Nepal Engineering College (*nec*)

Call for Expression of Interest (EOI)

(Date: June 12, 2025)

Implementation of Electronic Management Information System (EMIS)

Nepal Engineering College (*nec*), a leading institution dedicated to excellence in Engineering education, invites Expression of Interest (EOI) from qualified and experienced IT firms/consultants for the **design, development, and implementation of a comprehensive Electronic Management Information System (EMIS).**

Objective: EMIS is expected to simplify and automate administrative, academic, and financial processes at *nec* to enhance efficiency, transparency, and data-driven decision-making.

Scope of Work: The MIS should cover, but not be limited to, the following module/components:

- Student Information Management
- Academic Management (Admission, Course registration, result, notice, attendance, etc.)
- Human Resource Management
- Accounting System with Digital Payment Integration
- Library Management
- Research/Project Management
- Inventory, Asset and Procurement Management
- Reporting & Analytics Dashboard
- Online Portal & Mobile Integration
- As per attached EoI.

Eligibility Criteria: Interested firms/consultants must meet the following criteria:

- Minimum 5 years of proven experience in MIS development and implementation
- Prior experience with academic institutions is preferred
- Sound technical and financial capacity
- A dedicated project team with relevant qualifications

Submission Guidelines: Interested firms/consultants are requested to submit their Expression of Interest EOI along with the following documents:

- Company (Firm/consultant) Profile
- Details of similar completed projects
- Proposed approach and methodology
- CVs of key personnel
- Financial proposal (optional at this stage)

Deadline for Submission: June 25, 2025

Expression of Interest (EOI)s must be submitted in a sealed envelope or via email to the following address:

Nepal Engineering College (*nec*)
Changunarayan Municipality-04, Bhaktapur, Nepal
Email: info@nec.edu.np
Phone: 01-5221006
Website: https://nec.edu.np/

(**Note:** Only shortlisted firms/consultants will be invited for the Request for Proposal (RFP) stage.)

Expression of Interest (EOI)

Title of Consulting Service: Nepal Engineering College Educational Management Information System (E-MIS)

Project Name: Nepal Engineering College E-MIS Project – 2025

EOI:

Office Name: Nepal Engineering College

Office Address: Changunarayan, Bhaktapur

Introduction:

E-MIS (MIS Connect) is a robust Management Information System tailored to streamline academic and administrative operations of Nepal Engineering College. It bridges gaps in student data management, course registration, result processing, and administrative communication, thereby enabling efficient decision-making and reducing paperwork.

1. Purpose of the Proposal

With growing student intake, increasing administrative workload, and the need for transparent, efficient, and digitally streamlined processes, the adoption of a robust MIS platform is imperative. MIS Connect is tailored for academic institutions under Pokhara University and is well-suited to Nepal Engineering College's operational framework.

A. Software Requirements

1. **College Website (Content Management System)**

Admission & Enrollment

- Online admission application form
- Integrated eSewa, khalti, fone pay payment system
- QR-coded entrance cards
- Analytics on gender, province, and program
- Export applicant list
- Bulk student import and inter-program transfer

Course & Registration Management

- University Registration Form with Romanized input for Devanagari names
- Course Registration Form per University format
- Fee-payment controlled form access
- Automated rule validation (Concurrent Barrier, Odd/Even Rule)
- Digital signature integration for students, principals, and seal
- PDF generation (bulk/single) and triplicate Excel reports

Student & Teacher Profiles

- Comprehensive student profiles: personal, academic, and semester-wise (future support)
- Import/export of PU Registration No. and Exam Roll No.
- Admin control to update passwords and student credentials
- Teacher profile management: experience, training, workshops, research publications, subject assignment

Academic Results Management

- Triplicate Generation
- Import semester-wise university results with pdf & excel with attempt counts
- Result correction request system with student review
- Internal mark entry for theory and practical with components (attendance, tests, terminal)
- Multi-stage mark publishing (teacher to HOD)
- Auto grading: Pass, Fail, NQ, and relative grading

Project & Notice Management

- Project archive access for reference (proposals, mid-terms, final reports)
- Coordinator and supervisor assignment
- Project visibility after coordinator approval
- Tiered notice publication (college-wide, department-specific, batch-wise)

