interpret alignment analyses.
- **Forensic DNA Analysis:** Acquire skills in using genomic techniques for forensic purposes, including the ability to determine identity or kinship based on biological samples collected in simulated scenarios. This objective will be oriented toward the practical application of genomic theory in legal and investigative contexts.
- **Use of Bioinformatics Software for Comparative Analysis:** Students will learn to use software and algorithms to compare genomic sequences between different species or individuals, to identify significant similarities and differences that can be crucial for solving a forensic case.
- **Interpretation and Presentation of Scientific Results:** Develop the ability to interpret complex data and present them clearly and convincingly, both in written and oral form, including the preparation of lab reports and the defense of results in simulations of peer reviews or conferences.
- **Ethics in Genomics and Bioinformatics:** Introduction to ethical issues related to the use of genomic information, especially in forensic and research contexts, raising student awareness of the moral implications of genetic technologies.
- **Design and Conduction of Experiments:** Students will learn to design genomic and bioinformatics experiments, from ideation to data collection and analysis, through to results validation, following a rigorous scientific process.
- **Case-Solving Simulations:** Through role-playing games and simulations, students will put into practice the theoretical knowledge acquired to solve complex cases, integrating different analysis techniques and collaborating with peers to reach a shared solution.

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AI, PYTHON AND MACHINE LEARNING

CREATING INTELLIGENT SOLUTIONS

KEY COMPETENCE > 3: MATHEMATICAL COMPETENCE AND COMPETENCE IN SCIENCE, TECHNOLOGY AND ENGINEERING

KEY COMPETENCE > 4: DIGITAL COMPETENCE

Abstract

The AI, Python, and Machine Learning course offers students an immersive and interactive path to develop advanced skills in AI-driven programming, data analysis, and the creation of intelligent models.

Through a hands-on approach, students will learn to design, test, and optimize Machine Learning algorithms, using Python and the most advanced libraries. The course prepares participants for the challenges of automation, predictive analysis, and generative AI, providing a solid foundation for their academic and professional future.

General learning goals

- Fundamentals of AI-Driven Programming:** Acquire a solid understanding of the basics of Python programming and the fundamental concepts of Machine Learning, highlighting the role of these technologies in the challenges of automation and predictive analysis.
- Advanced Skills in Using AI Libraries:** Develop practical skills in using leading libraries and frameworks such as TensorFlow, PyTorch, and Scikit-learn, to translate theoretical concepts into functional and effective Machine Learning models.
- Innovation through Data Analysis:** Explore how the analysis and processing of large datasets can be used to extract strategic insights, solve complex problems, and drive innovation in various sectors.
- Development of Artificial Intelligence Solutions:** Provide students with the skills to design, test, and optimize complete AI solutions, from predictive analysis algorithms to virtual assistants and generative AI applications.
- Preparation for a Professional Future in AI:** Provide students with practical knowledge and skills to face the challenges of the job market, preparing them for innovative careers in the field of artificial intelligence, data science, and automation.

SMART WORK PLACEMENT

Specific learning goals

- Mastery of Python and its Libraries:** Achieve advanced competence in using Python and specific libraries like Pandas and NumPy for advanced data manipulation, processing, and analysis.
- Practical Application and Model Creation:** Apply theoretical knowledge to create Machine Learning models, testing their effectiveness and optimizing their performance through advanced training, validation, and tuning techniques.
- Practical Experience with Generative AI:** Gain direct experience in using generative AI models for the automated creation of content, including code, text, and images, understanding their practical applications.
- Development of Intelligent Automation Systems:** Develop the ability to use AI to design and implement automation solutions, such as chatbots and virtual assistants, to improve efficiency in customer service and other business processes.
- Integration of AI Models into Real-World Applications:** Implement and integrate artificial intelligence solutions within real-world software and applications, aiming to improve productivity and create intelligent workflows.

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VIBE CODING REVOLUTION

A JOURNEY INTO CREATIVE CODING

KEY COMPETENCE > 4. **DIGITAL COMPETENCE**

KEY COMPETENCE > 7. **ENTREPRENEURSHIP COMPETENCE**

Abstract

Vibe Coding Revolution is the course that teaches how to develop modern applications using artificial intelligence like a superpower. Students will learn to program with Visual Studio Code and cutting-edge AI tools that multiply productivity, allowing them to create professional apps even without years of experience.

