Project Proposal:

University Management System (UMS)

Software Engineering & System Analysis
CSE0613226

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Project Proposal: College Management System (CMS)

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1. Problem Identification

Modern universities have grown in size and complexity, managing thousands of students, multiple departments, faculty members, and administrative staff. Many institutions still rely on fragmented systems or even manual processes that lead to inefficiency, duplication of effort, and errors. Some of the key issues identified are:

1. **Central Database Absence:** Information is scattered across different platforms, making it difficult to access and update data in real-time.
2. **Departmental Control:** Each department maintains its own database, creating duplication, inconsistency, and poor communication between academic units.
3. **Result Management:** Publishing results often takes longer than expected due to lack of automation and centralized grading tools.
4. **Payment System:** Manual and semi-digital payment systems are error-prone, time-consuming, and lack transparency.
5. **Attendance Tracking:** Paper-based or outdated attendance systems reduce efficiency and increase the chance of inaccuracies.
6. **Routine Management:** Scheduling classes and exams manually often leads to overlapping or mismanagement.
7. **Biometric Attendance & Login:** Lack of smart login and biometric systems delays automation of attendance records.
8. **Online Classes:** Absence of a built-in digital platform for online lectures, assignments, and learning management.
9. **Remote Registration:** Students cannot register from home, requiring unnecessary visits to administrative offices.
10. **Notifications:** Lack of an automated system to notify students and staff about important events, deadlines, and academic updates.
11. **Web-Based Accessibility:** Students and faculty cannot access university services online in a single unified platform.
12. **Transportation Management:** No real-time information about buses, schedules, or routes, causing inconvenience.
13. **Administrative Control:** Limited oversight for higher authorities, making policy-making and monitoring less effective.

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2. Solutions to the problem:

To address these problems, a University Management System (UMS) will be developed with the following features:

- **Centralized Database:** A single secure system for all academic, financial, and administrative data.
- **Departmental Integration:** Each department can update and access the central database in real-time, eliminating redundancy.

- **Automated Result Processing:** Faculty can upload marks, and the system will generate GPA, transcripts, and reports instantly.
- **Online Payment System:** Integrated payment gateway for tuition fees, fines, and other payments with digital receipts.
- **Attendance System:** Automated through biometric devices or RFID cards, synced with the central server.
- **Routine & Scheduling:** Smart system to auto-generate class timetables and exam schedules without conflicts.
- **Biometric Login:** Secure student and faculty login using biometric authentication to ensure accuracy.
- **Online Learning:** Platform for lectures, video sessions, digital notes, assignments, and exam portals.
- **Remote Registration:** Students can register from home, reducing administrative burden.
- **Notification System:** Push notifications via app, email, and SMS for academic and non-academic updates.
- **Web-Based Application:** Accessible across devices (PC, tablet, mobile) with responsive design.
- **Transport Management Module:** Track buses, routes, timings, and provide GPS-based real-time location updates.
- **Administrative Dashboard:** Visual reports, analytics, and control tools for decision-making and monitoring.

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3. Value Needed for the Solution

The proposed UMS will provide significant value to the university:

- **Efficiency:** Reduces time spent on manual tasks like fee collection, attendance, and scheduling.
- **Accuracy:** Eliminates data duplication and reduces errors in academic and financial records.
- **Transparency:** Ensures students and parents have clear access to academic progress, attendance, and payments.
- **Accessibility:** Web-based system allows access anytime, anywhere.
- **Security:** Multi-layer authentication with biometric systems and encrypted databases.
- **Cost-Effectiveness:** Reduces printing, paperwork, and manpower costs in the long run.
- **Student Satisfaction:** Faster services, easy registration, and online facilities increase student engagement.
- **Administrative Control:** University management can monitor activities through dashboards and analytics.

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4. Elicitation Analysis

To ensure the proposed system meets the real needs of all stakeholders, requirement elicitation methods were applied. This process involved gathering, identifying, and clarifying needs from students, faculty, and administrative staff. The following elicitation techniques were used:

- **Interviews**: Conducted with faculty members, administrative staff, and students to understand their pain points in current processes.

- **Questionnaires/Surveys**: Distributed to a large student body to gather quantitative insights on system expectations.
- **Observation**: Existing manual and semi-digital processes (attendance marking, fee payment, class scheduling) were observed for inefficiencies.
- **Document Review**: Policies, academic records, and existing university documentation were analyzed to ensure compliance and accuracy.
- **Workshops & Focus Groups**: Brought together stakeholders to discuss challenges and desired features in an open discussion format.