Learning Management System

- Centralized platform for sharing course materials and assignments
- Upload and access lecture notes, presentations, and recorded videos
- Student submission portal for assignments and projects
- Faculty feedback and grading module
- Discussion forums for interactive learning
- Integrated calendar for academic schedules and deadlines

Library Management

- Digital cataloging and issue/return system
- Student integration and overdue alerts
- Inventory and usage analytics

Accounting System Integration

- Complete fee and finance management
- Sync with registration eligibility
- Real-time ledger updates and audit reports

Expanded Digital Payment Integration

- Added gateways: Khalti, ConnectIPS, Fonepay
- Seamless transaction history and invoice generation

Result & Learning Management

- Result Management: Import/export university results, grading, and internal assessment tracking.
- LMS Platform: Assignment uploads, recorded lectures, forums, and academic calendars.

Procurement Management.

- Maintain a comprehensive database of approved vendors.
- Enable users to create and submit purchase requisitions based on priority.
- Implement an approval workflow for requisition review and authorization.
- Allow requisition tracking from submission to fulfillment.
- Monitor expenditures against allocated budgets.
- Provide real-time budget status and alerts for budget overruns.

Clinic Management.

Asset Management System:

- **Inventory Control**: Maintains real-time records of lab equipment, computers, furniture, tools, and technical assets across departments.

  Lifecycle Tracking: Monitors asset purchase dates, maintenance schedules, depreciation, and disposal timelines.

  Preventive Maintenance: Ensures timely servicing and calibration of technical instruments, reducing equipment downtime.
- **Department-wise Allocation**: Allows accurate tracking of which assets are assigned to which labs, classrooms, or faculties.

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NEPAL ENGINEERING COLLEGE 1994

Loss and Theft Prevention: Helps reduce untracked movements, misplacement, or loss of institutional property.

Audit Readiness: Supports internal and external audits with detailed asset histories and current status reports.

- **Procurement Planning**: Assists in identifying obsolete or underutilized assets, helping in budget forecasting and resource optimization.

Human Resource Management System

- Recruitment through online application.
- Create, update, and maintain an HR database.
- Employee Management (including outsourced employees) along with shift scheduling
- Integration with the Roster Management module
- Overtime Management
- Email and SMS Notification system
- Employee Onboarding
- Interface with Biometric devices for daily attendance
- Attendance, Leave and Holiday Management
- Integration with Payroll Management
- Advanced Reporting with export and print facility
- Access Control / User division
- Creating and updating Staff ID / Student card and other details

Mobile Applications

- Android/iOS support for:
    - Students (registration, results, attendance)
    - Teachers (mark attendance, upload internal marks)
    - Parents (monitor academic progress)

In-App Notifications

- Real-time alerts for notices, payments, deadlines
- Synchronized across web and mobile apps
- SMS alert System

UGC and Project funding Report Generation

- Standardized reporting templates
- Ready-to-submit formats for compliance and audits

Analytics and Reporting for Decision-Making

- Dashboard visualization of student progress, batch-wise performance
- Trend analysis for enrollment, success rates, and academic planning

B. Other Requirements.

The E-MIS Application should be a core modular, automated, scalable, and integrated software application hosted centrally from where the users in these entities can access it through a web portal interface. Similarly, the application should support Nepalese language and dates.

Application Adaptability

The proposed Web based Electronics Education Management Information System (E-MIS) shall be fully modular and highly flexible so that only relevant functional requirements of the modules can be implemented. This also permits implementation in a phased manner within a hospital. The Proposed System is comprehensive, offering a wide range of Educational, Financial, and Administrative sub-system facilities. At the same time, the System is modular in design, with modules addressing specific functional requirements. All the modules integrate into a cohesive and robust system.

Application Portability

E-MIS has the ability of its applications to run across a variety of different hardware platforms, it is possible to port the Software across various computers regardless of power, capacity and type of operating systems used, especially Microsoft from large systems through minicomputers to microcomputer networks. It is also possible to port data from one hardware platform to another.