General learning goals

- Fundamentals of AI-First Development:** Acquire a comprehensive understanding of the "AI-First" development paradigm, learning to integrate Artificial Intelligence as a strategic partner in every phase of an application's lifecycle, from ideation to deployment.
- Development of AI-Assisted Full-Stack Skills:** Develop practical and integrated skills for creating complex full-stack applications, using AI to efficiently manage both backend (e.g., Node.js) and frontend (e.g., React) development.
- Promotion of Creative and Entrepreneurial Thinking:** Explore how AI-driven rapid prototyping tools can be used to quickly transform innovative ideas into functional Minimum Viable Products (MVPs), promoting an entrepreneurial approach to technology.
- Development of a Modern Problem-Solving Methodology:** Provide a problem-solving methodology that combines systematic computational thinking with the art of prompt engineering to creatively overcome programming and design obstacles.
- Preparation for Future Tech Professions:** Provide students with a competitive advantage in the job market, preparing them to fill emerging and high-demand roles such as AI Developer, Prompt Engineer, and Startup Founder, through mastery of cutting-edge tools.

Specific learning goals

- Mastery of the AI-Enhanced Development Environment:** Achieve practical competence in using professional editors (Visual Studio Code, Cursor AI) and programming assistants (GitHub Copilot) to write, complete, and refactor code with 10x productivity.
- Practical Application in Generating Graphic Assets:** Apply the use of generative AI models (Midjourney, DALL-E, Stable Diffusion) to autonomously create all the visual assets needed for an application, including icons, images, and user interface components.
- Direct Experience in AI-Assisted Debugging:** Gain practical experience in using conversational models (ChatGPT, Claude) to diagnose complex bugs, interpret error messages, and receive suggestions for code optimization.
- Creation of a Full-Stack Web Application:** Develop the ability to build a complete web application, with a Node.js backend and a React frontend, managing the entire development process with constant support from AI tools.
- Implementation of Deployment on Professional Platforms:** Develop the ability to autonomously publish (deploy) a functional web application on modern hosting platforms like Vercel and Netlify, completing the cycle from idea to online product.

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AGRITECH DIGITAL LAB:

INNOVATION AND NO-CODE TECHNOLOGY FOR AGRICULTURE AGRICULTURAL SUPPLY CHAIN TRACEABILITY SYSTEM

KEY COMPETENCE > 4: DIGITAL COMPETENCE

KEY COMPETENCE > 8: CULTURAL AWARENESS AND EXPRESSION COMPETENCE.

Abstract

The training course aims to equip students with the necessary skills to develop and implement an innovative no-code platform, aimed at significantly improving the traceability of the agricultural supply chain. This objective translates not only into an increase in transparency for consumers, who will be able to access detailed information regarding the origin and treatment of the agricultural products they purchase, but also into an advancement toward more sustainable production practices by producers. Through the use of advanced technologies such as QR codes or RFID, the training course will teach students how to effectively track the journey of agricultural products, from seeding to harvest, all the way to distribution to the final consumer. Emphasis will be placed on acquiring practical skills in the use of no-code platforms, thus allowing teachers to create technological solutions without the need for in-depth knowledge of coding or programming. These skills will include designing intuitive user interfaces, managing databases for storing traceability data, and integrating reading systems for QR codes and RFID. Furthermore, the training course will explore the importance of transparency in the agricultural supply chain and its impact on consumer purchasing decisions, as well as on producer production practices.

General learning goals

- 1. Increase Knowledge of No-Code Technologies:** Provide a solid understanding of no-code platforms and their potential to develop innovative solutions in the agricultural sector, increasing transparency and sustainability.
- 2. Develop Skills in Agricultural Supply Chain Traceability:** Equip students with the necessary skills to use technologies like QR codes and RFID, in order to effectively track agricultural products from the field to the consumer.
- 3. Promote Environmental Awareness and Sustainability:** Encourage students to become ambassadors for sustainable agricultural practices and to raise students' awareness of the importance of food transparency and environmental sustainability.

Specific learning goals

- 1. Mastery of No-Code Platforms:** Students will acquire practical skills in using specific no-code platforms to create databases, user interfaces, and customized traceability systems.
- 2. Implementation of Traceability Technologies:** Students will learn to implement and manage traceability technologies, such as QR codes and RFID tags, integrating them into no-code systems to monitor the path of agricultural products.
- 3. Development of Innovative Projects:** Students will be able to develop and implement projects that use the acquired skills to apply the principles of traceability in the agricultural supply chain and the importance of sustainability.
- 4. Critical Analysis and Reflection on the Agricultural Supply Chain:** Students will develop the ability to critically analyze current practices in the agricultural supply chain and reflect on the importance of transparency and sustainability, transferring these reflections into educational contexts.

These objectives aim to equip students with the necessary skills and knowledge to respond to contemporary challenges of sustainability and technological innovation.

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TECHNOLOGY, TOURISM AND TERRITORY

AN INTERDISCIPLINARY MAP

KEY COMPETENCE > 4: DIGITAL COMPETENCE

KEY COMPETENCE > 8: CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Abstract

The training course **Technology, Tourism, and Territory: an Interdisciplinary Map** is a unique educational experience that integrates skills from three different sectors: IT, Cartography and Topography, and Tourism.

