
Software Requirements Document for [SD-14 - Personalized Learning]

TEAM: SD-14

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1 Introduction

1.1 PURPOSE

The purpose of this document is to define the functional and non-functional requirements of the Learn-X Personalized Learning Platform. It outlines how the system should interact with its users and describes the capabilities necessary for successful deployment and user satisfaction.

1.2 SCOPE

The Learn-X platform is a web-based learning system for students and instructors. Instructors can create courses, upload learning materials (PDFs/audio), and manage students. Students can view materials, access personalized versions of files, and interact with a course-specific AI chatbot. The system supports onboarding surveys and adaptive content delivery based on each student's learning profile.

1.3 DEFINITIONS, ACRONYMS, ABBREVIATIONS

Term	Description
Personalized File	A student-specific version of course material based on onboarding data
Onboarding Quiz	A survey to gather student preferences and learning background
RAG	Retrieval-Augmented Generation – a technique combining search and AI
FAISS	Facebook AI Similarity Search – used for vector-based document indexing
Next.js	React-based web framework used for frontend

2 Overall Description

2.1 PRODUCT PERSPECTIVE

The Learn-X system is a personalized learning platform built with modern web and AI technologies. It includes role-based access (student/instructor), course and file management, and AI-powered content delivery. It integrates React (Next.js), Flask, Firebase, PostgreSQL, and OpenAI APIs. The system replaces traditional static learning with dynamic, tailored content.

2.2 PRODUCT FUNCTIONS

- **User Management:** Registration/login, role assignment, access control
- **Instructor Features:** Course creation, file upload, student management
- **Student Features:** Course joining, material viewing, onboarding quiz, profile management
- **Personalization:** AI-generated file transformations using student data
- **Chatbot:** Contextual Q&A, content-aware limitations, history tracking
- **Preview/Navigation:** In-browser PDF preview, navigation to personalized files

2.3 USER CHARACTERISTICS

- **Instructors:** Educators managing courses and uploading materials; typically use the platform weekly
- **Students:** College-level learners accessing materials and using personalization/chat; frequent users (2-5x/week)

