MANIPAL UNIVERSITY
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A Major Project Synopsis on

NextGen

(An Online E-Learning Platform)

Submitted to Manipal University, Jaipur

Towards the partial fulfillment for the Award of the Degree of

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by

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I. Introduction

NextGen is a modern online education system designed to connect learners with superior academic instruction. In today's rapidly evolving virtual sphere, gaining fresh talents and remaining current is now crucial

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NextGen provides an interactive, captivating, and approachable educational experience for students, experts, and people committed to continuous learning.

NextGen uses new technology to give you a smooth way to learn online. It is interactive, can fit into your schedule, and it is made to suit your study style. With an extensive variety of classes across different fields, individuals have the freedom to acquire knowledge individually and in the privacy of their residences.

NextGen is designed to be an expandable, fortified, and fast e-learning hub by using modern Java-based backend systems and a versatile React.js user interface. Our technology provides a smooth learning journey, immediate connection, and organized material for both students and teachers.

The starting part of NextGen is made with React.js. This helps in making a great and quick workplace for users.With a component-based architecture, it ensures flexibility, reusability, and faster load times.The user interface, also, employs Redux for managing data states to manage live data changes effectively.Tailwind CSS improves the UI with contemporary and sleek designs, and Progressive Web App (PWA) compatibility guarantees a smooth mobile learning journey on various devices.

NextGen's core is underpinned by its Spring Boot-driven backend, designed to allow the autonomous expansion of various components in a microservices structure. The server section includes RESTful programs that handle user verification, lesson material, billing, and data review. Secure Spring Security is employed to maintain confidentiality in data transmission and access levels based on roles, providing a secure setting for both educators and students.

The platform also has Stripe and Razorpay built in for safe payment processing, so users can buy courses without any hassle. NextGen lets students pick between subscribing or paying for each course giving them the freedom to choose how they want to learn. For teachers, the system takes care of creating invoices and shows earnings on dashboards making it easy to keep track of money coming in and out.

NextGen shines because of its cloud setup, instant chats, AI-guided learning paths, and tight user security. Its backend runs on small separate services, suggests smart course choices, and works on many devices. This means it can grow while still working well. Down the road, they plan to add a mobile app, make learning more like a game, and use AI to tailor the experience even more. These changes aim to make learning more fun and useful.

II. Motivation

Education serves as the cornerstone of development; however, numerous students face challenges in obtaining quality learning materials due to financial constraints, geographical limitations, or inflexible timetables. NextGen aims to eliminate these obstacles by offering a flexible, cost-effective, and stimulating educational experience accessible to all, at any time and from any location.

Learning forms the basis for personal development, but many students find it hard to get their hands on top-notch educational materials. This can happen because of high costs where they live, or strict timetables. NextGen aims to knock down these obstacles. It offers a learning experience that bends to your needs, doesn't break the bank, and keeps you hooked. You can tap into this resource whenever you want, no matter where you are.

Educators and instructors frequently encounter difficulties in expanding their audience, generating revenue from their content, and effectively managing their courses. NextGen offers a robust platform for course creators, allowing them to concentrate on teaching as we take care of payment processing, student interaction, and content distribution.

The emergence of online learning platforms has demonstrated the potential of digital education; however, numerous current platforms tend to be costly, complex, or limiting. NextGen aims to provide a user-friendly, affordable, and scalable solution, thereby ensuring that quality education is available to students from diverse backgrounds.

A significant shortcoming observed in numerous e-learning platforms is the absence of real-time interaction between students and instructors. NextGen addresses this deficiency by offering live classes, discussion forums, and interactive functionalities, thereby fostering an environment conducive to collaboration, inquiry, and prompt feedback for students.

As technology continues to advance, education should extend beyond traditional classroom settings. Whether for professional skill enhancement, exam readiness, or personal growth, NextGen empowers learners to take charge of their educational journey, allowing them to learn at their own speed and monitor their progress efficiently.

Security and trust play a vital role in online education, particularly concerning payments, certifications, and user information. NextGen guarantees a secure platform through strong authentication measures, encrypted transactions, and validated course content, thereby delivering a dependable and smooth learning experience.

Our objective is to enable both learners and educators by leveraging technology, facilitating seamless, interactive, and fulfilling knowledge exchange. By providing appropriate tools, support, and cutting-edge educational approaches, NextGen aspires to transform the delivery and consumption of education.

As we advance into the future, NextGen is dedicated to ongoing innovation, integrating emerging trends such as AI-enhanced learning pathways, gamification, and practical projects to improve.

III. Problem Statement

3.1 Creators:

3.1.1 Built in marketing tools and SEO optimization for targeted audience
3.1.2 Flexible pricing and high revenue sharing % to ensure fair earnings.
3.1.3 Analytics tools to provide student progress , Engagement and improvement.
3.1.4 Dedicated instructor communities, live interaction features foster growth.