The main focus is the use of information technologies to create an interactive map of a tourist area, enriched with multimedia content and useful information for visitors, and a dedicated web portal to host the map and provide further resources, using no-code tools.

Students will be immersed in a comprehensive educational experience, acquiring specific and transversal skills. They will learn to create digital maps, manage geographic data, create multimedia content, and develop a web portal with no-code tools.

Topics covered will include understanding the fundamentals of digital cartography, field data collection, integrating multimedia content into a map, and web portal development.

Furthermore, the program will include field visits to collect data and photograph points of interest, offering a unique opportunity for learning and connecting with the local area. The experience will be enriched by a practical understanding of the context in which they can apply the acquired skills.

The laboratory develops transversal skills such as teamwork, effective communication, problem-solving, time management, and adaptability.

The output will be an interactive online map of the chosen tourist area and a complete web portal, developed with no-code tools.

General learning goals

1. **Promote interdisciplinarity and collaboration** between different fields of study (IT, Cartography and Topography, Tourism).
2. **Develop technical and practical skills** in each of the three sectors.
3. **Stimulate creativity and critical thinking** through the design and implementation of a concrete project.
4. **Foster knowledge and awareness** of the territory and its tourist points of interest.
5. **Teach the use of digital and no-code tools** for creating online content.
6. **Improve presentation and communication skills** through the final project presentation.

Specific learning goals

1. **Acquire basic skills in using GIS software** for creating digital maps.
2. Develop skills in collecting and analyzing **geographic and tourist data**.
3. **Learn how to create multimedia content** (e.g., videos, photos, descriptions) to enrich an interactive map.
4. **Learn to use no-code tools** to develop a web portal.
5. **Acquire skills in project design and organization**, from the brainstorming phase to implementation.
6. **Develop skills in collecting and interpreting feedback** to improve a project.

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CYBERBOOTCAMP

THE ART OF CYBER DEFENCE

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

The **CyberBootcamp** training course provides students with practical cybersecurity skills to recognize, prevent, and respond to digital threats. Through real-world case studies, practical labs, and interactive challenges, students will explore topics such as social engineering, AI-based threats, ethical hacking, and incident management. By the end of the course, participants will have a solid foundation in cybersecurity best practices, threat detection, and defensive strategies—essential skills for today's digital world.

General learning goals

- 1. Understand Cybersecurity Fundamentals:** Learn the basics of cybersecurity, common threats, and best practices to protect personal and professional data.
- 2. Identify and Prevent Social Engineering Attacks:** Recognize phishing, deepfakes, and manipulation techniques used by hackers and apply strategies to prevent them.
- 3. Use Cybersecurity Tools and Defenses:** Gain practical experience with tools like Kali Linux, Wireshark, and firewalls to analyze, detect, and defend against cyber threats.
- 4. Manage Cybersecurity Incidents:** Learn to respond to cyber attacks, implement data backup and recovery strategies, and develop crisis management skills.
- 5. Apply Cybersecurity Knowledge in Real-World Scenarios:** Participate in simulations, gamified challenges, and a final project to test problem-solving skills in cybersecurity situations.

Specific learning goals

- 1. Analysis of Social Engineering Threats:** Develop the ability to analyze phishing emails and suspicious messages to identify indicators of compromise, applying assessment techniques to recognize potential deepfake campaigns.
- 2. Use of Network Analysis Tools:** Gain practical experience in using Wireshark to capture and analyze network traffic, in order to identify anomalous communications, unencrypted traffic, and potential intrusion attempts.
- 3. Implementation of Vulnerability Scans:** Apply basic tools available in Kali Linux to perform a vulnerability scan on a test system, identifying and documenting the main security flaws and possible corrective patches.
- 4. Application of Incident Response Procedures:** Execute a response procedure for a simulated security incident, practicing the fundamental steps of threat containment, eradication, and data recovery from a pre-existing backup.
- 5. Design of a Security Strategy:** Design and present (in the final project) a cybersecurity strategy for a small business scenario, which includes preventive measures (firewall configuration), detection plans, and a crisis management protocol.

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THE GREEN EVOLUTION

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

The "Green Evolution" course provides students with technological literacy, focusing on electric transport, energy, and the use of social media for climate awareness. Students will engage in concrete actions for the environment, futuristic gardening, and community outreach activities.

General learning goals

1. **Understanding the Ecological Transition:** Acquire a solid understanding of the scientific and technological principles guiding the green transition, with particular reference to electric mobility and renewable energy sources.
2. **Digital Literacy for the Environment:** Develop technological and digital literacy to critically analyze, interpret, and communicate complex data and information related to environmental challenges.
3. **Innovation and Sustainability:** Explore the application of emerging technologies and innovative solutions (such as "futuristic gardening" and urban agriculture) to promote sustainability at the local level.
4. **Strategic Communication and Advocacy:** Acquire advanced skills in the strategic use of social media and digital platforms as tools for climate advocacy and mobilization.
5. **Design of Collective Actions:** Develop the ability to use digital tools and STEM knowledge to design and promote effective community outreach actions.