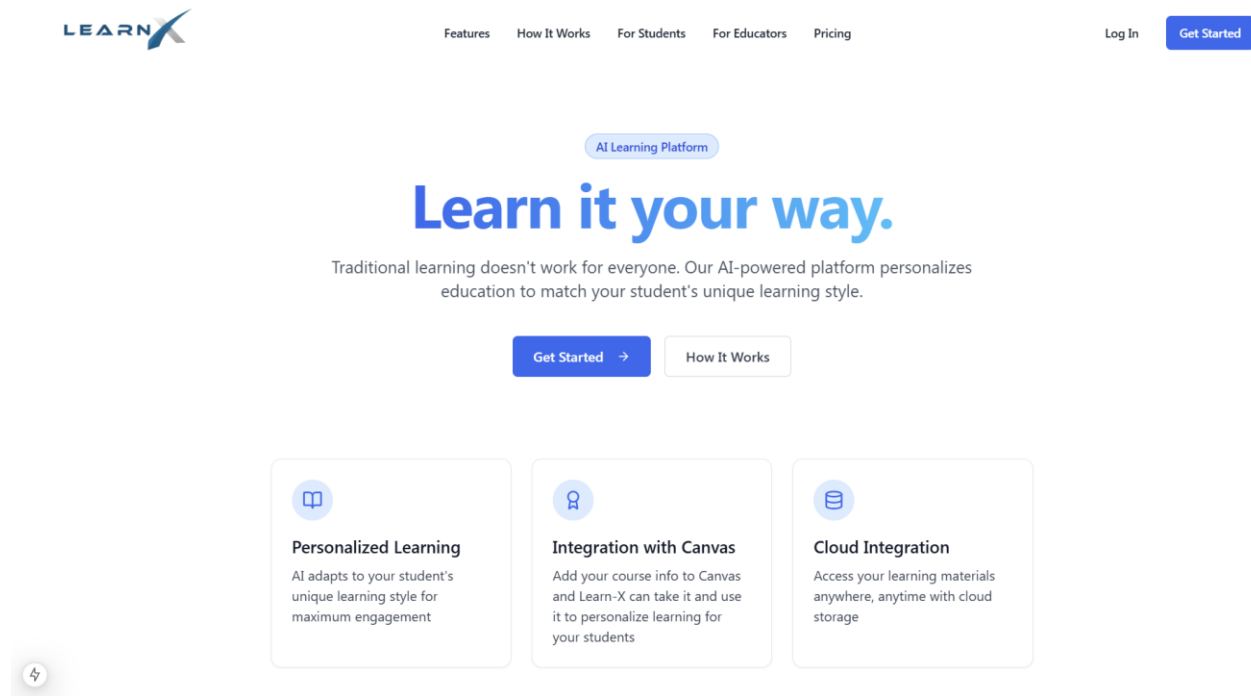
2.4 CONSTRAINTS

- Web-based only; must run in modern browsers
- Files must be under 100MB
- AI content is constrained to course uploads only
- Personalization accuracy is dependent on OpenAI and embedding algorithms

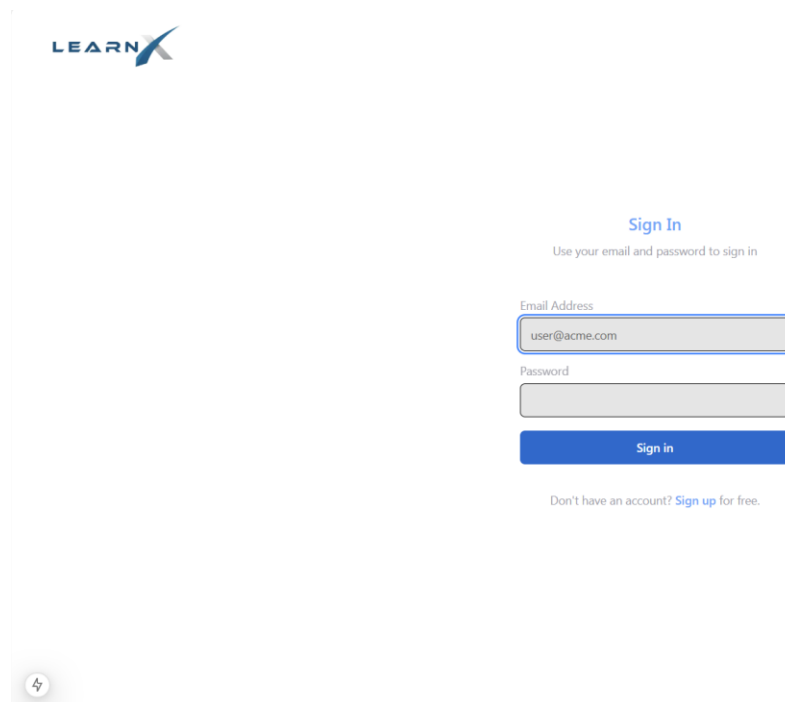
2.5 ASSUMPTIONS AND DEPENDENCIES

- Users have stable internet access
- Authentication depends on Firebase Auth
- Database hosted via PostgreSQL (Neon)
- AI features require OpenAI API and vector similarity search (FAISS + pgvector)

2.6 MAJOR USER INTERFACES



Screen 1: Landing Page



Screen 2: Sign In Page



Sign Up

Email Address

Password

I am a

Already have an account? [Sign in](#) instead.

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Screen 3a: Sign Up Page

Personalized Learning Setup

What should Learn-X call you?

What do you do?

What traits should Learn-X have?