Application Connectivity

The ability to communicate seamlessly across departments and campuses at the application level ensures that academic and administrative information can be accessed from anywhere within the institutional network. Online access to student records, including academic history, attendance, and

performance, not only enhances the quality of academic services but also reduces operational costs by minimizing redundant processes. This level of efficiency can be achieved through robust application-level connectivity across all information systems within the institution. Such integration eliminates delays and inaccuracies typically associated with manual or paper-based communication. Improved turnaround times for tasks such as inter-departmental approvals, exam result processing, and student support services contribute to a more efficient and responsive educational environment.

User Interface

The Company should focus on the ease of use of the Software with automated and flexible user interface, the approach to computerization and use of computer systems is changing very rapidly. In a nutshell, it is bringing users closer and closer to computers by providing direct interfaces to the organizational databases. Once the database is conceived and set up end users could manipulate them to suit their needs.

The system should manage digital documents and easy access to all necessary physical documents for mandatory modules.

Modularity

The proposed E-MIS should be highly modular and flexible such that only relevant modules can be implemented which allows implementation in a phased manner within the hospital. All the modules should integrate into a cohesive and robust system.

Availability

While the general operational hours in an academic institution may follow an 8-hour workday, certain critical digital services—such as student portals, learning management systems, and administrative platforms—must remain accessible 24/7. Therefore, the application is expected to maintain high availability. Except during scheduled maintenance for essential updates or security patches, the system must remain continuously operational. This ensures uninterrupted access for students, faculty, and administrative staff, supporting functions such as assignment submissions, attendance tracking, course registrations, and resource sharing at any time.

Security

An Educational Management Information System contains highly sensitive data related to students, staff, finance, and administration. In addition to enforcing role-based access controls at the application level, the system must also be protected against external threats. Security should be implemented across multiple layers including the operating system, network, and application levels. To ensure secure communication and protect data integrity, the system must employ technologies such as Secure Socket Layer (SSL) and data encryption. This layered approach to security safeguards confidential information from unauthorized access, data breaches, and cyber-attacks, ensuring trust and compliance with institutional and regulatory standards.

Usability

The user interface of the educational application should be intuitive and straightforward, ensuring ease of use for all users, including those with minimal technical experience. Usability must be a core priority, with a focus on delivering a user-friendly and flexible interface. To enhance efficiency and minimize manual data entry, the system should incorporate automated data capture technologies. These may include barcode scanners for student IDs, integration with online academic tools and analyzers, and document/image scanners. Such automation reduces dependency on keyboard input, speeds up data processing, and improves overall responsiveness of the system.

Interoperability and Platform Independence

The application should be platform independent at the server side and should allow any operating system from the client side to connect to the application over the intranet or the internet. The application should allow connection from all types of available browsers such as Google Chrome, Firefox, Safari, etc. The application should be browser independent

Robust & Scalable Architecture using the latest technology

The application must be designed with scalability in mind to maintain optimal performance as institutional data grows over time. As student records, academic resources, and administrative data accumulate, the system should continue to perform efficiently without degradation. To support this, the infrastructure should allow dynamic addition of servers to expand capacity and

implement load balancing, ensuring proportional resource utilization. This scalability not only protects the institution's investment in the system but also supports future growth and collaboration through modular, plug-and-play enhancements. Such flexibility enables continuous system improvement without overhauling existing infrastructure.

Access Control

The various modules outlined in the Software Requirement section will involve different types of users. The system should be designed to assign permissions to roles in order to control access to specific modules and functionalities. Secure user authentication mechanisms must be implemented. The access control mechanism should be flexible, allowing users to easily see and access the actions available to them upon logging into the system.

Testing Provisions

Provisional Acceptance Test

Guidelines:

- Conducted prior to full implementation and after integration of all academic and administrative modules into a single system.
- Must be observed by technical representatives from both the vendor and the educational institution.
- Executed in a controlled testing environment simulating real institutional conditions, without using actual student data.
- Detailed reports are required for each test, including feedback from institutional representatives and test results.
- Each module must be tested independently before performing integrated system testing.
- Performance metrics of individual modules should be recorded.
- Testing conditions—including hardware, software, and network setup—must be documented.
- Operational metrics of the integrated platform must be reported, along with results, issues, client feedback, and acceptance/rejection status.
- GUI and interface testing must be conducted in the presence of the designated institutional IT team.

