

SCS 3214 / IS 3113: Group Project II – 2025

Group 22 - Project Proposal



Helping students find the best university and career path for their future.

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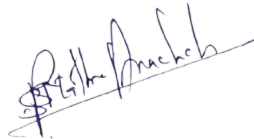
Details of Project Supervisor, Co-supervisor, Advisors and Clients

Proposed Project Supervisor (Academic Staff of UCSC):

Name of the supervisor: Dr. S.S.P. Mathara Arachchi

Signature of the supervisor:

Date: 30.05.2025



Proposed Project Co-Supervisor (Assigned by Course Coordinator):

Name of the co-supervisor: Mr. S.W.D.K.R.M. Manamendra

Signature of the co-supervisor:



Date: 30/05/2025

Project Advisors: (External industry advisors, if any)

(Please provide, Name, Organization, email address and institute)

.....
.....
.....

The client of the Project: (If applicable, otherwise supervisor will be considered as the client)

Name of the client:

Address of the client:

Contact person at client:

Contact number of the contact person:

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1. Project Title:

UniRoute: Helping students find the best university and career path for their future.

2. The Goal and Objectives:

This section outlines the main aim of the UniRoute project and the specific objectives it intends to achieve in order to provide an effective solution to the identified problem.

2.1 Goal:

The primary goal of this project is to develop a web-based platform that guides students in Sri Lanka, especially those who have completed their Ordinary Level (O/L) and Advanced Level (A/L) examinations towards suitable higher education programs and career pathways based on their academic subjects, Z-scores, and personal aspirations.

2.2 Objectives:

The following objectives are designed to bridge the gap between academia and industry and provides students with real-world insights.

1. **Program Recommendations (Post-A/L):** To allow A/L students to discover eligible university degree programs based on their subject stream and Z-score.
2. **Subject Stream Guidance (Pre-A/L):** To help O/L students plan their academic path by choosing their A/L subject stream (Science, Commerce, Arts, etc.) based on their interests and the associated university and career opportunities for each stream.
3. **Degree & Career Info:** To provide detailed information on degree programs, university requirements, and career opportunities.
4. **Mentor Network:** To connect current university students with O/L and A/L students for mentorship and career guidance via chat and video content.
5. **Feedback and Analytics:** To support a community where students can share reviews and ratings about degree programs and universities.
6. **Academic Resources:** To enable university students to publish study materials (e.g. lecture notes, past papers, recorded “kuppi” revision sessions) for academic support (free or paid).
7. **Tutoring Schedules:** To allow university students to create and share their available tutoring schedules, making it easier for students to book individual or group sessions for academic support.

8. **Monetization and Ads:** Design advertisement management and monetization features that allow educational sponsors or third-party tutors to advertise tutoring packages. Support paid tutoring sessions (handled via secure payment) and subscription tiers for premium content or services.

3. Tentative Problem Definition:

Many students in Sri Lanka face uncertainty when planning their educational and career paths after completing O/L and A/L examinations. They often lack access to reliable information about which university degree programs they qualify for, what career options are available based on their subjects, or what Z-scores are required for entry into specific universities. Additionally, students with a clear career goal may not know which academic path to pursue to reach that goal. There is also a communication gap between school students and current university students who could provide valuable insights and mentorship. As a result, students make misinformed decisions, leading to mismatched degrees, dissatisfaction, or even dropouts. This project aims to address these issues by developing a centralized platform to offer personalized guidance, mentorship, and educational content.

4. A brief introduction to the project:

UniRoute is an educational guidance platform designed to bridge the information gap for Sri Lankan students navigating post-O/L and A/L decisions. The system recommends university degree programs and career options based on subject choices and Z-scores. For students with a specific career goal, the platform suggests the ideal subject streams and university programs required to achieve that goal. Additionally, **UniRoute** fosters a mentorship network by connecting school students with current university students who can offer advice, reviews, and tutoring support. Our motivation comes from witnessing how many capable students miss out on opportunities due to poor guidance or misinformation. By offering a clear, interactive, and personalized experience, this project aims to empower students to make informed decisions about their academic and career futures.