Specific learning goals

1. **Energy Data Analysis:** Analyze and compare the efficiency and environmental impact of electric transport systems versus traditional ones, using industry data and reports.
2. **Digital Content Creation:** Design and create a digital communication campaign (texts, graphics, short videos) to raise awareness about a specific environmental action.
3. **"Green" Prototyping:** Use modeling software or practical tools to design a basic model of an innovative gardening system (e.g., hydroponic, vertical).
4. **Online Community Management:** Learn to use social media analysis tools to identify the target audience and maximize the impact of an awareness message.
5. **Outreach Planning:** Use digital platforms (e.g., maps, organizational tools) to logistically plan an awareness initiative (e.g., a flash mob, an info point) in one's own community.

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EXPLORING SCRATCH

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

An immersive and practical experience in using Scratch, suitable for different abilities. Going beyond pure technical competence, the course promotes computational thinking and digital creativity, preparing participants to confidently navigate the ever-evolving technological landscape.

General learning goals

- Fundamentals of Computational Thinking:** Acquire a solid understanding of the principles of computational thinking, learning to break down complex problems (decomposition), recognize patterns, and develop algorithmic solutions.
- Coding Literacy:** Develop a fundamental competence in visual block-based programming, understanding the logic that governs the creation of software, animations, and games.
- Digital Creativity:** Learn to use programming tools as a means of creative expression, transforming abstract ideas into interactive and multimedia digital projects (storytelling, animations).
- Problem-Solving Competence:** Develop a methodical approach to problem-solving, learning to identify, analyze, and correct errors (debugging) in one's own projects.
- Technological Autonomy:** Provide participants with the confidence and skills needed to transition from passive consumers to active creators in the technological landscape, ready to tackle more complex tools.

Specific learning goals

- Mastery of the Scratch Interface:** Achieve full autonomy in using the Scratch environment: managing sprites, backdrops, scripts, and sounds.
- Application of Programming Logic:** Correctly use fundamental blocks to create functional scripts, applying logical sequences, loops, and conditional statements (if/then/else).
- Creation of Interactivity:** Implement interactivity in one's projects using the "Sensing" and "Events" blocks (e.g., keyboard input, mouse clicks, sprite contact).
- Management of Simple Data:** Introduce and use variables (e.g., to manage a score in a game) and lists to manage data within a program.
- Completion of a Full Project:** Design, develop, and present a complete digital project (e.g., a basic video game or an animated story) from ideation to the final working product.

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ECOPOWER LAB

KEY COMPETENCE > 3. STEM COMPETENCE
KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

This exciting SmartLab combines learning mechanical engineering with the use of no-code programming. Students will learn to customize applications, manage data, and automate processes. Topics covered will include understanding the fundamentals of Tinkercad, building and customizing applications, integration with other tools and services, and developing strategies to optimize and scale applications.

General learning goals

- 1. Integration between Mechanics and Digital:** Understand the synergy between the principles of mechanical engineering (applied to "EcoPower" themes) and modern no-code development platforms for prototyping and systems management.
- 2. Fundamentals of 3D Modeling:** Acquire a solid understanding of the principles of computer-aided 3D design and modeling (CAD) using standard software like Tinkercad.
- 3. Competence in No-Code Development:** Develop the ability to design, build, and customize functional software applications without writing code, democratizing the development of digital solutions.
- 4. Principles of Automation and Data Management:** Learn to map, analyze, and automate complex processes (e.g., data collection, notifications) and to manage databases and information flows within an application.
- 5. Systemic Mindset and Scalability:** Develop a strategic approach to integrating different digital tools (APIs, external services) and understand the principles for optimizing and scaling an application or process.

Specific learning goals

- 1. Mastery of Tinkercad:** Use Tinkercad tools to create and modify 3D models of simple mechanical components or "EcoPower" related prototypes.
- 2. No-Code App Construction:** Build a functional application (e.g., an energy monitoring app) using a dedicated no-code platform, defining its user interface (UI) and user experience (UX).
- 3. Automation Implementation:** Create at least one functional automation within the app (e.g., "if sensor X exceeds value Y, send a notification").
- 4. No-Code Database Management:** Structure and manage a simple database within the application to collect and display data (e.g., consumption readings, maintenance logs).
- 5. Integration of External Services:** Connect the no-code application to an external tool (e.g., Google Sheets, a weather service) to import or export data, demonstrating integration capability.

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GADGET DOCTORS

(MALAGA & SOFIA)

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 5. PERSONAL, SOCIAL AND LEARNING TO LEARN COMPETENCE

Abstract

"Gadget Doctors" is an opportunity to enhance students' work experience through the creation of educational materials to support younger students on the professional path of an IT technician. The "hands-on" practical approach, under the guidance of professional IT technicians, will support the development of students' skills for the entire duration of the Laboratory.