- Final provisional clearance is granted only upon institutional approval and only if no critical errors or warnings exist.
- All testing documentation must be submitted within 7 days of test completion.

Final Acceptance Test

Guidelines:

- Confirms that all previously identified issues during the Provisional Test have been resolved.
- Conducted using actual institutional data and scenarios to validate real-time performance.
- Carried out with participation from academic staff, administrative personnel, and technical support teams.
- Verifies that all system modules perform accurately and meet pre-defined requirements.
- Evaluates system stability and responsiveness under both normal and peak academic loads.
- Confirms smooth integration with external education tools, databases, and reporting systems.
- Overseen by an independent third-party, responsible for final testing and reporting.
- Includes submission of product design documentation, licenses, module descriptions, and component records.
- Covers all hardware and software specified under the project scope.
- Real-time testing reports must be included.
- Acceptance granted only if all deployed hardware and software pass the test without critical issues.
- Requires consensus and approval from all key academic and administrative stakeholders.
- A full deployment plan including timeline, resource allocation, and risk management must be prepared.
- A post-deployment support and maintenance plan (user training, updates, technical support) must also be submitted.
- All documentation must be provided within 25 days of testing.

Security Acceptance Test

Guidelines:

- A multi-level security evaluation is required.
- Configuration Management Test: Reviews security settings of servers, network devices, and other components.
- Data Storage Test: Ensures protection of sensitive data (e.g., student IDs, login credentials), and verifies use of standard encryption methods and key lengths.
- Authentication Test: Verifies use of secure login protocols and checks for vulnerability to brute-force or dictionary attacks.
- Authorization Test: Ensures role-based access control is enforced to prevent unauthorized access or privilege escalation.
- User and Session Management Test: Evaluates session handling, session ID security, and user logout mechanisms.
- Data Validation Test: Assesses inputs and outputs to prevent issues like SQL injection, buffer overflow, or cross-site scripting.
- Error and Exception Handling Test: Checks for secure error reporting and system behavior during failures without revealing sensitive data.
- Auditing and Logging Test: Reviews how system activity is logged, the security of log files, and whether audit trails are in place.
- Each test must be documented with results, penetration methods used, identified vulnerabilities, and recommendations for mitigation.
- Supervised and validated by an independent third-party security expert.
- Final documentation must cover test summaries, results, vulnerabilities found, responses, and feedback

Verification Provision

Guidelines:

- Conducted prior to system validation.
- Compares proposed system specifications with the developed system after completion.
- Verifies documents like requirement and design specifications prepared prior to implementation against final system output.

- Involves the preparation of evaluation plans, requirement specs, test cases, and design documents.
- Independent third-party reviews help assess whether the design meets educational objectives and scope.
- Informal walkthroughs by internal and external academic/IT teams help identify issues.
- Formal inspections involve checklists, entry/exit criteria, and documentation of issues found by a skilled moderator.
- Consolidated documentation must include test summaries, reviews, inspections, and walkthrough findings.

Deliverables and Source Code Rights

All rights of the E-MIS source code shall lie with the institution. The final source code must be handed over after successful Operational Acceptance. It must exactly replicate the live application used on the production server. Deliverables include:

- Functional Specification Document
- Technical Specification Document
- Software and Database Architecture Documents
- User Manuals and Video Guides
- Training Manuals
- Release Notes
- Step-by-step user guide for installation, configuration, and operation

Training

The vendor is required to provide comprehensive training to institutional IT staff for development, database administration, and support. Additionally, user training for faculty and administrative staff must be conducted to ensure smooth system usage.

Deployment Details

- The system must undergo complete User Acceptance Testing (UAT) with test data provided by the institution before going live.
- Phased implementation is preferred; modules should be deployed as they are completed.
- Any requested changes within 1 year of contract initiation must be made free of cost.
- Post-implementation on-site support is mandatory.

- Vendors must provide specifications for required hardware and software.
- The application must support failover management using mirrored application and database instances to minimize downtime.
- Data backup should be maintained through institutional or third-party cloud services.

