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**Guide 1. APT Project Definition**

**Capstone Course**

1. **PART I**

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| **1. Personal Background** |
| The following table presents the fields where you must complete the requested information. |

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| Student Name | **Gonzalo Esteban Troncoso Cortes** |
| Rut | **14.162.742-2** |
| Major. | **Computer Engineering** |
| Campus | **Maipu** |

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| **2. APT Project Description** |
| In the description, you should briefly state the name of your APT project and the graduate profile competencies you will put into practice. If your degree program defines areas of performance, also mention which areas of performance are linked to the project. |

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| Name of the Project | *NutriHuella* |
| Area(s) of Performance | *Software Development*  *Databases*  *Software Engineering and Agile Methodologies*  *Information Security*  *Artificial Intelligence and Data Science*  *Systems Integration*  *Technology Project Management* |
| Competencies | ***Comprehensive IT Solution****: The platform is designed to cover the entire process from requirements gathering to development, deployment, integration, and reporting.*  ***Structured Databases****: Management of medical records, pantry inventory, recipe book, and metrics.*  ***Programming Best Practices****: Use of AI, business logic, and clear workflows supported by well-structured and maintainable code.*  ***System Integration****: Connection with external APIs (Google/Apple, notifications, .ics, WhatsApp/email) to expand functionality.*  ***Project Management****: Timeline, milestones, technical documentation, and user manual reflect an organized and professional approach.*  ***Critical Thinking and Innovation****: The creation of personalized and accessible nutritional plans reinforces creative skills applied to real-world challenges.*  ***Effective Communication****: Documenting functionalities, interfaces, and user manual connects the academic environment with future users.* |

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| **3. Justification of the APT Project.** |
| The following fields must be completed with the requested information. This section aims for you to describe your project in detail and justify its relevance and significance. |

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| Relevance of the APT Project | *The NutriHuella project arises because most dog owners in Chile feed their pets primarily with kibble, due to a lack of knowledge about animal nutrition and the perception that preparing natural diets is costly or complex. This situation creates a need for practical and accessible guidance. The application is conceived as a tool that, through artificial intelligence, can recommend personalized feeding plans based on the dog’s medical record and the ingredients available at home, while also providing safe recipes, reporting features, and collaborative functionalities. In this way, the project seeks to generate an impact on pet owners, giving them confidence to improve their animals’ health without incurring additional expenses.*  *For Computer Engineering, the relevance of the project lies in its ability to apply key program competencies such as web and mobile software development, databases, security, external systems integration, and artificial intelligence within a practical case that has social impact. The problem is framed within a national context, particularly in urban and semi-urban areas where owners have internet access. Its resolution provides value both socially—by improving the quality of life of pets and their families—and professionally, by simulating a comprehensive technological project with the potential to become a real-world industry solution.* |
| Description of the APT Project | *The objective of the NutriHuella project is to develop a web and mobile application that supports dog owners in adopting a natural, safe, and accessible diet for their pets. The goal is for users to be able to record their pets’ clinical information, manage the ingredients available at home, and receive, through artificial intelligence, personalized feeding plans tailored to each dog’s needs and the economic reality of their owners.*  *The problem will be addressed through the design of a system that combines a digital clinical record, a pantry inventory, and an intelligent assistant that generates daily and weekly menus based on that information. In addition, the platform will include a collaborative recipe book, usage metrics reporting, and external integrations (secure login, notifications, calendar, and WhatsApp/email) to facilitate the user experience. In this way, the project aims to provide a comprehensive technological solution that positively impacts animal well-being and the daily lives of pet owners.* |
| Alignment of the Project with the Graduate Profile. | *The NutriHuella project is directly related to the competencies defined in the graduate profile of the Computer Engineering program. As established in the training, a computer engineer must be capable of proposing innovative technological solutions to real-world problems, and in this case, the team addresses the need to improve pet nutrition through an accessible, cross-platform application.*  *Likewise, the program requires the development of software by applying programming best practices and modern work methodologies, which is fulfilled through the implementation of a web and mobile application supported by an agile framework such as Scrum, ensuring an iterative, controlled, and efficient process.*  *Another key competency is data management and modeling, which is reflected in the project through the design of a relational database that supports pets’ clinical records, pantry inventory, and usage metrics reporting. This ensures that the information is secure, reliable, and useful for user decision-making.*  *Regarding system integration and emerging technologies, the project incorporates Google authentication, push notifications, and export to external calendars, in addition to an artificial intelligence–based assistant that personalizes feeding plans. This demonstrates the ability to apply current tools that enhance the value of the solution.*  *Finally, the graduate profile also establishes the importance of managing technology projects and working as a team—competencies that are embodied in NutriHuella through milestone planning, role assignment in Scrum (Product Owner, Scrum Master, and Development Team), and the preparation of technical documentation and user manuals.* |
| Relation to Professional Interests | *The group’s professional interests are oriented toward software development, the integration of innovative technologies, and the creation of solutions with social impact. The team seeks to design and build applications that are not only functional but also add value to people’s lives, applying knowledge in databases, artificial intelligence, and agile methodologies to address real-world problems.*  *The NutriHuella project directly reflects these interests, as it integrates web and mobile development, the use of artificial intelligence to personalize services, and the implementation of collaborative systems with meaningful data for users. Carrying out this APT Project will contribute to the professional growth of the group by allowing them to practically apply the competencies acquired during their studies, face a comprehensive challenge similar to those in the workplace, and strengthen their profile as future engineers capable of leading innovative technology projects that improve the lives of people and their communities.* |
| Feasibility of Developing the APT Project | *The team considers that the development of the NutriHuella project is feasible within the academic semester, since the course provides the necessary hours to plan and execute a functional prototype. The required resources are limited to personal computers, internet access, software development environments, and free or academic cloud services, all of which are available to the group.*  *Among the external factors that facilitate development are access to bibliography and technical documentation, the availability of third-party APIs with free plans, and the support of the supervising professor. As potential challenges, the team* ***identifies*** *the limitation of academic time and the dependency on external services such as Google, Apple, or WhatsApp. To mitigate these risks, the team will prioritize the development of the MVP with critical functionalities and will evaluate replacement alternatives or fallback mechanisms in case any API becomes unavailable.* |