5. The scope of the project:

This section defines the boundaries of the system and identifies the main users who will interact with the platform. It outlines what the system will cover and who it is designed to serve.

5.1 Users (Possible Actors) and their functionalities:

1. Students (After O/L, A/L, and Post-A/L Students)

- Stream Selection Guidance
- Degree Recommendation
- Preference List Builder
- Connect with Mentors
- Book Tutoring Sessions
- Access Academic Resources
- Provide Feedback
- View Degree Program Syllabi
- Enroll in Pre-Uni Courses

2. University Students & Graduated Students

- Create Mentor Profile
- Offer Mentoring
- Provide Pre-Uni Courses
- Share Academic Resources
- Book Senior Mentors
- Manage Tutoring Sessions
- Manage Videos
- View Earnings
- Access Feedback

3. Institutions / Universities

- Manage Portfolio
- Upload Academic Content
- Advertise Services
- Post Events or Announcements

4. Companies

- Post Internship Opportunities
- Publish Educational Content
- Sponsor Content or Ads

5. System Administrators

- UGC Data Management
- User Management
- Content Moderation
- Manage Advertisements
- Generate Reports

- Feedback Analysis
- Payment & Revenue Oversight

5.2 Main functionalities of the System:

- **Stream Selection Guidance (Post-O/L):**
Help students choose A/L subject combinations based on career interests, Z-score competitiveness, and future academic paths.
- **Tutoring for A/L Students:**
Enable university students to offer tutoring for A/L subjects through scheduling, video conferencing, and content sharing.
- **University & Degree Recommendation (Post-A/L):**
Recommend suitable degree programs based on Z-score, subject stream, and preferences. Match students with eligible universities.
- **Preference List Generator:**
Help students prioritize and arrange UGC degree selections based on program relevance, location, and personal interests.
- **Mentor Matching & Messaging:**
Connect students with verified mentors (university students or graduates) for personalized advice through chat, video, or messaging.
- **Syllabus & Curriculum Access:**
Display detailed degree program syllabi and specialization paths to help students understand what they are applying for.
- **Academic Resource Sharing:**
Share notes, past papers, recorded kuppi sessions, and revision content for A/L and university courses.
- **Pre-University Preparation Courses:**
Allow undergraduates and tutors to conduct paid sessions for post-A/L students to prepare for university life.
- **Monetization Features:**
Include secure payment gateways for paid tutoring, mentorship, or subscription-based content.
- **Advertisement & Sponsorship System:**
Manage banner ads, sponsored content, and institution portfolios through an admin panel.

- **Institutional Portfolios:**
Allow universities and partner institutions to showcase degree programs, achievements, and events.
- **Internship Recommendations & External Contributions:**
Let interns and professionals share internships or industry resources with students.
- **Reporting & Analytics:**
Enable admins to view user behavior, performance feedback, tutoring history, and generate long-term user analytics.
- **System Backups:**
Enable admins to make backups of the System.

5.3 Non-Functional Requirements:

Performance

- System should respond quickly to user actions.
- Live features like chat should feel smooth and fast.
- It should work well even with many users at once.

Scalability

- System should handle more users, data, and features as it grows.
- It should support more institutions and mentors without breaking.
- Storage and performance should remain stable as content increases.

Reliability & Availability

- System should be available most of the time.
- It should recover quickly from failures.
- Errors should be handled gracefully.

Usability

- Interface should be clean and easy to use.
- Accessible for users with disabilities and different internet speeds.
- Should work properly on all common browsers.
- Interface should give feedback on actions (like confirmations, loaders).

Maintainability

- System should be modular and easy to update.
- Code should be well-documented.
- Bugs should be easy to find and fix.
- System should be monitored for health and performance.

Security

- User data should be encrypted and protected.
- Only authorized users should access specific data.
- Common security issues should be prevented.