Disaster Recovery Plan

Recovery Plan for Natural and Accidental Hazards

- Maintain backup databases on alternate servers for each module.
- Restrict server room access to authorized personnel.
- Ensure data center construction adheres to guidelines for natural hazard resistance (e.g., earthquake safety).
- Provide employee guidelines to prevent accidental data loss or physical system damage.
- Implement regular cloud data backups.
- Periodically generate and securely store hard copies of critical data.

Recovery Plan Against Cyber Attacks

- Establish a dedicated response team for cyber threats.
- Notify and activate the institution's Incident Response Team.
- Identification:
    - Identify system vulnerabilities and critical modules
    - Identify cybersecurity experts and data backup points
    - Determine type of attack, breach paths, and affected networks
- Containment:
    - Limit damage by isolating affected systems/modules
    - Suspend compromised modules and servers
    - Perform forensic backups of affected systems (e.g., using FTK, EnCase)
    - Reroute network traffic and establish secure links
- Eradication:
    - Remove compromised components and address vulnerabilities
- Recovery:
    - Restore systems using secure backups and resume services

Operation and Maintenance

The contract period for support, operation, and maintenance is 1 years after the full implementation of all E-MIS modules. The vendor must provide full-time, on-site support at Nepal Engineering College during this 1-year period. The vendor will be fully responsible for the operation and maintenance of the E-MIS, and Nepal Engineering College will not pay for these services during the free support period. Maintenance activities will be conducted in coordination with the college's IT team.

Following this, the vendor should be prepared for a renewable 5-year Annual Maintenance Contract (AMC) term. However, the renewal of the contract lies solely at the discretion of Nepal Engineering College.

The vendor must submit a detailed cost proposal for AMC coverage for up to 5 years after the initial free maintenance period. Nepal Engineering College retains full rights over contract renewal or termination, based on vendor performance.

Data Migration

Data from existing legacy systems must be migrated to the new E-MIS once modules are operational. Data integrity should be verified through thorough auditing post-migration.

Rights to Implement Different Modules

If the total cost proposed by the vendor exceeds the estimated budget set by Nepal Engineering College, the college reserves the right to implement only selected modules from the full E-MIS suite. The decision regarding which modules to implement rests solely with Nepal Engineering College, and the vendor is obligated to proceed with implementation of those selected modules as directed.

Conclusion

This specification document serves as a general guideline for vendors to properly develop and deliver the required tasks. The cost of identified modules, as per the Billing of Quantity (BOQ), must be included in the proposal. In case of any conflicting or redundant descriptions, the decision of Nepal Engineering College will prevail.

Scope of Consulting Services

- Prepare an Inception Report, based on the submitted proposal and discussions with Nepal Engineering College, including Software Development Methodology, Project Activity Plan, Knowledge Transfer Plan, Training Types, Project Team, Communication Plan, and Quality Control Plan.

- Analyze existing systems and prepare system requirement documents, including functional, non-functional, and domain-specific needs.
- Formalize specifications and develop a Detailed Design Document.
- Deliver modular software using modern development methodologies (e.g., Agile).
- Prepare a System Information Security Assessment Framework and system assessment report.
- Develop, test, integrate, and implement a centralized, web-based, SOA-based E-MIS.
- Successfully migrate data from old systems within departments of Nepal Engineering College.
- Prepare and provide knowledge transfer, technical documentation, and user manuals; conduct training for technical, operational, and user staff.

Deliverables

- **Deliverable #1:** Inception Report
- **Deliverable #2:** Modular deliveries with:
    - System Requirement Specification
    - System Design & Database Architecture
    - Developed Solutions with Source Code
    - Quality Assurance and Control Process
    - Training Manuals and Guidelines
    - Data Migration Tools

- **Deliverable #3:** Network System Analysis Design
- **Deliverable #4:** Hardware System Recommendations
- **Deliverable #5:** Final Report including user manuals, testing documents, and complete system source code

Application Architecture and Specifications

- Centralized, integrated E-MIS for Nepal Engineering College
- Extensive web-based services with design-first approach
- Multi-application support
- SOA implemented with RESTful APIs or equivalent
- Secure implementation with protocols like RADIUS or OAuth 2.0
- Proper activity and transaction logging
- Enterprise-grade RDBMS using open standards and licensed software where applicable
- Capability to interface with third-party applications
- Clear separation between application and data access layers