General learning goals

- Diagnostic and Technical Competence:** Acquire solid practical competence in diagnosing, maintaining (hardware/software), and resolving the most common problems in IT devices (PCs, smartphones, peripherals).
- Teaching and Dissemination Skills:** Develop the ability of "learning by teaching," translating complex technical knowledge into clear, accessible, and effective educational content.
- Creation of Digital Educational Content:** Learn to design and produce multimedia training materials (guides, tutorials, videos) using digital tools to support others' learning.
- Development of Relational and Coaching Skills:** Acquire social and mentorship skills in actively supporting younger students, managing communication constructively and motivatingly.
- Professional Awareness:** Understand the dynamics, methodologies, and responsibilities of the IT technician role in a practical context supervised by industry professionals.

Specific learning goals

- Hardware/Software Diagnosis:** Perform a complete diagnosis to identify the nature of a fault (hardware or software) and propose the correct resolution procedure.
- Practical Maintenance:** Perform standard maintenance procedures (e.g., physical cleaning, RAM/disk replacement, OS optimization, malware removal) on a device.
- Tutorial Design:** Structure the storyboard and write the text for a "step-by-step" guide intended to teach a specific technical procedure to a beginner student.
- Educational Video Production:** Create a short video tutorial (e.g., screencast or "hands-on" recording) that visually demonstrates how to perform an installation or repair.
- Support Session Management:** Simulate or conduct a support session (peer-to-peer), verbally guiding another student in resolving a technical problem.

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NO CODE REVOLUTION

KEY COMPETENCE > 2. MULTILINGUAL COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

This laboratory combines learning no-code web programming, through the Airtable platform, with language enrichment. Students will embark on a true learning adventure, acquiring specific and transversal skills.

General learning goals

- Understanding the No-Code Paradigm:** Acquire a solid understanding of the principles of "no-code" development, understanding how this approach democratizes application creation and digital process management.
- Development of Computational and Relational Thinking:** Develop a data-oriented and computational thinking mindset, learning the fundamentals of relational database management (tables, records, relationships) through a visual interface.
- Competence in Application Development:** Develop the ability to design, build, and implement functional web and management applications, using a no-code platform (Airtable) to solve concrete problems.
- Enhancement of Language Skills:** Enhance language skills (Italian and/or foreign language), using them actively in a technical and project-based context to describe processes, interfaces, and documentation.
- Acquisition of Transversal Skills:** Strengthen transversal skills (problem-solving, critical thinking, project management, and collaboration) through a practical and integrated learning experience.

Specific learning goals

- Mastery of the Airtable Interface:** Create and configure a database ("Base") in Airtable, correctly defining tables, field types, and custom views.
- Creation of Relational Logic:** Implement links, "lookup" fields, and "rollup" fields to build a functional relational database that connects different types of information.
- Implementation of Automations:** Use Airtable's "Automations" feature to design and activate automatic workflows (e.g., send a notification, create a record) based on specific triggers.
- Construction of User Interfaces:** Design and build a custom "Interface" (user interface) in Airtable to allow external users to intuitively view or input data.
- Linguistic Application in a Technical Context:** Write brief documentation or a project presentation (in Italian or a foreign language), describing the database structure and the implemented logic using appropriate technical terminology.

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AUTOMATED SORTING TRACKING SYSTEM

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

This laboratory offers high school students an integrated experience in mechanics, electrical engineering, and logistics. Using no-code tools like Tinkercad and MIT App Inventor, students design and simulate automated sorting systems and create an app for package tracking.

General learning goals

- 1. Understanding Mechatronic Systems:** Acquire an integrated understanding of how mechanics, electrical engineering, and software collaborate to create complex automation systems, such as those used in logistics.
- 2. Fundamentals of Design and Simulation (CAD):** Develop a solid understanding of the principles of computer-aided design (CAD) and electrical circuit simulation for virtual prototyping.
- 3. Competence in No-Code Development:** Develop practical skills in creating functional mobile applications using visual block-based programming (no-code) platforms, democratizing access to software development.
- 4. Knowledge of Logistic Processes:** Understand the fundamental concepts of warehouse logistics, particularly the logic governing the sorting and tracking processes of goods.
- 5. Systemic Thinking and Data Flow:** Develop the ability to design integrated systems, understanding how data generated by sensors (in the sorting system) can be collected, processed, and visualized by a software application (the tracking app).