Compliance

- System must follow local data protection laws.
- Personal data must be used responsibly.

5.4 Out of scope:

- Mobile app version of the platform (only web-based version will be implemented).
- Multilingual support beyond English (Sinhala/Tamil localization not planned for initial version).
- Automated AI-based career prediction beyond Z-score and subject stream recommendations.
- Deep learning-based personalized content recommendations
- Direct integration with UGC online application portal.
- Offline usage or SMS-based features for rural accessibility
- Direct examination registration or results fetching from government portals.
- Addressing degrees other than ICT related ones (Only ICT related degrees will be addressed in order to reduce the complexity.)

6. Tentative Technologies:

The following technologies have been selected to support the development and management of the system:

Frontend Technologies	ReactJS, Material-UI
Backend Technologies	Django, Python
Relational Database	MySQL
Project Architecture	Model View Controller
Project Management	Jira
Diagramming	Draw.io
UI Design & Prototyping	Figma
Version Control	Git / GitHub

7. Feasibility Study:

7.1 Technical Feasibility

All the technologies mentioned in the “Technologies” section are open source and readily available. As a result, the development team will have convenient access to the necessary resources, and the chosen technologies are robust and well-documented, ensuring the technical feasibility of the project. Moreover, it is feasible to successfully develop and deliver the final expected output of the project by utilizing the listed technologies. The development team has adequate knowledge and experience in these technologies, and the system architecture is designed to be modular and scalable. Hosting will be handled by a reliable cloud provider, ensuring high availability and performance for users across Sri Lanka.

7.2 Economic Feasibility

The economic feasibility of the UniRoute platform is assessed using a bottom-up estimation method, which provides a detailed and transparent view of project costs and potential revenue streams. This approach is widely recognized for its accuracy and suitability for software development projects.

Cost Estimation

Given the project team of six members and a project duration of approximately four and a half months, the total effort is estimated as follows:

- Team Size: 6 members
- Project Duration: 18 weeks (4.5 months)
- Estimated Hours per Member: 2–3 hours per day (academic project, realistic estimate)
- Total Hours per Member: 225 hours (approx.)
- Total Team Effort: 1,350 hours

To illustrate commercial viability, a notional hourly rate can be applied:

Category	Effort (Hours)	Notional Rate (LKR/hr)	Subtotal (LKR)
Frontend Development	400	2,000	800,000
Backend Development	400	2,000	800,000
Database Integration	100	2,000	200,000
Testing & QA	200	2,000	400,000
Project Management	50	2,000	100,000
Subtotal	1,150		2,300,000
Contingency (10%)			230,000
Total Estimated Cost			2,530,000

Note: This is a simplified example for commercial viability. For this academic project, actual costs are limited to minor expenses such as cloud hosting and domain registration, as most tools are open-source and development is student-led.

Revenue Potential

UniRoute has strong revenue potential through multiple streams:

- Paid tutoring and mentorship sessions
- Subscription-based premium content
- Advertising and sponsorship opportunities
- Platform commissions on paid services

Projected user growth and conversion rates indicate that the platform can achieve a sustainable revenue stream, supporting ongoing maintenance and future enhancements.

Conclusion

Using a bottom-up estimation method, the project is economically feasible, with clear paths to revenue and sustainable operation. The platform's design ensures that development and operational costs are manageable, and its revenue model supports long-term viability

7.3 Legal and Ethical Feasibility

The system will strictly comply with Sri Lankan data protection laws, ensuring user data confidentiality and safe storage practices via encrypted authentication and secure database management.

Key ethical measures include:

- User identity verification to ensure genuine mentorship interactions.
- Content moderation to maintain quality and appropriateness of tutorial videos and session content.
- Transparent payment handling and a review system to promote accountability and fairness.

All educational materials will respect intellectual property rights, and terms of use will be clearly communicated.