1. **PART II**

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| **4. Objectives** |
| In this section, you must define the general and specific objectives of the APT Project. It is important to clarify that the objectives should be stated clearly and concisely, without further explanations; in other words, they must be self-explanatory. It is recommended to write them using verbs in the infinitive form, as this requires specifying concrete actions. |

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| General Objective | *To develop a cross-platform web and mobile application that supports dog owners in adopting a natural, safe, and accessible diet, through the implementation of a digital clinical record, a pantry inventory of ingredients, and an artificial intelligence assistant that generates personalized nutritional plans.* |
| Specific Objectives | *Design and implement a digital clinical record to register and manage each dog’s health data.*  *Develop a pantry inventory module to manage the ingredients available at home.*  *Implement an artificial intelligence assistant capable of generating personalized feeding plans based on the clinical record and the registered ingredients.*  *Build a collaborative recipe book that allows users to share, validate, and rate recipes, including cost calculation for each recipe.*  *Integrate external systems such as Google/Apple login, push notifications, calendar export (.ics), and plan delivery via WhatsApp/email.*  *Develop a reporting module that provides usage metrics, weight evolution, and reminder compliance.*  *Prepare technical documentation and a user manual to ensure correct understanding, usage, and maintenance of the application.* |

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| **5. Methodology** |
| In the following section, you must describe the methodology, specific to your discipline, that you will use to carry out the previously described APT Project, including the stages and working methods. |

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| Description of the Methodology |
| *The team will address the problem using the agile Scrum framework, chosen for its iterative and incremental approach, which allows continuous value delivery and flexibility in responding to changing requirements that may arise during project development. Scrum fosters collaboration, transparency, and frequent inspection—key characteristics for the success of a project with an academic scope and a limited timeframe.*  *The project will be organized into two-week sprints, each with defined objectives contributing to the progressive construction of the product. During each sprint, the main Scrum ceremonies will be carried out:*  *Sprint Planning: planning of tasks, definition of priorities, and selection of user stories from the Product Backlog.*  *Daily Scrum: short meetings for coordination and progress tracking among team members.*  *Sprint Review: presentation of the progress achieved as a potentially deliverable increment.*  *Sprint Retrospective: analysis of practices used and proposals for improvement for the next sprint.*  *Scrum artifacts will be used to ensure transparency of the process: the Product Backlog (prioritized list of features and requirements), the Sprint Backlog (set of tasks selected for each iteration), and the Increment (the result of completed work at the end of each sprint). To support visual workflow management and progress tracking, digital tools such as Trello or Jira will be employed, along with GitHub repositories for version control and source code management.*  *Regarding team organization, the following roles and responsibilities are defined:*  *Scrum Master: responsible for facilitating the application of the framework, promoting the adoption of agile principles, removing impediments, and ensuring that the team can focus on value delivery.*  *Product Owner: in charge of representing the end user, keeping the Product Backlog updated and prioritized, ensuring clarity of product objectives, and making decisions about the value of each feature.*  *Development Team: composed of the remaining members of the group, responsible for designing, coding, integrating, and testing the different modules of the application. They also prepare technical documentation and the user manual, ensuring that each increment meets the agreed definition of “done.”*  *Through the adoption of Scrum, the team will be able to:*  *Achieve the project objectives within the established academic timeframe.*  *Ensure the delivery of a minimum viable product (MVP) in the short term.*  *Foster effective collaboration and self-organization among members.*  *Maintain adaptability in the face of changing requirements and received feedback.*  *In summary, Scrum ensures an orderly, transparent, and value-centered development process, which are fundamental conditions for NutriHuella to achieve the expected results.* |

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| **6. Evidence** |
| Below, describe which evidence will be evaluated in the progress report and in the final report of your APT Project. These pieces of evidence must be agreed upon with your instructor. Evidence will be understood as the products developed during the project, whose purpose is to make visible or document how the work has been implemented. |