Specific learning goals

- 1. Mechanical Design on Tinkercad:** Design a 3D model (CAD) of a simplified sorting system, including mechanical components such as conveyor belts and diverters.
- 2. Electrical Simulation and Automation:** Use the simulation environment (e.g., Tinkercad Circuits) to design the electrical circuit that controls the system, using sensors (e.g., optical, color) to identify packages and actuators (e.g., servo motors) to sort them.
- 3. App Interface (UI) Creation:** Develop the user interface (UI) on MIT App Inventor for a tracking application, including elements such as text fields for the package ID, buttons, and status display areas.
- 4. App Logic Implementation (No-Code):** Program the app's block-based logic to allow the user to search for a package and view its status (e.g., "In warehouse," "Sorting," "Shipped").
- 5. Data Integration Simulation:** Simulate the interaction between the sorting system and the app: when an event occurs in the simulator (e.g., "package sorted"), manually or via a simulated database update the corresponding status in the application.

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CULTIVATING HARMONY

(MALAGA)

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Abstract

Exploring the world of agriculture and horticulture, students have the opportunity to work creatively in landscape design, while learning the best agricultural practices that the region has to offer for wine and olive oil.

General learning goals

- 1. Understanding Agronomic Principles:** Acquire a solid understanding of the scientific principles (agronomic, botanical, chemical) that govern modern and sustainable agriculture and horticulture practices.
- 2. Development of Design Creativity:** Develop creative skills and an aesthetic sensibility applied to landscape design, learning to harmoniously integrate natural and man-made elements.
- 3. Knowledge of Regional Excellences:** Understand the value and specificities of the territory's excellent agricultural supply chains, with particular reference to the production processes of wine (viticulture) and oil (oleiculture).
- 4. Awareness of Cultural Heritage:** Explore how agricultural practices and landscape configuration are a fundamental component of a region's cultural, historical, and economic identity.
- 5. Evaluation of Sustainable Practices:** Develop the ability to analyze and evaluate the impact of different agricultural practices (organic, integrated, traditional) on the environment and the quality of the final product.

Specific learning goals

- 1. Analysis of Cultivation Techniques:** Distinguish and describe the main agronomic techniques used in the cultivation of grapevines and olive trees in the specific region.
- 2. Landscape Design (Basic):** Create a preliminary project (sketch, layout) of a small green space (e.g., garden, vegetable plot) applying the basic principles of landscape design.
- 3. Identification of Production Processes:** Map the fundamental stages of the transformation process from raw material (grapes, olives) to the finished product (wine, oil), identifying the critical points for quality.
- 4. Creative Project Presentation:** Present one's own design project, justifying the aesthetic and functional choices in relation to the reference landscape and cultural context.
- 5. Qualitative Evaluation Simulation:** Perform a guided evaluation (e.g., visual, olfactory analysis) of local products (oil or derivatives) to recognize their fundamental characteristics.

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SUSTAINABLE ARCHITECTURE

(MALAGA)

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Abstract

This laboratory offers a perfect balance between past and present, combining a love for architectural history with contemporary and sustainable design skills, using a range of technologies and creativity.

General learning goals

- 1. Understanding Sustainability Principles:** Acquire a solid understanding of the principles of sustainable architecture, including energy efficiency, the use of eco-friendly materials, and bioclimatic design.
- 2. Historical and Contextual Analysis:** Develop the ability to analyze solutions adopted in historical architecture (past) as a source of inspiration for passive sustainability (e.g., orientation, local materials, natural ventilation).
- 3. Competence in Contemporary Design:** Develop practical skills in designing contemporary spaces that integrate aesthetics, functionality, and sustainability requirements.
- 4. Technological Literacy in Design:** Learn to use a range of digital technologies and design software (CAD/BIM) to model, simulate, and visualize sustainable architecture projects.
- 5. Development of Creative Thinking:** Stimulate creativity in the search for innovative solutions that balance human needs, respect for the environment, and the historical-cultural context.

Specific learning goals

- 1. Analysis of a Historic Building:** Select and analyze a historic building, identifying and documenting its passive bioclimatic strategies and the use of local materials.
- 2. 3D Model Design:** Use design software (e.g., SketchUp, Revit, AutoCAD) to create a 3D model of a small building or space that applies sustainability principles.
- 3. Selection of Sustainable Materials:** Create a "technical sheet" for a project, selecting building materials based on their ecological footprint, life cycle assessment (LCA), and origin.
- 4. Integration of "Green" Technologies:** Include at least two active sustainability technologies in one's digital project (e.g., solar panels, green roof, rainwater harvesting system).
- 5. Creative Project Presentation:** Present one's final project, illustrating how it balances inspiration drawn from the "past" (historical context) with "present" solutions (sustainable design and technology).

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URBAN RAILS

(MALAGA)

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 6. CITIZENSHIP COMPETENCE

Abstract

This Smart Lab allows future railway operators, engineers, and train enthusiasts to learn the intricate world of the railway system, train safety and security, and customer satisfaction in the world of transport.

