

# Abstract

This report presents the design and development of Neureom, a comprehensive AI-powered online learning platform built to transform digital education through intelligent content delivery, personalized learning experiences, and advanced multimedia capabilities. The platform enables instructors to create structured courses with multiple content types—including video lessons, text-based content, and interactive quizzes—while students benefit from AI-enhanced learning tools, progress tracking, and community engagement features.

A core innovation of Neureom lies in its integration of artificial intelligence throughout the learning experience. Utilizing State of the art models from Google and OpenAI, the platform automatically generates course outlines, creates personalized learning roadmaps for students, transforms video lessons into multiple learning formats (summaries, flashcards, worksheets), and provides intelligent content recommendations. The AI-powered roadmap generator analyzes student goals and available courses to create customized 4-8 step learning paths with realistic time estimates and skill progression.

The platform features advanced video processing capabilities powered by Google Cloud Platform, including automatic transcoding to multiple quality levels, subtitle generation in both English and Arabic using OpenAI's whisper model, and adaptive streaming for optimal viewing experiences across different network conditions. Real-time communication is enabled through WebRTC-based voice and video calling, Socket.IO-powered notifications, and a comprehensive chat system built with Firebase.

Neureom supports multiple user roles (students and instructors) with dedicated dashboards, course management tools, and analytics. The platform includes a community forum for discussions, Stripe payment integration for course monetization, progress tracking with completion certificates, and a mobile-responsive design built with Next.js and React.

Developed over a comprehensive development cycle, the system was implemented using a modern technology stack: Next.js 14 for the frontend, MySQL for data persistence, Google Cloud Storage for media management, Firebase for real-time features, and Google Gemini AI for intelligent content generation. The platform demonstrates strong potential for revolutionizing online education by offering personalized, intelligent, and accessible learning experiences tailored to diverse educational needs.