Preferred Learning Style

Depth of Explanation

Topics of Interest

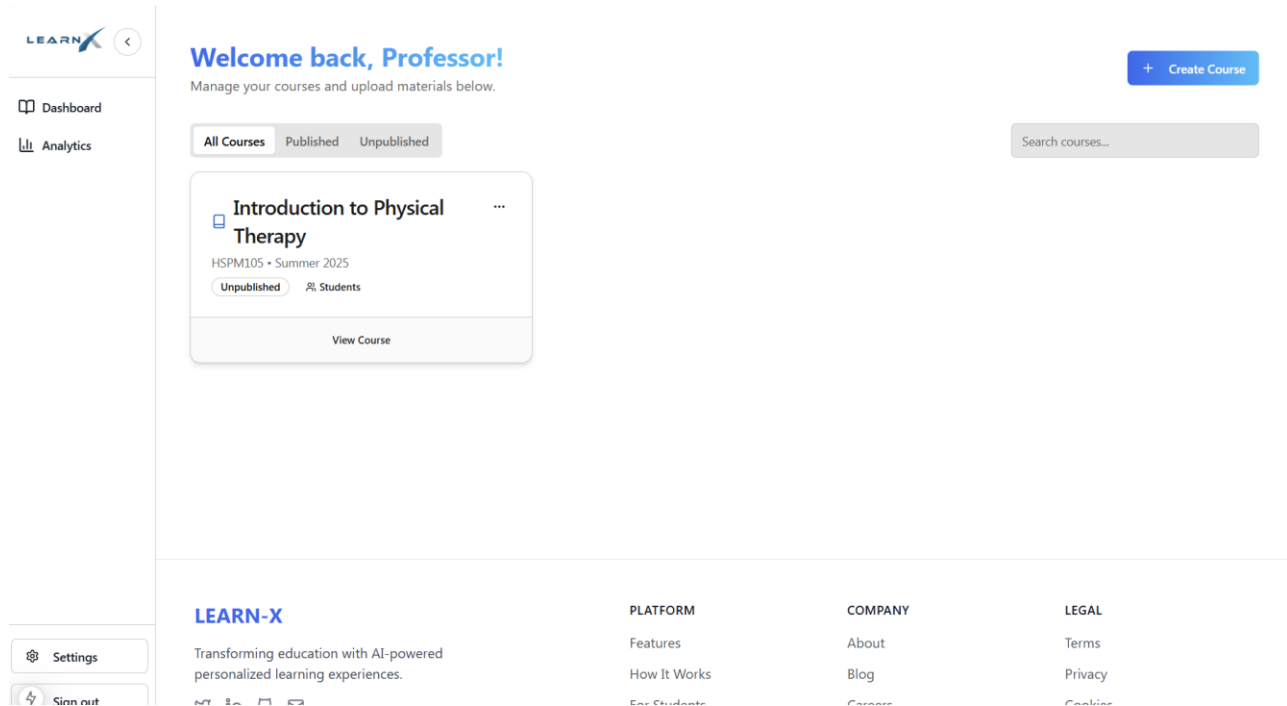
Interests, Preferences

Preferred Study Schedule

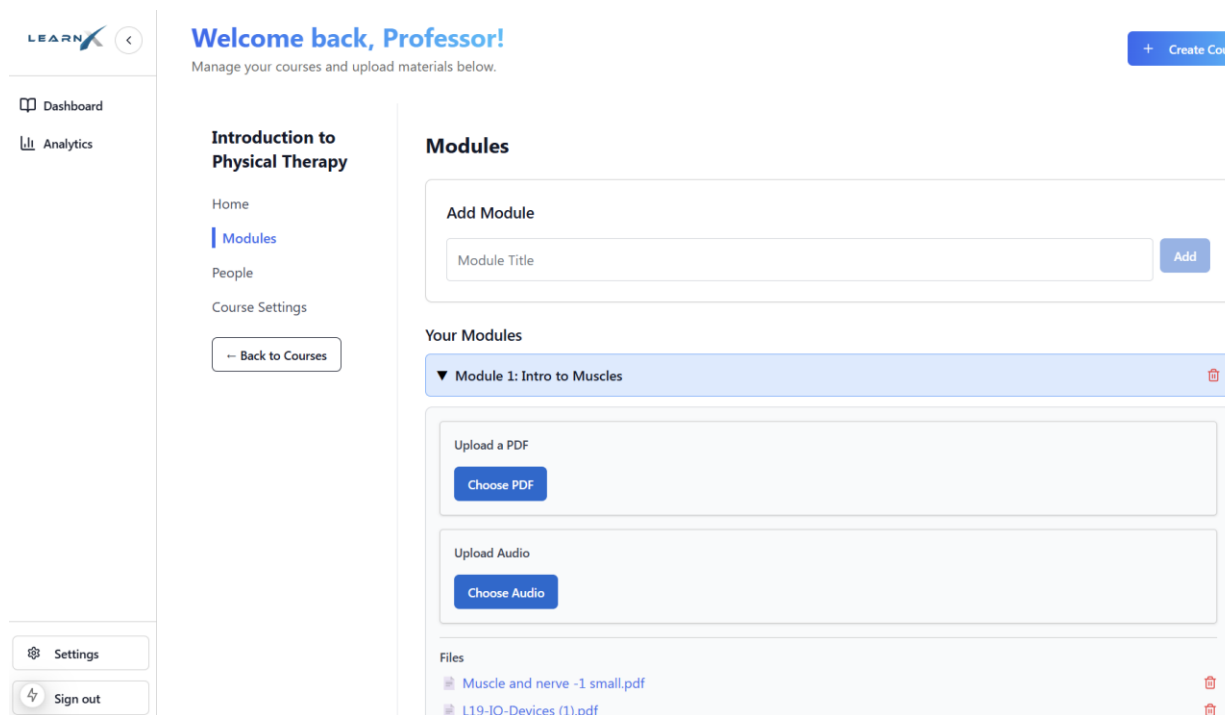
