Guide 1. Definition of APT Project Capstone Course

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1. **PART I**

Below is a table in which you must complete the requested information.

**1. Personal Background**

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| --- | --- |
| Student Name | **Erick Brandon San Martín Zuñiga** |
| ID | **21.449.917-7** |
| Major | **Computer Engineering** |
| Location | **Maipú** |

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| --- | --- |
| Student name | **John Herrera** |
| ID | **21,367,897-3** |
| Major | **Computer Engineering** |
| Location | **Maipú** |

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| Student name | **Alexander Javier Pulgar Allende** |
| ID | **21,091,734-9** |
| Major | **Computer Engineering** |
| Location | **Maipú** |

In the description, you should briefly state the name of your APT project and the graduate profile competencies you will be putting into practice. If your degree program defines areas of performance, also mention which areas of performance the project is linked to.

**2. APT Project Description**

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| Project name | OfiSync: Comprehensive Building Management System |
| Performance area(s) | Software Development Systems Analysis  IT Service Management  Technology Project Management |
| Competencies | Manage the configuration of environments, application services, and databases   * Configure VPS, centralized database, and development/testing environments.   Offer IT solution proposals by comprehensively analyzing processes   * Define modules according to profiles (Administrator, Concierge, Cleaning, Customers).   Develop a software solution using systematic development and maintenance techniques   * Iterative development in sprints, version control, testing, and documentation.   Build scalable data models   * Design and standardization of the centralized database.   Program queries or routines to manipulate information in the database   * CRUD for common expenses, reservations, inventories, logs, and payments.   Build programs and routines of varying complexity with good coding practices   * Developing the web portal and mobile application with database integration.   Performing quality testing on both products and processes.   * Unit, integration, functional, and load testing. |

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|  | Build the architectural model of the systemic solution.   * Definition of multi-platform architecture (web + app + centralized database).   Implement comprehensive system solutions to automate business processes.   * Automation of common expenses, reservations, payment validation, inventory control, and notifications.   Resolving systemic vulnerabilities and complying with security standards   * User validations, credential encryption, database and application security testing. |

Below are several fields that you must complete with the requested information. This section asks you to describe your project in detail and justify its relevance and significance.

**3. APT Project Rationale**

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| Relevance of the APT project | This project seeks to address a real problem in building management in Chile: the lack of digitization and automation in the daily management of common expenses, service reservations, cleaning logs, and entry and exit records. Currently, many communities still use manual processes, Excel spreadsheets, or non-specialized software that is not adapted to the specific needs of each role (administrator, tenant, cleaning staff, and concierges).  The project is mainly located in the Metropolitan Region, especially in districts such as Las Condes, Providencia, Huechuraba, and Vitacura, where there is a high concentration of office buildings, and also in districts such as Santiago Centro, where there is a high concentration of residential buildings. It would directly impact building administrators, cleaning workers, janitors, and tenants, improving their experience, efficiency, and traceability in processes.  The choice of this topic responds both to its real impact on the work environment and its alignment with current trends in digital transformation, automation, and smart services. |
| APT Project Description | The project consists of developing a multi-platform system comprising: A web portal developed with custom views for:  - Administrator: calculation and management of common expenses, receipt and validation of payment receipts, management of service reservations, control of inventory  supplies, maintenance schedule. |

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|  | * Concierge: recording of reception logs, access control, assigned tasks, and notification management. * Cleaning staff: supply inventory management and activity logging in the cleaning log.   A hybrid mobile application (Ionic + JavaScript) aimed at:   * Customers (Tenants): check common expense amounts, upload payment receipts, and reserve common building services.   A centralized database, hosted on a VPS, that synchronizes information between the web portal and the mobile application in real time, ensuring data consistency and availability for all user profiles.  The objective of the system is to modernize and automate office building management processes, optimizing operational efficiency and improving the experience of the various users involved. |
| Relevance of the project to the graduate profile | The project is directly related to the graduate profile because:   * It requires the design and development of comprehensive technological solutions, taking into account different types of users and devices. * It involves technology project management, sprint planning, deliverable control, and progress monitoring. * It applies principles of interoperability, data synchronization, and IT security, which are part of the graduate profile. * It is based on agile methodologies, such as Scrum, which allow value to be delivered iteratively and continuously. * The selected competencies are essential to the success of the project, as they allow both the technical and management aspects to be addressed. |
| Relationship to professional interests | This project aligns perfectly with our professional interests in software development.  It allows us to work in multiple areas of development such as frontend, backend, databases, and systems architecture, as well as strengthening our experience with agile methodologies and multi- platform development.  Its implementation will give us the opportunity to improve our technical skills and expand our portfolio with a solid and functional project that is useful for the job market. |
| Feasibility of APT Project Development | Strengths:   * The project is well defined in its main functionalities and has a backlog organized by epics and user stories. * The estimated time (11 weeks) is sufficient, divided into 5 sprints, allowing for progressive delivery of functionalities. * The technologies used (Ionic, JavaScript, Django) are   manageable and realistic for this academic context. |