7.4 Operational Feasibility

The operational feasibility of UniRoute—a student mentoring and educational guidance platform—is strongly supported by its alignment with real user needs across different stages of a student's academic journey. The system delivers value to a wide range of stakeholders including students (O/L, A/L, post-A/L), university students, graduates, tutors, institutions, and educational sponsors.

Value Proposition for Each User Group:

- Students benefit from personalized educational guidance, subject stream selection, degree program recommendations, and access to mentoring and academic resources. The system supports them at critical decision-making stages, reducing uncertainty and improving outcomes.
- University students and graduates are empowered with income opportunities through tutoring and mentorship. They also gain recognition, build networks, and contribute meaningfully to peer development.
- Tutors and institutions can use the platform to promote educational services, build reputations, and reach a targeted student audience.

Staffing Requirements:

To ensure smooth operation, the platform will require a core team including:

- Software developers (to maintain and improve the system),
- Content moderators (to verify mentors, approve resources),
- Academic content managers (to manage UGC handbook updates and degree data),
- Customer support agents (to assist users and resolve issues),
- Marketing and community managers (to grow user base and promote engagement),
- Admin panel users (internal staff to manage users, ads, and analytics).

Problem-Solving Capabilities:

UniRoute addresses several core problems:

- Lack of structured A/L subject guidance after O/L.
 - Confusion among post-A/L students about degree choices.
 - Limited mentorship availability for university entrants.
 - Absence of centralized academic resources and real-world guidance.
- By tackling these gaps, the system supports long-term academic success and informed decision-making.

Opportunities:

UniRoute leverages the increasing digital adoption in Sri Lanka's education sector. It capitalizes on:

- Rising interest in mentorship and career guidance.
- Demand for personalized recommendations.
- Need for affordable academic support and pre-university preparation.

Conclusion:

The operational feasibility of UniRoute is well-established. Its focus on addressing educational gaps, providing practical value to every user group, and enabling a vibrant ecosystem of collaboration and support ensures strong long-term sustainability. With appropriate staffing, legal compliance, and user-centric design, UniRoute is positioned to operate effectively and evolve with future needs in Sri Lanka's education landscape.

7.5 Social Feasibility

UniRoute is designed to foster a socially inclusive and collaborative educational ecosystem that supports Sri Lankan students, mentors, tutors, institutions, and industry contributors. The platform strengthens social connections among stakeholders at different stages of the academic journey and promotes a culture of mutual growth, knowledge sharing, and empowerment.

Students (O/L, A/L, and Post-A/L)

UniRoute acts as a digital companion to students navigating key academic transitions—from selecting A/L subject streams to making informed decisions about university education. Through personalized Z-score-based recommendations, career roadmaps, and real student feedback, learners are empowered to shape their futures more confidently. Socially, the platform allows students to:

- Connect with mentors who have first-hand experience in their preferred fields.
- Access to ‘*kuppi*’ sessions and shared academic resources.
- Join discussion forums or live Q&A sessions to interact with peers and mentors.
- Track their academic journey, preferences, and recommendations.

This sense of community support reduces isolation during stressful academic periods and motivates students to make proactive educational choices.

University Students and Graduates

UniRoute offers university students a platform to contribute socially meaningful mentorship while also creating income through tutoring and pre-university courses. This creates a **peer-to-peer educational ecosystem**, where students become guides for their juniors, reinforcing solidarity and shared experience.

Graduated students also play a vital role by:

- Mentoring undergraduates on academic specializations, internships, and early career moves.
- Contributing to knowledge-sharing through career stories, webinars, and resource uploads.

This fosters a **culture of giving back** and builds lasting academic networks.

Universities and Industry Partners

University departments and administrators can use UniRoute to:

- Showcase degree programs, events, and faculty.
- Host informational webinars or verified resources.
- Interact with prospective students through official portfolios.

Internship providers and external professionals (career coaches) can socially engage students by:

- Sharing knowledge, opportunities, or motivational talks.
- Promoting career readiness and skills development.