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| **Type of Evidence**  **(progress or final)** | **Name of the Evidence** | **Description** | **Justification** |
| **Progress** | **Project Charter** | **Document that defines the purpose, scope, objectives, initial risks, and stakeholders of NutriHuella.** | **Allows the team and the instructor to have clarity regarding the project’s definition and initial guidelines.** |
| **Progress** | **Functional and Non-Functional Requirements** | **Document containing the prioritized list of system functionalities, user stories, and technical constraints.** | **Ensures that the development is based on a clear and agreed-upon set of requirements.** |
| **Progress** | **Interface Prototype (Wireframes)** | **Initial design of the application screens (web and Android mobile) using tools such as Figma** | **It provides a visualization of the user experience and serves to validate the design prior to development.** |
| **Progress** | **Project Work Plan using Scrum Methodology.** | **This deliverable includes the initial backlog, role assignments, sprint planning, and the definition of “done.** | **It justifies the team’s agile organization and the management of the development process.** |
| **Final** | **Minimum Viable Product (MVP)** | **An initial operational version of NutriHuella that includes the main modules: authentication, clinical record, pantry, AI-driven nutritional plans, and a collaborative recipe book.** | **It demonstrates the real implementation of the software and its effectiveness in addressing the identified problem.** |
| **Final** | **System Technical Documentation and User Manual.** | **Documents that describe the system’s architecture, installation, usage, and maintenance.** | **It ensures proper understanding and continuity of the project after its delivery.** |
| **Final** | **Presentation and Defense of the Project.** | **An oral presentation and visual materials (slides) that synthesize the project’s development, results, and lessons learned.** | **Allows the assessment of communication, synthesis, and justification competencies regarding the work carried out.** |

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| **7. Work Plan** |
| In the following table, define the planning of your APT Project according to the requirements. |

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| **APT Project Work Plan** | | | | | | |
| Competency or Units of Competency | Name of Activities/Tasks | Description of Activities/Tasks | Resources | Duration of the Activity | Responsible | Observations |
| *Name the competencies or units of competencies that are related to the different activities required for the development of the task.* | *Indicate the name of the task or activity..* | *Describe the task or activity.* | *Name the resources needed to carry out the defined activities.* | *Write the duration of the activities or task.* | *Write the name of the team member responsible for the activity and associated tasks.* | *Write the difficulties or enablers that could arise during the execution of each of the proposed activities to carry out the work plan..* |
| *Propose IT solutions by conducting a comprehensive analysis of the processes.* | *Analysis of Requirements and Definition of Scope.* | *Collect, document, and prioritize the system needs, including the clinical record, pantry, AI, and collaborative community.* | *Meetings with the supervising professor, project charter templates, and the initial backlog.* | *1 week* | *Alexander Orell* | *Changes in requirements may arise; they will be reviewed in each sprint.* |
| *Build data models to support the requirements.* | *Design of the Data Model.* | *Develop an entity-relationship model and subsequently adapt it to the database.* | *Modeling tools (Draw.io, Lucidchart) and database management systems (PostgreSQL/MySQL).* | *1 week* | *Gonzalo Troncoso* | *The model will be validated to ensure scalability and support for future integrations.* |
| *Build the architectural model of a systemic solution.* | *System Architecture Definition* | *Design the architecture of the web and mobile (Android) platform, including a Django/Node backend, artificial intelligence integration, and a database.* | *Technical documentation, software development frameworks, and a Git repository.* | *1 week* | *Leandro Valenzuela* | *Adjustments may be required depending on technical or time constraints.* |
| *Develop programs and routines of varying complexity to meet the requirements.* | *Development of Functional Modules* | *Program the main modules: authentication, clinical record, pantry, AI, recipe book, and reporting.* | *Development environment (VS Code), AI libraries, React/Tailwind framework.* | *4 weeks (in sprints)* | *Alexander Orell* | *The implementation will follow an incremental approach, with priority given to the MVP.* |
| *Resolve systemic vulnerabilities to ensure that the software complies with security standards.* | *Security Implementation* | *Set up JWT authentication, implement password encryption, apply input validations, and conduct security testing.* | *Authentication libraries, OWASP Top 10 guidelines, and security documentation.* | *2 week* | *Gonzalo Troncoso* | *Security testing will be applied to detect risks.* |
| *Carry out certification testing of both products and processes.* | *System Testing and Validation* | *Execute unit, integration, and acceptance tests based on user stories.* | *Testing frameworks, testing checklist, and test database.*   |  | | --- | |  | | *2 week* | *Leandro Valenzuela* | *Rework may be required in modules with critical errors..* |
| *Manage IT projects, offering alternatives for decision-making.* | *Project Management with Scrum* | *Define the backlog, plan the sprints, conduct follow-up meetings, and document the retrospectives.* | *Trello, meeting records, and Scrum board.* | *Throughout the semester* | *Leandro Valenzuela* | *It aims to ensure transparency and effective communication with the supervising professor.* |

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| **8. Gantt Chart** |
| Find a Gantt chart format that suits you and organize the planned activities from the previous section in it, considering the period assigned for the development of your APT Project. You must maintain the academic term’s timeline across the three phases covered by the Capstone Portfolio course. |