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|  | * The required materials are accessible (free software or with academic licenses).   Weaknesses/Potential difficulties:   * Synchronization between platforms may create technical complexity. * Possible difficulties with VPS connection and configuration. * Careful planning is required to avoid overloading the sprints.   Solution:   * Mitigate these weaknesses by applying agile methodologies and conducting frequent testing. * Prioritize critical functionalities in the first sprints. * Consult teachers/technical tutors in case of technical difficulties. |

1. **PART II**

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

**4. Objectives**

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| General objective | Develop a multi-platform system consisting of a web portal and a mobile application that modernizes and automates the administration of office buildings by digitizing processes, optimizing resources, and improving the experience of all users involved. |
| Specific objectives | Strategic objectives:   * Reduce administrative errors by digitizing and automating key processes such as common expenses, reservations, and logs. * Improve transparency and tenant confidence in payment and reservation management through an accessible and secure system. * Save time and resources by optimizing the workflows of administrators, concierges, and cleaning staff. * Increase user satisfaction by offering a modern, intuitive, and efficient platform. * Develop a scalable and flexible solution capable of adapting   to future improvements or functional enhancements. |

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|  | * Implement agile methodologies that ensure efficient development management and timely deliveries. * Foster effective collaboration between development team members and stakeholders.   Project Objectives:   * Develop a web portal with different views for:   + Administrators (management of common expenses, reservations, receipts, inventories, agenda).   + Concierges (reception logs, access control, assigned tasks).   + Cleaning staff (activity log and supply control). * Develop a mobile application for customers (tenants) with features such as:   + Checking the amount of common expenses.   + Upload payment receipts.   + Reservation of common services. * Ensure real-time synchronization between the mobile application and the web portal through a centralized database in the cloud. * Design intuitive and accessible interfaces for all types of users, ensuring ease of use. * Implement a secure data storage and query system, backed up in the cloud. * Structure a robust database that allows for efficient management of common expenses, reservations, records, and logs. * Enable the uploading and validation of payment receipts to facilitate financial control by administrators. * Implement a digital log for concierges and cleaning staff, with the possibility of attaching photos and comments. * Develop an efficient reservation system, avoiding scheduling conflicts and duplications. * Create a cleaning supplies inventory module, with low stock alerts to facilitate replenishment. * Meet the established deadlines for development without compromising the technical or functional quality of the product. |

In the following section, you should describe the methodology, specific to your discipline, that you will use to complete the APT project described above, including the stages and working methods.

**5. Methodology**

Description of the Methodology

Agile Methodology: Scrum

The project will be developed using the agile Scrum methodology, with the aim of ensuring frequent, functional deliveries that are aligned with the client's needs. Scrum will facilitate continuous collaboration, dynamic planning, and the ability to adapt to changes in requirements or priorities.

Product Owner: Alexander Pulgar Scrum Master: John Herrera

Front-End Developer: John Herrera Back-End Developer 1: John Herrera Back-End Developer 2: Erick San Martín

Back-End Developer 3: Alexander Pulgar DBA: Erick San Martín

QA 1: John Herrera

QA 2: Alexander Pulgar

Next, describe what evidence will be evaluated in the progress report and final report for your APT project. This evidence must be agreed upon with your teacher. Evidence refers to the products developed during the project whose purpose is to highlight or document how the work has been implemented.

**6. Evidence**

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| **Type of evidence**  **(progress or final)** | **Name of**  **evidence** | **Description** | **Justification** |
| Progress | Common Expense Management Module (Web) | Functional code demonstrating the complete development of the common expenses module on the web portal, including calculation, management, and visualization for the Administrator profile. | Shows progress in the development of the web portal for one of its key functionalities.  Demonstrates the automation of business processes by enabling the calculation and management of expenses. |
| Progress | Reservations and Payments Module (Web) | Functional code for the module that allows Administrators to manage service reservations and validate payment receipts. | Demonstrates progress in the implementation of comprehensive systemic solutions. It is critical evidence of the development of the web portal, which manages one of the administrator's main tasks. |
| Progress | Data synchronization test | Screenshot or video recording showing the functionality of the centralized database, demonstrating the synchronization of information between the mobile app and the web portal in real time. | Demonstrates the ability to build the architectural model of the systemic solution. It is evidence of the proper functioning of the project's central infrastructure. |
| Final | Security and Permissions Test Report | Document detailing the results of tests performed to ensure proper user validation and profile security (Administrator, Concierge, Cleaning, Customers). | Evidence that systemic vulnerabilities have been resolved and security standards have been met. It is essential for the final delivery of a system with multiple user profiles. |
| Final | Version 1.0 of the Complete System | The complete multi-platform solution (web portal and mobile application) | This is the definitive evidence that a complete |

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|  |  | running in a production or testing environment. | software solution has been developed and that all modules are integrated and functional, ready to automate the defined business processes. |

The following table defines the planning for your APT Project according to requirements.