General learning goals

- 1. Understanding Transport Systems:** Acquire an overview of the architecture and operation of rail transport systems (urban and non-urban), analyzing their technological, infrastructural, and logistical components.
- 2. Safety & Security Awareness:** Understand the fundamental distinction and importance of safety (operational safety, incident prevention) and security (protection from malicious acts) protocols in the railway sector.
- 3. Customer Service Centricity:** Develop an awareness of how operational management, punctuality, and safety directly impact "customer satisfaction" and the perception of the public transport service.
- 4. Knowledge of Engineering Principles:** Explore the basic engineering concepts (mechanical, electrical, and signaling) that ensure the movement and control of trains.
- 5. Professional Role Orientation:** Provide an overview of the different professional roles (operators, engineers, maintenance staff, station staff) and their interdependencies in ensuring an efficient service.

Specific learning goals

- 1. Analysis of Emergency Protocols:** Describe the standard operating procedures to be implemented in the event of a technical failure or an on-board emergency to ensure passenger safety.
- 2. Identification of Signaling Systems:** Recognize (visually or via simulators) the different types of railway signals and explain their meaning for the safe circulation of trains.
- 3. Mapping of Security Risks:** Identify at least three potential security threats in a transport context (e.g., station, train) and the related countermeasures (e.g., video surveillance, checks).
- 4. Customer Satisfaction Management:** Simulate the handling of a complaint or a situation of discomfort (e.g., prolonged delay), applying effective customer communication techniques.
- 5. Description of Technical Roles:** Illustrate the specific responsibilities of a railway engineer (e.g., rolling stock maintenance) and of an operator (e.g., train driver or conductor) in the daily service cycle.

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GEOEXPLORERS

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

Students will master the fundamental techniques of geodetic survey using a range of tools, gaining practical experience in accurate data collection. They will also develop spatial design and mapping skills through GIS tools, creating detailed and aesthetic maps that perfectly integrate the survey data. They will also use 3D models made with eco-compatible materials.

General learning goals

- 1. Understanding Geomatics:** Acquire a solid understanding of the principles of geomatics and geodetic survey techniques (topography, GPS) for the accurate measurement and representation of the territory.
- 2. Competence in Using Digital Tools (GIS):** Develop advanced skills in using GIS (Geographic Information System) software for spatial analysis, territorial data management, and the creation of digital cartography.
- 3. Development of Spatial and Creative Thinking:** Learn to combine technical-scientific rigor with creativity in cartographic design, producing maps that are not only accurate but also aesthetically effective.
- 4. Data Collection Methodology:** Develop a rigorous methodological approach for the "in-field" (hands-on) collection of geospatial data, understanding the importance of precision and accuracy.
- 5. Integration between Digital and Sustainable Physical:** Understand the complete workflow that transforms digital data (survey, GIS) into a three-dimensional physical model, emphasizing the use of sustainable materials.

Specific learning goals

- 1. Execution of a Geodetic Survey:** Perform a topographic survey of a defined area using specific tools (e.g., total station, GPS/GNSS), recording and downloading the data.
- 2. Data Integration in GIS Platform:** Import the survey data into GIS software, georeferencing and integrating them with other data sources (e.g., base maps, orthophotos).
- 3. Creation of a Thematic Map:** Design and produce a detailed thematic map, curating the layout, symbology, legend, and essential cartographic elements (scale, orientation).
- 4. Generation of a Digital 3D Model:** Use survey or GIS data to generate a digital 3D model of the terrain (DTM/DEM) or specific elements.
- 5. Creation of a Sustainable 3D Physical Model:** Build a physical (scale) model of the studied area, using eco-compatible materials (e.g., recycled cardboard, bioplastics) based on the digital 3D model.

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CIVIC EXPLORERS

KEY COMPETENCE > 4. DIGITAL COMPETENCE

KEY COMPETENCE > 6. CITIZENSHIP COMPETENCE

Abstract

Students will participate in hands-on activities and professional visits, which include a tour of the Fire Station, a meeting with Police Forces, and an exploration of crime scene investigation techniques. They will collaborate on creating a final video project to showcase what they have learned about safety, crime prevention, and community service.

General learning goals

1. **Understanding the Civic System:** Acquire a solid understanding of the role, structure, and functions of key public safety institutions (Fire Department, Police Forces) and their impact on the community.
2. **Safety and Prevention Awareness:** Develop a strong awareness of the principles of safety, risk prevention (e.g., fires, crimes), and emergency procedures.
3. **Knowledge of Investigative Techniques:** Explore the basic methods and procedures used in crime scene investigation, understanding their methodological approach.
4. **Development of a Sense of Community:** Promote the value of community service and understand the importance of active collaboration between citizens and institutions for the common good.
5. **Digital Communication Competence:** Learn to use digital tools and (video) storytelling techniques to document, synthesize, and effectively communicate the learning experience.