☐ Include quizzes for progress tracking

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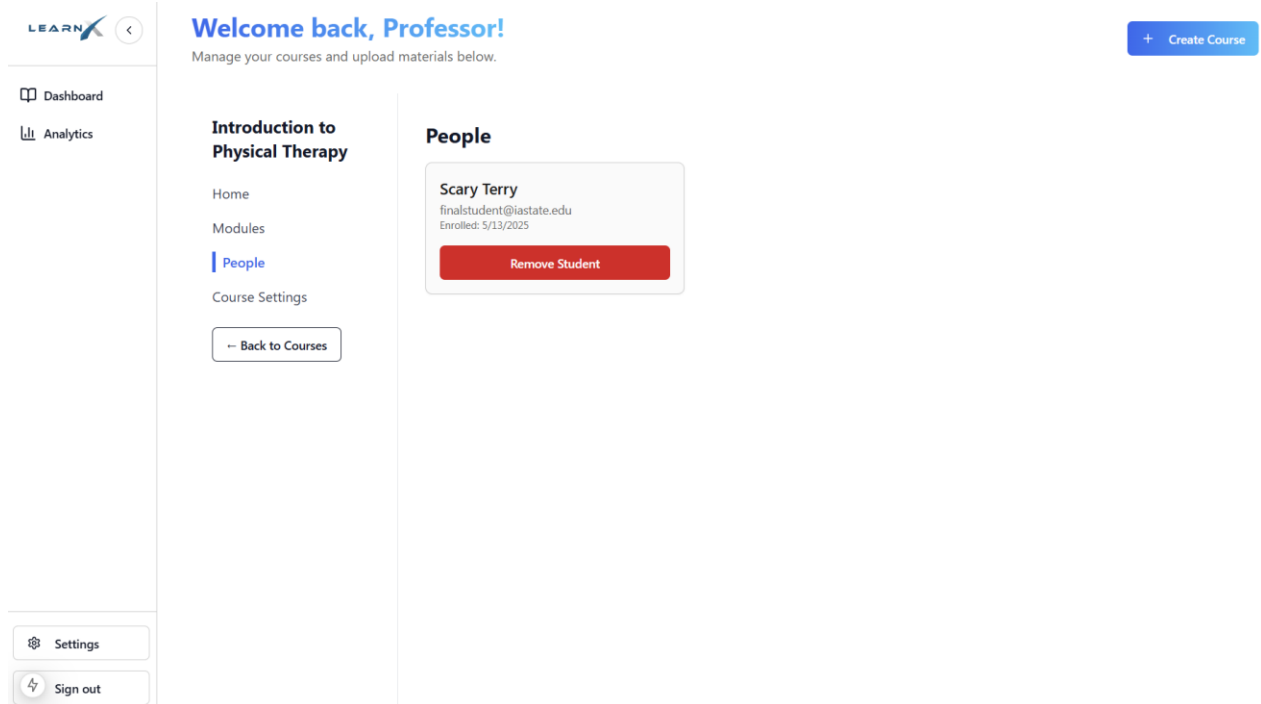
Screen 3b: Onboarding Page (after sign up)