This **bridges the gap between academia and industry** and provides students with real-world insights.

UniRoute's social feasibility is grounded in its mission to build a collaborative, mentorship-driven academic community. Students gain empowerment and clarity; mentors and tutors gain recognition and income; institutions gain reach; and external professionals contribute to the nation's educational upliftment.

By fostering transparency, trust, and collaboration, UniRoute creates a win-win social ecosystem for all its stakeholders, promoting a shared culture of learning, giving back, and academic excellence in Sri Lanka.

7.6 Schedule Feasibility

The Smart Mentoring System is planned to be completed within a 4-month timeframe. The development schedule has been carefully structured into distinct, manageable phases, ensuring efficient progress and timely completion.

Project Phases:

1. Month 1 – Planning & Design
 - Requirement gathering and stakeholder analysis
 - Finalizing system features and user roles
 - Designing UI/UX wireframes and system architecture
2. Month 2 – Development
 - Front-end and back-end development
 - Core functionalities: user registration, mentor scheduling, video uploads, and messaging system
 - Integration of Firebase or chosen backend services
3. Month 3 – Development & Testing
 - Back-end development
 - Functional and usability testing
 - Bug fixing
4. Month 4 – Testing & Refinement
 - Functional and usability testing
 - Bug fixing and feature refinement
 - Implementation

Regular progress reviews will be conducted to track milestones and resolve issues promptly. The use of agile development practices allows flexibility and ensures the project stays on track. With this structured approach, the project is feasible within 4 months, supporting a timely and efficient launch.

8. Main deliverables of the system:

- Complete working software and source code (if the client doesn't want you to share the source code you have to produce clients consent and non-disclosure agreement signed with the client)
- Complete Software Requirement Specification
- User manual
- Administrators manual together with deployment instructions
- License of the software

9. The Project Plan:

The following Gantt chart shows the project timeline over the course of 5 months.

No	Activity	May				Jun				Jul				Aug				Sep			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Problem Identification																				
2	Requirements Analysis																				
3	Feasibility Study																				
4	Proposal Presentation																				
5	Interface Design Phase I																				
6	Implementation Phase I																				
7	Unit and Integration Testing Phase I																				
8	SRS Documentation																				
9	Interim Presentation																				
10	Interface Design Phase II																				
11	Implementation Phase II																				
12	Unit and Integration Testing Phase II																				
13	System Testing																				
14	Implementation Phase III																				

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11. Technology Justification:

11.1 Frontend Technologies: ReactJS, Material-UI

- ReactJS is the industry standard for building modern, interactive, and scalable web interfaces. Its component-based architecture enables code reuse, faster development, and easier maintenance. React’s virtual DOM ensures high performance for dynamic applications.
- Material-UI provides a comprehensive set of pre-built UI components that follow Google’s Material Design guidelines, ensuring a professional and consistent user experience. It accelerates frontend development and helps maintain design consistency across the platform.
- **Comparison:** Alternatives like Angular or Vue.js are also popular, but React’s vast ecosystem, flexibility, and community support make it ideal for rapid prototyping and long-term scalability.
- **Client & Maintenance Benefits:** Faster feature delivery, modern user experience, and easier onboarding for new developers.

11.2 Backend Technologies: Django, Python

- Django is a high-level Python web framework known for its “batteries-included” philosophy—offering built-in features like authentication, admin interface, ORM, and security protections. This allows rapid development and enforces best practices.
- Python is widely used for web development, data processing, and AI integration. Its readability and simplicity speed up development and reduce bugs.
- **Comparison:** While frameworks like Spring Boot (Java) offer high performance for enterprise-scale systems, Django’s rapid development and strong security make it more suitable for your project’s needs.
- **Client & Maintenance Benefits:** Secure, maintainable backend; rapid prototyping; easy integration with future AI or analytics features.