Key Findings from Elicitation:

- Students strongly demand **remote registration, online payments, and instant notifications**.
- Faculty members prioritize **automated grading, attendance, and timetable generation**.
- Administrative staff require a **centralized database, transport tracking, and monitoring tools**.
- University management emphasizes **security, data accuracy, and decision-making dashboards**.

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5. Requirements Analysis

Based on elicitation, the system requirements are classified into **Functional** and **Non-Functional** requirements:

5.1 Functional Requirements

1. **User Management**
    - Role-based access (Student, Faculty, Admin).
    - Secure login via credentials and biometrics.
2. **Academic Management**
    - Course registration from home.
    - Automated class and exam timetables.
    - Online result processing (marks, GPA, transcript).
3. **Attendance System**
    - Biometric/RFID-based attendance.
    - Automatic syncing with central server.
4. **Payment & Finance**
    - Online fee submission with receipts.
    - Support for multiple payment gateways.
5. **Communication & Notifications**
    - Push notifications (email, SMS, app).
    - Event and deadline reminders.
6. **E-Learning & Online Classes**
    - Upload/download of lecture materials.
    - Assignment submission and grading.
    - Live class integration (Zoom/Google Meet API).
7. **Transport Management**
    - Real-time GPS bus tracking.
    - Display of routes and schedules.
8. **Administrative Dashboard**

- Visual analytics and reports.
- Policy compliance and audit logs.

5.2 Non-Functional Requirements

1. **Performance**: The system must handle concurrent users without downtime (scalability up to thousands of students).
2. **Security**: Data encryption, multi-factor authentication, and GDPR/data privacy compliance.
3. **Usability**: Mobile-friendly, responsive UI for ease of access.
4. **Reliability**: 99.9% uptime using cloud hosting.
5. **Maintainability**: Easy updates, modular architecture, and API integration.
6. **Compatibility**: Support across multiple devices and browsers.

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6. Technology Used

To ensure scalability, performance, and user-friendliness, the following technologies will be used:

- **Frontend:** HTML5, CSS3, JavaScript (React.js or Angular for dynamic interface).
- **Backend:** Node.js / PHP (Laravel) for efficient server-side processing.
- **Database:** MySQL / MongoDB for central storage with high availability.
- **Biometric Integration:** Fingerprint scanners or RFID devices integrated via APIs.
- **Payment Gateway:** Integration with PayPal, Stripe, or local banking APIs.
- **Hosting:** Cloud-based (AWS / Microsoft Azure) for scalability and reliability.
- **Transport Tracking:** GPS devices connected to buses, linked with Google Maps API.
- **Security Measures:** SSL encryption, role-based access, and two-factor authentication.

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7. Managerial Consideration

To ensure successful project delivery, the following managerial aspects will be addressed:

- **Project Management:** Agile methodology with iterative releases.
- Stakeholder Involvement: Regular feedback from university administration, faculty, and students.
- **Training Programs:** Faculty and staff will be trained to use the system efficiently.
- **Maintenance Plan:** Continuous support and updates after deployment.
- **Performance Monitoring:** KPIs (uptime, response time, accuracy) will be tracked.

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8. Organizational Consideration

Implementation will require alignment with organizational policies and infrastructure:

- **Policy Compliance:** System will comply with academic policies and government data regulations.

- **Role-Based Access:** Students, faculty, and administrators will have different levels of access.
- **Data Privacy:** Student records will be protected under institutional privacy policies.
- **Scalability:** Designed to adapt to new departments, campuses, or academic programs.
- **Integration:** Can integrate with existing learning management systems (LMS) if required.