**7. Work Plan**

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| **APT Project Work Plan** | | | | | | |
| Competency or competency units | Name of Activities/Task s | Description of Activities/Task s | Resources | Duration of activity | Responsible[1](#_bookmark0) | Comments |
| SPRINT 1 |  |  |  |  |  |  |
| Manage the configuration of environments, application services, and databases. | Infrastructure and Central Database | Configuration of VPS, centralized database, and development/ testing environments. | Cloud servers (VPS),  databases (PostgreSQL). | 3 weeks | Erick San Martin - Back- End/DBA | Scalability must be ensured. |
| Develop a software solution using systematic development and maintenance techniques. | Web portal base | Create the base structure of the web application using iterative development techniques. | HTML, CSS | 2 weeks | John Herrera - Front-End | Connection to the back-end API. |
| Building scalable data models. | Central data model | Design and normalization of the centralized database. | Data modeling tools. | 1 week | Erick San Martin - Back- End/DBA | Entity relationships must be validated. |
| Build programs and routines of | Base app | Create the base structure of the mobile | Ionic Framework | 4 weeks | Alexander Pulgar - Mobile App | Connection to the back-end API. |

1 If the APT Project is a group project, the names of those responsible for each task or activity should be indicated in this column. This will subsequently allow for individual assessment of each member.

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| varying complexity using good coding practices. |  | application following good coding practices. |  |  |  |  |
| SPRINT 2 |  |  |  |  |  |  |
| Resolve systemic vulnerabilities and comply with security standards. | User authentication | Development of the registration, login, and session management system with user validation and credential encryption. | HTML, CSS,  Django framework | 1 week | John Herrera - Front-End and Erick San Martin - Back- End/DBA | The integration between the front and back ends must be continuous and secure. |
| Program queries or routines to manipulate information in the database. | Common expense query | Implementatio n of functionalities to query and record common expenses in the mobile application. | Ionic Framework | 2 weeks | Alexander Pulgar - Mobile App | The database must be optimized for these queries. |
| SPRINT 3 |  |  |  |  |  |  |
| Build programs and routines of varying complexity using good coding practices. | Concierge and cleaning API modules | Development of APIs for managing concierge and cleaning activities, following good coding practices. | Django framework | 2 weeks | Erick San Martin - Back- End/DBA | The specifications for the modules must be clear before starting. |
| Build the architectural model of the systemic solution. | Reservation and payment receipt APIs | Implement APIs for managing reservations and generating payment receipts, following the defined architecture. | Django Framework | 2 weeks | Erick San Martin - Back- End/DBA | APIs must be secure and handle errors robustly. |

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| Develop a software solution using systematic development and maintenance techniques. | Complete functionalities | Integration and completion of mobile application functionalities. | Ionic Framework. | 4 weeks | Alexander Pulgar - Mobile App | Depends directly on the progress of the back-end. |
| SPRINT 4 |  |  |  |  |  |  |
| Implement comprehensiv e systemic solutions to automate business processes. | Reservations and Payments | Implementatio n of interfaces to automate reservations and process payments on the web portal. | HTML, CSS | 2 weeks | John Herrera - Front-End | Usability and performance tests must be carried out. |
| SPRINT 5 |  |  |  |  |  |  |
| Resolve systemic vulnerabilities and comply with security standards. | Security and permissions | Implement user roles, security validations, and security tests. | Django Framework | 2 weeks | Erick San Martin - Back- End/DBA | This is the most critical phase of integration, requiring joint effort. |
| SPRINT 6 |  |  |  |  |  |  |
| Perform quality testing on both products and processes. | Testing on devices and closure | Testing on different devices and operating systems to ensure quality and proper functioning. | Mobile application, various devices (iOS, Android). | 1 week | Alexander Pulgar - Mobile App | This is an important stage to ensure quality and proper functioning on multiple devices. |
| Performing quality tests on both products and processes. | Closure | Completion of the project.  Final testing of the platform. | Complete platform, test checklist. | 1 week | Complete team | Completion of processes must be documented. |

Find a Gantt chart format that suits you and organize the activities planned in the previous point, considering the period assigned for the development of your APT Project. You must maintain the academic period timeline in the development of the three phases covered by the Degree Portfolio Course.

**8. Gantt chart**