Integration Architecture

- Support for Single Sign-On (SSO) using OAuth 2.0 or equivalent
- Based on SOA and open standards
- Designed for interoperability with other academic and government IT systems

Database Architecture

- Develop a cost-effective, high-performance RDBMS with:
    - ANSI SQL compliance
    - Transaction and clustering support
    - Data caching
    - Row movement and logging features
    - Memory optimization and user-friendly tools for configuration
    - Proper client/server data validation
    - Migration and cleaning of existing data

Additional Features and Support

- Capable of generating customizable reports
- Role-Based Access Control and Security Management
- Support for installation, maintenance, and future enhancements
- AMC contract of at least one-year post-warranty
- Two years of free support for newly developed software

Knowledge and Technology Transfer

- Conduct IT and software training for academic and administrative staff
- Orientation sessions for institutional leadership
- Technical training for RDBMS, front-end architecture, and server configuration (minimum 3 months for 3 employees)
- Transfer of all technical documentation, source code, and related intellectual property to Nepal Engineering College

Duration of Services

- The total duration for analysis, development, testing, migration, and deployment of E-MIS is 12 months from the contract start date
- No additional charges for time extension; complete activity plan must be submitted

Reporting and Performance Requirements

- Nepal Engineering College will form a technical committee to monitor and manage progress
- Monthly/quarterly and final reports must be submitted to the committee
- The consultant must incorporate feedback and submit a final report aligned with TOR and SRS

Software Quality Requirements

- Implement comprehensive Software Quality Assurance (SQA) practices
- Verify whether the system meets expectations set in TOR and SRS
- Conduct Vulnerability Assessment and Penetration Testing (VAPT) prior to go-live

Composition of Consulting Team

Minimum Consulting Team Composition (208 Man-Months):

SN	Position	Quantity
1	Team Leader / Project Manager	1
2	System Analyst & Software Engineer	1
3	Integrated Architect Designer	1
4	Programmer / Developer	5
5	Database Developer / Administrator	2
6	Network Security Expert	1
7	Quality Control / Assurance Engineer	2
8	E-MIS Expert	1
9	Documentation Expert	1

25. Personnel Qualifications

- **Team Leader:** 5+ years' experience; Project Management certifications preferred
- **System Analyst:** 3+ years' experience; certified in system analysis and databases preferred
- **System Architect:** Certifications in architecture frameworks (e.g., TOGAF, Microsoft); experience in MVC and Agile
- **Programmer/Developer:** Experience in SOA-based applications
- **Database Administrator:** DBA certification; experience in performance tuning, clustering, and DR replication
- **Network Security Expert:** 1+ enterprise-level security project experience
- **QC/QA Engineer:** Experience designing and executing test plans for enterprise systems
- **E-MIS Expert:** 4+ years in education system design and implementation
- **Documentation Expert:** Experience preparing technical/user manuals for enterprise systems

Evaluation of Consultant's EOI Application

Eligibility & Completeness Test

EOI applications that meet the following minimum eligibility criteria will be evaluated:

Sl. No.	Criteria Title
1	Corporate Registration
2	Tax Clearance/Return Submission for 2080/81
3	VAT/PAN Registration
4	Submission of EOI Forms 1 to 5
5	No blacklist status as per GoN regulations
6	No corruption case pending in court against key individuals or partners

Recommendation:

This specification document serves as a general guideline for vendors to develop and deliver the required tasks properly. The cost of identified modules, as per the Bill of Quantity (BOQ), must be included in the proposal. In case of any conflicting or redundant descriptions, Nepal Engineering College's decision will prevail.

Given the comprehensive nature of the project, the diversity of technical requirements, and the necessity of ensuring transparency and competitiveness, it is recommended that the administration proceed with an **open bidding process**. This will allow Nepal Engineering College to attract a broad range of qualified vendors, evaluate them based on clearly defined eligibility and evaluation criteria, and ensure value for investment while maintaining fairness and accountability.