11.3 Relational Database: MySQL

- MySQL is a reliable, open-source relational database known for its speed, scalability, and ease of use. It integrates seamlessly with Django via its ORM, supporting robust data management for users, courses, and content.
- **Comparison:** PostgreSQL offers more advanced features, but MySQL’s simplicity and widespread adoption make it a practical choice for most web applications.
- **Client & Maintenance Benefits:** Proven reliability, strong community support, and straightforward maintenance.

11.4 Project Management: Jira

- Jira is the industry standard for Agile project management, supporting task tracking, sprint planning, and team collaboration. It helps ensure timely delivery and transparency throughout the project lifecycle.
- **Comparison:** Tools like Trello or Asana are simpler but lack Jira's depth for software development projects.
- **Client & Maintenance Benefits:** Improved project tracking, accountability, and documentation.

11.5 Diagramming: Draw.io

- Draw.io is a free, versatile tool for creating flowcharts, UML diagrams, and ERDs. It supports collaborative design and integrates easily with other tools.
- **Comparison:** Paid alternatives like Lucidchart offer similar features but at a cost.
- **Client & Maintenance Benefits:** Clear system documentation and easy communication of design ideas.

11.6 UI Design & Prototyping: Figma

- Figma is a cloud-based design tool that enables real-time collaboration, interactive prototyping, and seamless handoff between designers and developers. It accelerates UI/UX design and iteration.
- **Comparison:** Adobe XD and Sketch are alternatives, but Figma's collaboration features and browser-based access make it superior for distributed teams.
- **Client & Maintenance Benefits:** Faster prototyping, improved feedback cycles, and consistent design.

11.7 Version Control: Git / GitHub

- Git is the industry-standard version control system, enabling efficient code management, collaboration, and rollback capabilities.
- GitHub provides cloud-based repositories, issue tracking, and collaboration tools, supporting distributed teamwork and code reviews.
- **Comparison:** Alternatives like GitLab or Bitbucket offer similar functionality, but GitHub's popularity and integrations make it the preferred choice.
- **Client & Maintenance Benefits:** Reliable code versioning, easy collaboration, and secure backups.

11.8 Justification for Adequate Project Scope

- Despite leveraging powerful frameworks and tools, your project involves substantial custom development:
- Building complex logic for stream and degree recommendations, mentor matching, and tutoring management.
- Implementing secure, real-time messaging and payment systems.
- Developing role-based access, resource libraries, and analytics dashboards.
- Integrating and maintaining a multi-actor system with distinct workflows.
- This ensures each group member will have significant technical and design contributions, providing ample academic scope for a 3-credit group project

11.9 MVC Architecture Justification

The Model-View-Controller (MVC) architecture is selected for this platform because it clearly separates data logic (Model), user interface (View), and application workflow (Controller). This separation is vital for handling the diverse user roles and complex interactions required in a university and career guidance system. MVC's modularity allows for scalable development, easier maintenance, and straightforward integration of new features or user types in the future. It is widely recognized for its success in educational and mentoring applications, where managing multiple actors and workflows is essential. Furthermore, MVC integrates seamlessly with our technology stack—React for interactive frontend views, Django (following a Model-Template-View pattern, which closely matches MVC) for backend logic and data management, and MySQL for reliable data persistence—ensuring a robust, adaptable, and maintainable system.

12. Declaration:

The project proposal is a contract between students who will undertake the project and teachers who will supervise and coordinate this course module. Hence, all members of the project team should declare their willingness and readiness to carry out the project in their best within the rules, regulations and code of ethics for this course.

*We as members of the project titled **UniRoute**, certify that we will carry out this project according to guidelines provided by the coordinators and supervisors of the course as well as we will not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university. To the best of our knowledge and belief, the project work will not contain any material previously published or written by another person or ourselves except where due reference is made in the text of appropriate places.*

<i>Name</i>	<i>Signature</i>
(i) J.M.C.K. Jayathilaka	
(ii) K.V.N.T. Liyanage	
(iii) K.L.T. Sanjunie	
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(vi) B.R.K.D. Basnayaka	