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9. Project Timeline

Phase	Duration	Activities
Elicitation Analysis	**2 weeks**	**Conduct interviews, surveys, workshops, and document reviews with stakeholders. Identify challenges and expectations.**
Requirement Analysis	**2 weeks**	**Categorize requirements (functional & non-functional), finalize scope, and prepare requirement specification document.**
System Design	**2 weeks**	**Architecture design, database schema creation, UI wireframes.**
Frontend Development	**4 weeks**	**UI design, responsive interface, and user interaction features.**
Backend Development	**6 weeks**	**API development, business logic, and database integration.**
Module Integration	**3 weeks**	**Biometric devices, payment gateways, transport tracking integration.**
Testing & QA	**3 weeks**	**Unit testing, bug fixing, user acceptance testing.**
Deployment	**1 week**	**Cloud hosting, production release.**
Training & Support	**2 weeks**	**Documentation, faculty and student training, helpdesk setup.**

Total Duration: ~25 weeks (about 6 months)

10. Budget Estimation

Item	Estimated Cost (USD)	Notes
Software Development	**$25,000 – $30,000**	**Full-stack development, database design, API integration, frontend + backend modules.**
Biometric Devices & Setup	**$3,500 – $5,000**	**Fingerprint scanners / RFID devices for multiple entry points, installation & calibration.**
Payment Gateway Integration	**$2,000 – $3,000**	**Gateway licensing fees, secure integration, and compliance with banking standards.**
GPS & Transport Integration	**$4,000 – $6,000**	**GPS devices for buses, integration with maps API, and tracking system.**
Server & Cloud Hosting (1 year)	**$3,000 – $4,500**	**Cloud hosting (AWS / Azure) with scalability, storage, and security services.**
Testing & QA	**$2,500 – $3,500**	**Unit testing, user acceptance testing, bug fixing, and performance optimization.**
Documentation & Training	**$1,500 – $2,500**	**User manuals, training sessions for staff, and student orientation.**
Maintenance & Support (1 year)	**$4,000 – $6,000**	**Continuous updates, technical support, and issue resolution.**
Contingency (10%)	**$4,000 – $5,000**	**Buffer for unexpected expenses.**

Total Estimated Budget: $50,500 – $65,500

11. Risk Analysis and Mitigation

Risk	Impact	Mitigation
Data Breach	High	Use encryption, firewalls, and secure login protocols.
System Downtime	Medium	Host on reliable cloud servers with backups.
Device Malfunction (Biometric/GPS)	Medium	Provide manual backup attendance/transport logs.
User Resistance	Medium	Conduct training and awareness programs.
Budget Overrun	High	Use Agile model to prioritize features and control costs.
Integration Failure	Medium	Thorough API testing before deployment.
Technical Skill Gap	Low	Provide workshops for IT staff.

11. Conclusion

The proposed **University Management System (UMS)** aims to transform the way academic, administrative, and student-related activities are managed in the university environment. By introducing a centralized and web-based platform, the system will ensure efficiency, transparency, and accessibility across all departments. Features such as biometric-based attendance, online payment, result automation, transport management, and real-time notifications will provide significant value to both students and administrators.

Moreover, the solution addresses major challenges like data duplication, communication gaps, and manual inefficiencies, while also aligning with future trends in digital education. Once implemented, the UMS will not only reduce administrative overhead but also enhance the academic experience and overall satisfaction of students and staff. With careful planning, proper training, and continuous support, this project will serve as a long-term digital foundation for the university's operations.

12. Sources / References:

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6. Official documentation of cloud providers (AWS, Microsoft Azure) and web development frameworks (React.js, Node.js, Laravel).

Test - 01

Class Ten-English 2nd paper: Changing Sentances [By RRFahad]

Part A: Change from Affirmative to Negative

(Each carries 1 marks – 15 marks total)

1. He is always punctual.
2. Everybody loves an honest man.
3. She can solve this problem easily.
4. The boy is very intelligent.
5. We should obey our parents.
6. I will remember your help forever.
7. She likes reading story books.
8. They are playing in the field.
9. The teacher is very kind to the students.
10. Life is full of struggles.
11. He knows everything about the matter.
12. The girl sings beautifully.
13. All the students attended the class.
14. It is possible to win the prize.
15. Honesty is the best policy.

Part B: Change from Negative to Affirmative

(Each carries 1 marks – 15 marks total)

1. He is not a dishonest boy.
2. Nobody likes a liar.
3. She cannot solve the puzzle.
4. The man is not poor.
5. We should not neglect our duties.
6. He never tells a lie.
7. I will not forget your kindness.
8. The girl is not lazy.
9. Nothing is impossible in this world.
10. He does not like fish.
11. The teacher is not unkind.
12. The students did not disobey the rules.
13. The boy has no sense of duty.
14. We cannot but respect our teachers.
15. No man is free from mistakes.