3.2 Learners:

3.2.1 Gamification, Quizzes, community discussions making learning engaging.
3.2.2 Hands on projects and case studies ensure Practical Knowledge application.
3.2.3 Affordable pricing, free introductory courses provide budget friendly learning.
3.2.4 Live Q&A, Mentorship programs foster better student-instructor interaction

IV. Methodology/Planning of Work:

Week 1: Project Setup & Initial Development

a. Requirement Gathering & Planning

- Define core features for the MVP (Minimum Viable Product).
- Finalize tech stack (React.js, Spring Boot, MySQL, AWS, etc.).

b. Backend Setup (Spring Boot + MySQL)

- Create a Spring Boot project with basic configurations.
- Implement user authentication (JWT & OAuth2).
- Define database schema for Users, Courses, Payments, and Progress.
- Set up MySQL database and establish connections.

c. Frontend Setup (React.js + Tailwind CSS)

- Initialize React.js project with Vite for faster performance.
- Implement basic routing (React Router).
- Develop homepage and authentication screens (Login, Signup).

Week 2: User Management & Course Module

a. Backend Development

- Implement User Roles (Student, Instructor, Admin).
- Develop CRUD APIs for Courses (Create, Update, Delete, Fetch).
- Implement file storage (AWS S3) for course materials.

b. Frontend Development

- Build User Dashboard (Enrolled Courses, Profile, Learning Progress).
- Develop Course Listing & Course Preview Pages.
- Fetch course data from backend using Axios/Fetch API.

c. Database Integration

- Create tables for User Profiles, Courses, and Enrollments.
- Test database queries using Postman.

Week 3: Payment System & Course Enrollment

a. Backend Development

- Integrate Stripe/Razorpay for course payments.
- Implement Order & Payment Processing APIs.
- Develop subscription models (One-time purchase & Monthly Plans).

b. Frontend Development

- Implement course purchase & checkout page.
- Develop Instructor Dashboard (Course Creation, Earnings Tracking).
- Show purchase history & invoice generation.

c. Testing & Optimization

- Perform API testing with Postman.
- Conduct unit testing on payment & enrollment flows.

Week 4: Interactive Features & AI-Based Recommendations

a. Backend Development

- Implement AI-powered course recommendations using user behavior data.
- Add progress tracking service to track student learning.
- Develop real-time notifications system (WebSockets).

b. Frontend Development

- Build Discussion Forums & Live Chat System.
- Display personalized course recommendations.
- Implement quiz & assessments module.

c. Cloud Deployment (AWS/GCP)

- Deploy backend services on AWS EC2.
- Use AWS RDS for database hosting.
- Integrate CloudFront CDN for faster content delivery.

Week 5: Admin Panel & Security Enhancements

a. Backend Development

- Develop Admin Dashboard (Manage Users, Courses, Payments).
- Implement a content moderation system for course approvals.
- Add security features (Spring Security, OAuth, CSRF protection).

b. Frontend Development

- Build Admin Portal UI with analytics and reports.
- Implement a user management system (Activate/Deactivate accounts).
- Optimize frontend for mobile responsiveness.

c. Performance & Security Testing

- Conduct stress testing to handle high traffic loads.
- Run security audits to prevent vulnerabilities.

Week 6: Final Testing, Bug Fixes & Deployment

a. Bug Fixes & Optimizations

- Fix UI inconsistencies and optimize load times.
- Resolve backend errors and database queries.
- Optimize API response times.

b. Final Testing

- Perform end-to-end testing on all features.

- Test payment flows, enrollment, and content delivery.
- Conduct user testing for UI/UX feedback.

c. Production Deployment & Marketing Launch

- Deploy frontend (Vercel/Netlify) & backend (AWS/GCP).
- Set up monitoring tools (Prometheus & Grafana).
- Start SEO & digital marketing campaigns.

V. Requirements for proposed work -:

5.1 Software Requirement:

a. Operating System: Windows 11
b. User Interface: React JS
c. Database: MYSQL
d. Backend: Spring Boot using Java , Postman for Restful APIs , Firebase

5.2 Hardware Requirement:

e. RAM: 8GB expandable 32GB.
f. Storage: 512 SSD.

VI. Bibliography/References -:

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6.2 Building REST APIs with Spring Boot: https://www.baeldung.com/rest-api-spring
6.3 Spring Security & JWT Authentication: https://www.baeldung.com/spring-security-jwt
6.4 React Official Docs: https://react.dev/
6.5 MySQL Documentation: https://dev.mysql.com/doc/
6.6 Postman API Testing: https://learning.postman.com/docs/getting-started/introduction/

VII. Conclusion -:

By offering a user-friendly, AI-driven, and flexible platform that is both engaging and adaptable, NextGen will revolutionize the landscape of e-learning. It has a well-structured, 6-week-long development plan that includes React.js for frontend, Spring Boot (the backend component), and MySQL to manage data effectively while also maintaining high performance, security measures, and user engagement.

With its fusion of personalized learning, real-time interaction, and an intuitive course creation system, NextGen will offer both high-quality education and accessibility. It's equipped with cloud storage, AI-based recommendations, and a hassle-free payment portal, making it geared towards the future.

NextGen, with the appropriate execution, ongoing upgrades, and strategic marketing, will become a leading e-learning platform that can revolutionize knowledge sharing and learning worldwide.