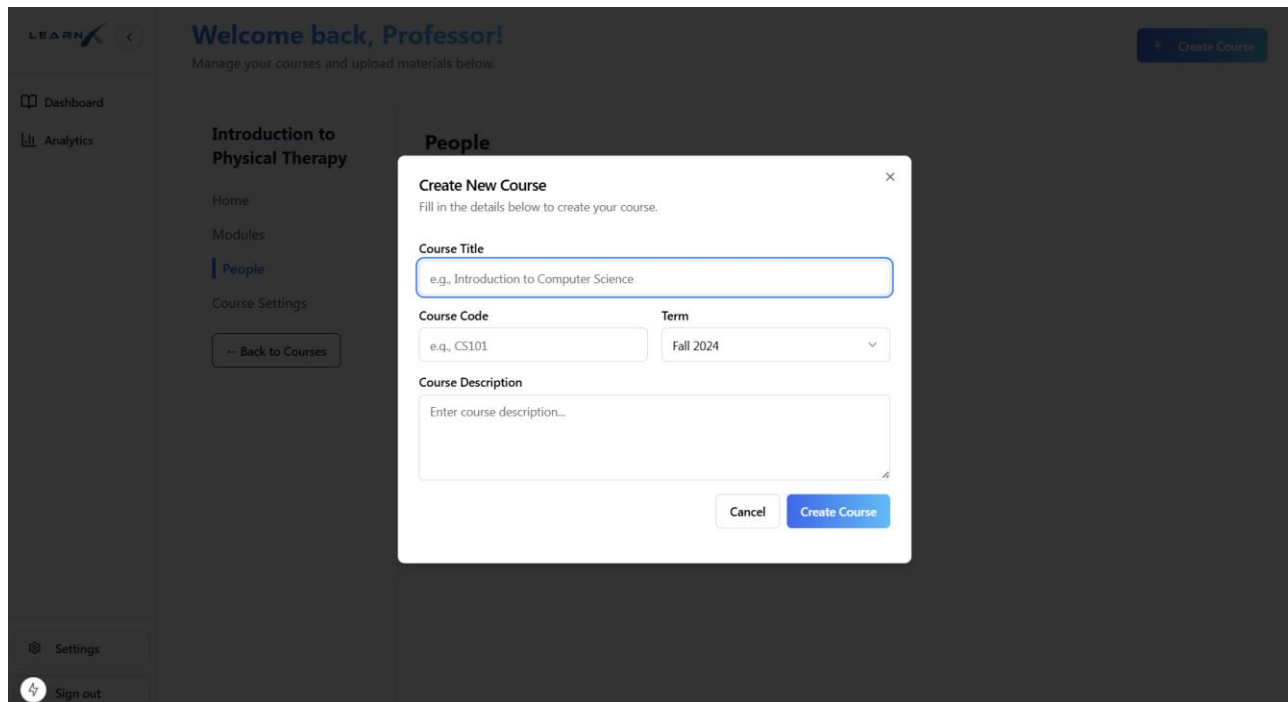
Screen 4: Professor Dashboard



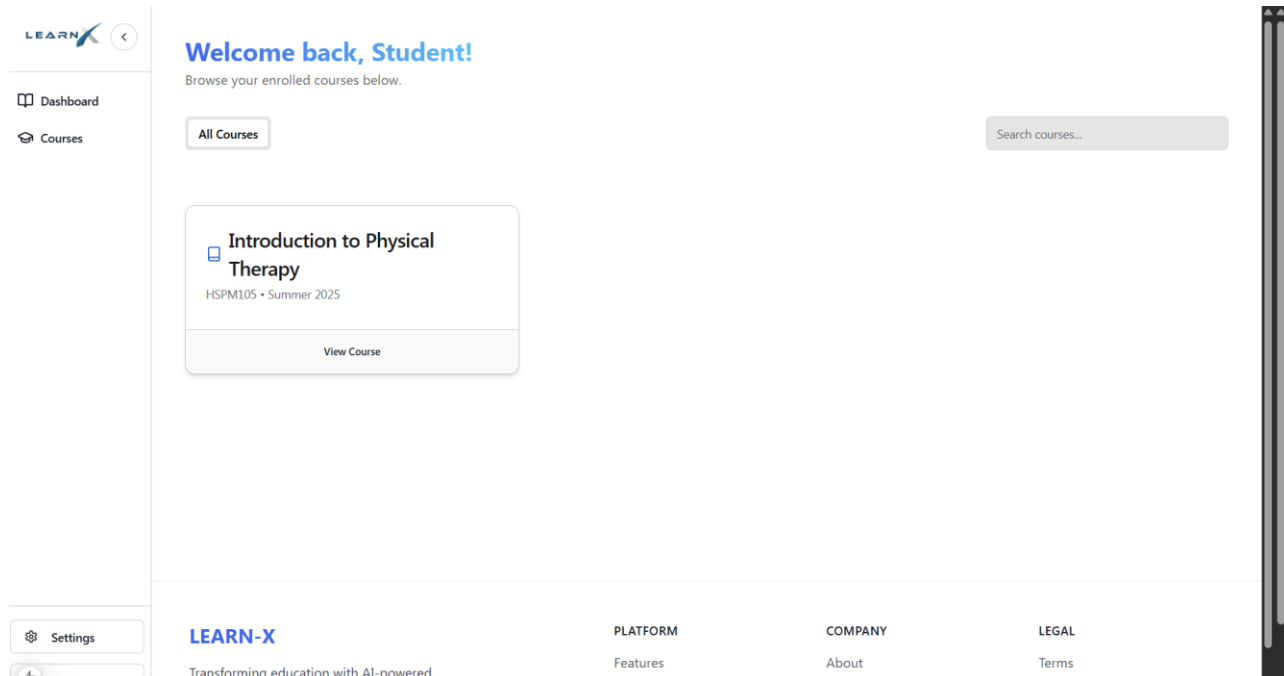
Screen 5: Professor Modules Tab



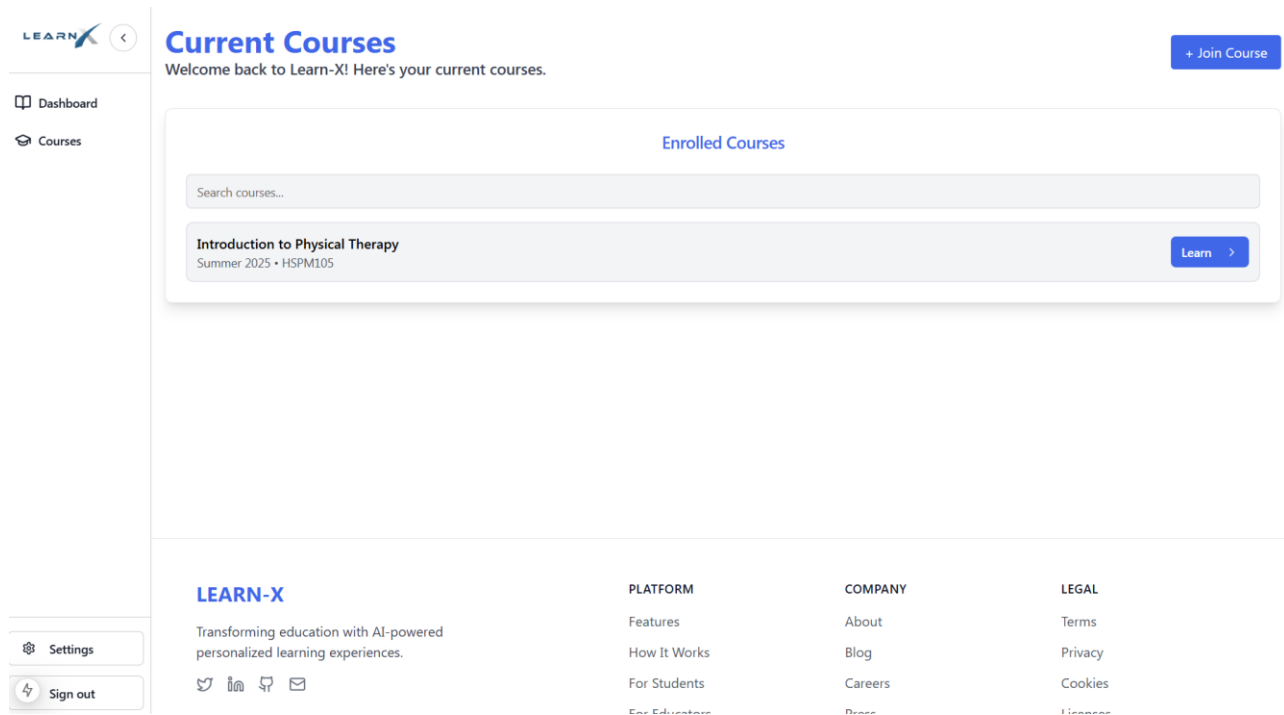
Screen 6: Professor People Tab



Screen 7: Professor Create Course



Screen 8: Student Dashboard



Screen 9: Student Courses Page

LEARN

<

Dashboard

Courses

Settings

Sign out

Introduction to Physical Therapy

Home

Modules

People

Back to Courses

Welcome back, Student!