Specific learning goals

1. **Analysis of Institutional Roles:** Describe the organization of the Fire Station and the different roles of the Police Forces (e.g., prevention, investigation) following the professional visits.
2. **Application of Investigative Techniques:** Perform a simulated "crime scene" processing (e.g., identification, documentation, and collection of fictitious evidence) by applying the explored techniques.
3. **Identification of Safety Protocols:** List the correct procedures to follow in case of an emergency (e.g., fire, call for help) and basic crime prevention strategies.
4. **Video Project Design:** Collaborate in a group to define the storyboard, script, and roles for the production of the final video.
5. **Multimedia Content Production:** Create (film and edit) a short video that illustrates the activities carried out and clearly communicates the concepts learned about safety and community service.

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DIGITAL HEALTH INNOVATOR

KEY COMPETENCE > 3. STEM COMPETENCE

KEY COMPETENCE > 4. DIGITAL COMPETENCE

Abstract

The "Digital Health Innovator" Smart Lab is a cutting-edge program designed for Healthcare Assistants (HCAs), focused on the integration and optimization of digital technologies in healthcare. Through two specialized workshops, the program provides HCAs with the essential skills to navigate and leverage the digital health landscape, driving transformative models of care.

General learning goals

1. **Digital Health Literacy:** Acquire a solid understanding of the digital health ecosystem, including tools (e.g., electronic health records, telemedicine) and their impact on modern models of care.
2. **Competence in Process Optimization:** Understand how digital technologies can be used to optimize the healthcare operator's workflows, improving efficiency and reducing the administrative burden.
3. **Awareness of Data Management and Privacy:** Develop a strong awareness of the importance of collecting, managing, and protecting health data, in full compliance with regulations (e.g., GDPR) in the digital environment.
4. **Technological Integration Skills:** Develop the ability to effectively integrate and use new digital tools (apps, monitoring devices) within existing care protocols.
5. **Promotion of Innovation in Care:** Act as a "bridge" between technological innovation and practical care, supporting the adoption of new transformative care models (e.g., tele-assistance, remote monitoring).

Specific learning goals

1. **Use of the Electronic Health Record (EHR):** Navigate a simulated EHR system to correctly enter, retrieve, and update patient data and care notes.
2. **Telemedicine Management:** Configure and manage a tele-assistance or teleconsultation session, providing basic technical support to both the patient and the clinician to ensure the success of the visit.
3. **Evaluation of Health Apps (mHealth):** Identify and evaluate the basic reliability of a health application (mHealth) and be able to instruct a patient on its use for parameter monitoring.
4. **Mapping a Digital Workflow:** Analyze a traditional care process (e.g., recording vital signs) and propose an optimized workflow that integrates a digital tool.
5. **Application of Security Protocols:** Correctly apply digital security procedures (e.g., secure login, data anonymization, logout) in simulated scenarios involving sensitive patient data.

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THE GREEN URBAN MOSAIC

(RHODES)

KEY COMPETENCE > 2. MULTILINGUAL COMPETENCE

KEY COMPETENCE > 8. CULTURAL AWARENESS AND EXPRESSION COMPETENCE

Abstract

Groups follow unique paths within the city they visit, collecting and processing information to produce digital outputs. From interview techniques, video creation and editing, to researching the city's cultural, historical, and geographical aspects, students will gain a more comprehensive knowledge of multimedia skills and the English language. The focus of this "Green Urban Mosaic" is renewable energy, green themes, circular economy, pollution, etc.

General learning goals

- Awareness of "Green" Themes:** Acquire a solid understanding of urban sustainability concepts, including renewable energy, circular economy, and pollution management, applied to a real city context.
- Competence in Multimedia Production:** Develop practical skills in digital storytelling, covering the entire workflow: from planning and video shooting to editing and post-production.
- Field Research Methodology:** Learn to collect data and information in an urban context, using active research techniques such as interviews, direct observation, and photographic documentation.
- Competence in Territorial Analysis:** Develop the ability to analyze a city holistically, integrating geographical, cultural, and historical aspects to understand its "green" challenges and opportunities.
- Enhancement of Language Skills:** Improve proficiency in the English language (or other vehicular language) by actively using it in a professional and creative context for research, interviews, and content creation.

Specific learning goals

- Conducting an Interview:** Prepare and conduct an interview (in the target language) with a local resident or an expert on a specific topic (e.g., waste management in a neighborhood).
- Researching a "Green" Topic:** Research and document a tangible example of sustainability (e.g., a renewable energy plant, a circular economy project) present in the visited city.
- Video Shooting:** Perform "in-field" video shooting following a predefined storyboard, paying attention to framing and audio to document their research path.
- Editing a Video Product:** Use editing software to assemble a short video report (1-3 minutes), integrating interviews, footage, and an audio track or captions.
- Presentation of Results:** Present the final video to the group, describing (in the target language) the findings, the storytelling choices made, and the conclusions of their investigation into the "urban mosaic".

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