UNIVERSIDAD DISTRITAL FRANCISCO JOSÉ DE CALDAS

ENGINEERING FACULTY

SYSTEMS ENGINEERING CURRICULUM PROJECT

ADVANCED PROGRAMMING

Web Application for Medication Delivery Management and Scheduling at Famisanar EPS

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September 29, 2025

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Chapter 1

GENERAL KNOWLEDGE OF CONTEXT AND ORGANIZATION

1.1 Company

- **Name:** Famisanar EPS S.A.S.

- **Logo:**

- **Slogan:** "We take care of you, because your health comes first"

- **Legal Name:** Famisanar EPS S.A.S. Health Promoting Entity

- **Economic Activity:** Provision of health insurance services and benefits administration (appointments, authorizations, medication delivery and associated services)

1.1.1 Mission

To provide quality health insurance services, promoting comprehensive, accessible and timely care for users, with a focus on prevention, treatment and continuous improvement.

1.1.2 Vision

To be recognized as the leading EPS in Colombia for innovation in digital health services, patient-centered care and efficiency in medical and pharmaceutical service delivery.

1.2 Company Objectives

- Guarantee coverage and treatment continuity for affiliates

- Reduce physical congestion (queues) through scheduling and alternative delivery points

- Implement integrations with Electronic Health Records (EHR) and pharmaceutical providers

1.3 Company Goals

- Reduce pharmacy waiting time: -50% annually

- Prescription coverage through platform: electronic scheduling for ≥80% of prescriptions within 12 months

- User satisfaction: NPS ≥ +40 (equivalent to satisfaction ¿85%)

- System availability: 99.95% annually (SLA)

1.4 Company Policies

- Compliance with Colombian health regulations

- Confidentiality and security of patient information

- User care with quality, equity and timeliness

- Digital transformation as a strategic axis

1.5 Company Strategies

- Web portal + responsive mobile application for patients and clinical module for physicians

- API integration with EHR, pharmacy inventories and logistics operators

- Decentralization of delivery points through agreements with operators (operator changes must be considered in design). (See news about contract termination with pharmaceutical provider and transition to new operators; this implies dynamic support for changing providers/delivery points on the platform)

- Train physicians and users in system usage

1.6 Organizational Structure

- Board of Directors

- General Management

- Medical Direction

- Administrative Direction

- Technology Direction (IT)

– Development Team (Front, Back, Integration)

– DevOps / Infrastructure

– Security and Compliance

• Pharmacies (pharmaceutical operations / contracts)

• User Service (call center / digital channels)

(The corporate governance and QMS section of Famisanar supports this structure).

1.7 Functional Structure

The following process separation is proposed:

Mission processes: affiliation, prescription, verification/authorization, delivery scheduling, delivery/validation at pharmaceutical point, post-delivery follow-up.

Strategic processes: planning, drugstore alliance management, continuous improvement.

Support processes: IT, document management, legal/privacy, provider management.

Control processes: audit, SLA monitoring, information security.

Simplified flow (high level): Physician → Records diagnosis + electronic prescription → System validates inventory and generates delivery options → Patient receives options → Patient schedules date/point → System confirms and issues anti-fraud code → Delivery point validates and delivers → Delivery record + satisfaction surveys.

Chapter 2

REQUIREMENTS ENGINEERING

2.1   Identification and Justification of Functional Area

Problem: congestion at physical delivery points (long queues, waiting, failed collections) that affect treatment adherence and satisfaction. Need for a delivery scheduling system that reduces times and allows dispensing decentralization, integrating with inventory and authorizations. This is consistent with the services Famisanar offers and its digitalization objectives.

    Recent context impact: changes in pharmaceutical operators/contracts (e.g., termination with Colsubsidio and transition to new operators) require the system to dynamically support updating delivery points and operational routes, without downtime for users.

2.2   Process and Activity Characterization

2.2.1   Top-down — Processes and subprocesses

1. Clinical registration

1.1 Physician authentication (MFA, roles)

2.2 Diagnosis registration and electronic prescription (E-prescription)

3.3 Authorization request (if applicable)

    2. Stock generation and verification / eligibility

2.1 Inventory consultation at associated pharmacies (APIs)

2.2 Coverage / authorization validation

    3. Delivery scheduling

3.1 Generate point/date/time options based on stock and capacity

3.2 Show alternatives (local, home delivery, collection at partner points)

3.3 Confirmation and anti-fraud code issuance

4. Notifications and reminders

4.1 Initial notification (SMS/Email/APP push)

4.2 Reminders (24h, 2h)

4.3 Incident notification (stock shortage, point change)

5. Validation and delivery at point

5.1 Unique code scanning/validation

5.2 Digital signature/receipt registration and status update

6. Reports and monitoring

6.1 KPIs: average waiting times, deliveries per point, complaints (PQRS), SLA compliance

6.2 Audit (access and transaction logs)

2.2.2 Bottom-up — Components and data

Patient entity: patient_id, document, contact (email, mobile), prescription_history, consents.

Physician entity: physician_id, credentials, specialty, prescribing authorization.

Prescription: prescription_id, medication(s), dosage, issue_date, authorizations.

DeliveryPoint / Operator: operator_id, type (own pharmacy, partner drugstore, shopping center, dispatch), inventory (stock per medication), schedules and capacity per time slot. (Important: support dynamic updating by provider contracts).

Schedule: delivery_appointment_id, patient_id, delivery_point, time_slot, status, anti_fraud_code, metadata (technical: headers for integrity and signature).

Delivery transaction: delivery_id, appointment_id, recipient, evidence (signature/image), timestamp.

2.3 Information Requirements Analysis

- Diagnosis registration

- Medical prescription management

- Delivery schedule

- History consultation

- Efficiency reports

2.4 Requirements Gathering

2.4.1 Functional Requirements

RF1: Register medical diagnoses
RF2: Generate medical prescription and availability
RF3: Date and location selection by patient
RF4: Automatic notifications
RF5: Delivery reports

2.4.2 Non-Functional Requirements

RNF1: 24/7 availability
RNF2: Compliance with Data Protection Law
RNF3: Intuitive interface
RNF4: Scalability for 10,000 concurrent users

2.4.3 Domain Requirements

- Only authorized physicians register diagnoses

- Integration with central medication database

- Appointments with unique anti-fraud code

2.4.4 User Requirements

- **Physicians:** register diagnoses

- **Patients:** consult and schedule

- **Administrators:** global reports

2.4.5 System Requirements

- Responsive web application

- Email/SMS notifications

- Centralized and secure database

2.5 Requirements Specification Document (ERS)

Actors: Physician, Patient, Administrator, Pharmacy/Operator, EHR System.
    Scope: Digital prescription management and medication delivery scheduling, with anti-fraud confirmation and complete traceability.
    Restrictions: Health and data protection regulations (Law 1581/2012 and regulatory decrees).
    Assumptions: Users have internet access; pharmaceutical operators expose APIs or allow integration via CSV/FTP if no API available. (Practical note: design adapters for heterogeneous formats).

2.5.1 Prioritization (MoSCoW):

Must: Prescription registration, option generation, scheduling, notifications, point validation, security.

Should: EHR integration, operational dashboards, dynamic multi-operator support.

Could: UX personalization, home deliveries integrated with last-mile.

Won't (for now): Integration with IoT devices at delivery point.

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