Browse your enrolled courses below.

Modules

Your Modules

Module 1: Intro to Muscles

Files

Muscle and nerve -1 small.pdf

L19-IO-Devices (1).pdf

L19-IO-Devices (1).pdf

Adam Video Part 2.mp4

Screen 10: Student Modules Tab

LEARN

<

Dashboard

Courses

Settings

Sign out

Introduction to Physical Therapy

Home

Modules

People

Back to Courses

Modules

Back to Modules

Personalize

Muscle and nerve -1 small.pdf

MUSCULAR SYSTEM

Introduction – Functions and basic types of muscle cells

Skeletal muscle cells and connective tissues

The nervous system

Mechanism of muscle contraction

Motor unit

Action potential – basis of EMG

Length tension characteristics

Force regulation in skeletal muscles

Energy consideration of muscle contraction

Cellular respiration

Fatigue in static and dynamic muscular work

Functions

The muscular system is composed of specialized cells called **muscle fibers**. Their main characteristic is their ability to **contract**. Muscles, where attached to bones or internal organs and blood vessels, are responsible for movement. Nearly all movements in the body are the result of muscle contraction.

The integrated action of joints, bones, and skeletal muscles produces obvious movements such as walking and running. Skeletal muscles also produce more subtle movements that result in various facial expressions, eye movements, and respiration.

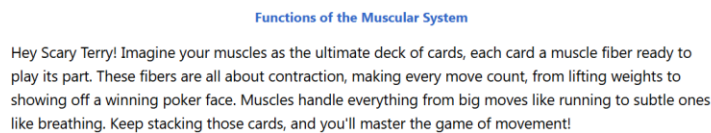
In addition to movement, muscle contraction also fulfills some other important functions in the body, such as **posture, joint stability, and heat production**. Posture, such as sitting and standing, is maintained as a result of force produced by muscle contraction. The skeletal muscles are continually making fine adjustments that hold the body in stationary positions. The **tendons of many muscles extend over joints and in this way contribute to joint stability**. This is particularly evident in the knee and shoulder joints, where muscle tendons are a major factor in stabilizing the joint. Heat production, to maintain body temperature, is an important by-product of muscle metabolism. **Nearly 85 percent of the heat produced in the body is the result of muscle contraction.**

Screen 11: Student Pdf Click

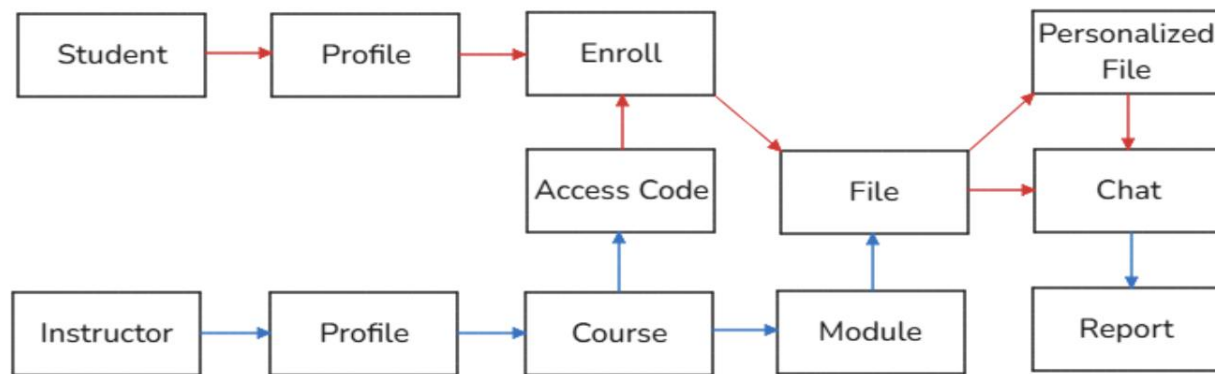
SRS DOCUMENT

Overall Description

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2.7 USER FLOW



2.8 USER STORIES

Student User Stories

- **As a student**, I want to register and log in so that I can access my personalized dashboard.
- **As a student**, I want to join a course using an access code so that I can see course materials.
- **As a student**, I want to complete an onboarding quiz so that the system can tailor content to my learning preferences.
- **As a student**, I want to view PDFs and audio files uploaded by my instructor so that I can study effectively.
- **As a student**, I want to receive a personalized version of the course files so that the content aligns with my interests.
- **As a student**, I want to interact with an AI chatbot so that I can get help with course content.
- **As a student**, I want to see previous chatbot conversations for each module so that I can review past questions.
- **As a student**, I want to update my onboarding responses so that my learning preferences can be revised as needed.

Instructor User Stories

- **As an instructor**, I want to create courses and modules so that I can organize my curriculum.
- **As an instructor**, I want to upload PDFs and audio files to a course so that students can access learning materials.
- **As an instructor**, I want to manage enrolled students so that I can track participation.
- **As an instructor**, I want to preview how content will be personalized so that I understand what students will see.

- **As an instructor**, I want to delete outdated files or modules so that my course stays current.

System User Stories

- **As the system**, I want to personalize uploaded content using student onboarding data so that each student gets a tailored learning experience.
- **As the system**, I want to restrict access to instructor-only features so that students cannot modify courses.
- **As the system**, I want to store chat history per student/module so that each conversation is persistent and relevant.

Admin User Stories

- **As an admin**, I want to have full access to all instructor and student functionality so that I can manage and test the system from any user perspective.

3 Specific Requirements

3.1 FEATURES

FEATURE-1: Course Management

- Description: Instructors can create, edit, and delete courses and modules.
- Functional Detail: Courses include title, description, and modules. Each module can hold multiple files.
- Non-Functional Requirement: Interface should load within 2 seconds when navigating between courses. Course data should persist across sessions.

FEATURE-2: File Upload & Preview

- Description: Instructors upload PDFs or audio files; students can preview them in-browser.
- Functional Detail: Files are displayed with embedded viewers and auto-labeled by filename/type.
- Non-Functional Requirement: Files must be under 100MB. System must prevent unsupported file types.

FEATURE-3: AI Personalization

- Description: Uploaded files are converted into personalized content per student.
- Functional Detail: On upload, files are chunked, embedded (FAISS), and personalized based on onboarding data using OpenAI and RAG.
- Non-Functional Requirement: Personalized content generation must complete within 10 seconds.

FEATURE-4: Student Onboarding

- Description: New students fill out a quiz to guide personalization.
- Functional Detail: Stores preferences like learning style, interests, prior experience.
- Non-Functional Requirement: Data must be editable and securely stored. Usability goal: form completion < 2 minutes.

FEATURE-5: Course Chatbot

- Description: AI chatbot answers questions based on course material.
- Functional Detail: Restricts answers to uploaded files using vector search relevance.
- Non-Functional Requirement: Responses returned in < 5 seconds; must reject off-topic questions clearly.

3.2 PERFORMANCE REQUIREMENTS

- Dashboard and file preview pages must load in under 2 seconds.
- AI-generated responses must return results in under 10 seconds
- File personalization must return results in under 30 seconds.

3.3 DESIGN CONSTRAINTS

- Must use: Next.js (frontend), Flask (backend), PostgreSQL (database), Firebase (auth), OpenAI (AI engine), FAISS + pgvector (embedding/search).
- Deployment must be Docker-compatible.
- Frontend styled using Tailwind CSS and responsive on common screen sizes.

3.4 SOFTWARE SYSTEM ATTRIBUTES

- Reliability: Uptime target 99.5%. Auto-reconnect to DB on failure. Firebase handles auth session expiration.
- Security: HTTPS-only cookies, Firebase-auth verified sessions, role-based endpoint protections, and ownership validation.
- Maintainability: Frontend/backend separated; modular file and API structure; environment variables stored in .env.
- Portability: Fully Dockerized. Compatible with cloud platforms like Vercel, Heroku, or AWS.

