DIGITAL READINESS – FUNCTIONAL REQUIREMENT

Abstract

Requirements list for Digital Readiness of the University

Office of Academics (Feb 2025)

This document serves as a comprehensive guide to the technology requirements of JAIN (Deemed-to-be University), providing an end-to-end overview of the university's academic and administrative processes. It is designed to offer potential technology vendors a clear understanding of the university's ecosystem, facilitating the development or integration of solutions that align with institutional objectives and enhance overall operational efficiency.

The requirements outlined herein capture the current (and ideal) state of processes, desired functionalities, and key performance expectations. However, as the university evolves and refines its strategic and operational priorities, there may be adjustments to these requirements. Vendors should anticipate potential changes in scope, features, or processes, accounting for a variability of approximately 15-20%.

The intent of this document is to foster a collaborative approach, ensuring that technological solutions remain adaptable, future-ready, and capable of supporting the university's mission of academic excellence and innovation.

Name and Designation	Signature

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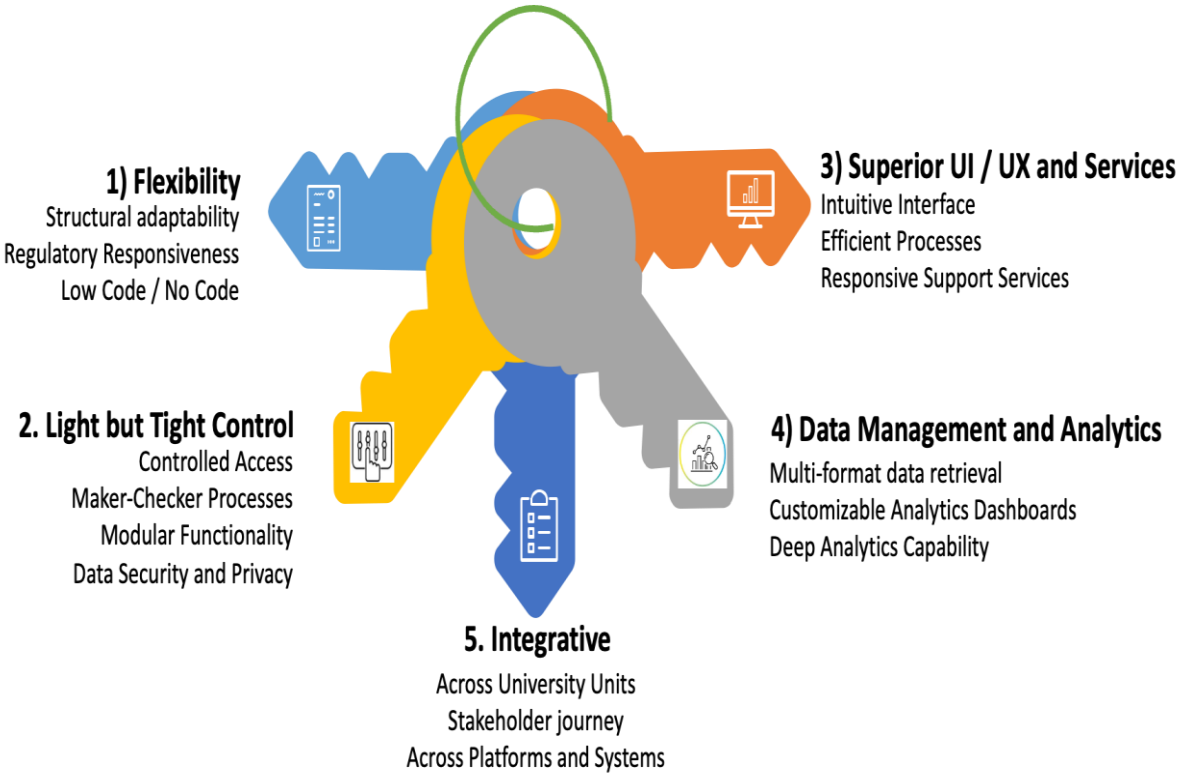
1. Broad Objectives of Technology Enablement

JAIN University is a large, multi-disciplinary institution offering Traditional, Distance Learning, and Online education.

The technology requirements for the University Management Platform are defined by five core themes: 1) Flexibility, 2) Light but Tight Control, 3) Superior UI/UX and Service, 4) Efficient Data Management and Insightful Analytics, and 5) Integration.



Broad Objectives of Technology Enablement – Core Themes

1. **Flexibility**

To meet the evolving demands of a dynamic academic ecosystem, the technology solution must offer flexibility in the following ways:

a. **Structural Adaptability** - Accommodate modifications to the university's core structure as departments, courses, or campuses evolve.
b. **Regulatory Responsiveness** - Enable rapid adjustments in line with changing regulatory requirements and advancements in higher education frameworks.
c. **Low Code/No Code**: The platform should support low-code or no-code customizations, allowing non-technical users to make system adjustments quickly.)

2. Light but Tight Control

Given the university's decentralized structure, the technology must provide centralized control with decentralized autonomy, ensuring that the Head Office maintains oversight while campuses and departments operate independently. The system should enable:

a. **Controlled Access** - Role-based privileges and access settings tailored to individual IDs.
b. **Maker-Checker Process** - Clear workflows that establish hierarchy and an approval matrix.
c. **Modular Functionality** - Split processes into minimal functional units, granting ground-level users the specific permissions they need.
d. **Data Security and Privacy** - Strong adherence to data security protocols and privacy norms.

3. Superior UI / UX and Service

The platform will support a large and diverse user base, so usability is critical. It should aim to:

- **Intuitive Interface** - Feature an AI-driven UI that is easy to navigate for users with varying levels of tech proficiency.
- **Efficient Processes** - Minimize the number of steps or clicks required to perform essential tasks.
- **Responsive Support Services** - Provide accessible support tailored to the needs of different user groups within the university.

4. Efficient Data Management and Insightful Data Analytics

A robust data management and analytics framework is essential for JAIN's reporting, compliance, and decision-making needs. The platform should offer:

a. **Multi-format Data Retrieval** - Easily retrieve and export data in multiple formats, catering to regulatory, compliance, and ranking agency requirements.
b. **Customizable Analytics Dashboards** - Provide visual and data analytics tools for continuous insights.
c. **Deep Analytics Capability** - Deliver data in formats that support advanced analysis for data-driven strategies.

5. Integrative

The platform should seamlessly integrate:

- **Across University Units** - Connect operations across individual campuses, schools, and departments.
- **Across each Stakeholder Journey** - Ensure digital enablement and integration at every touchpoint for the students, faculty members, academic administrators, academic leaders, University's principal officers, facilities managers, parents, recruiters, vendors, external agencies etc.

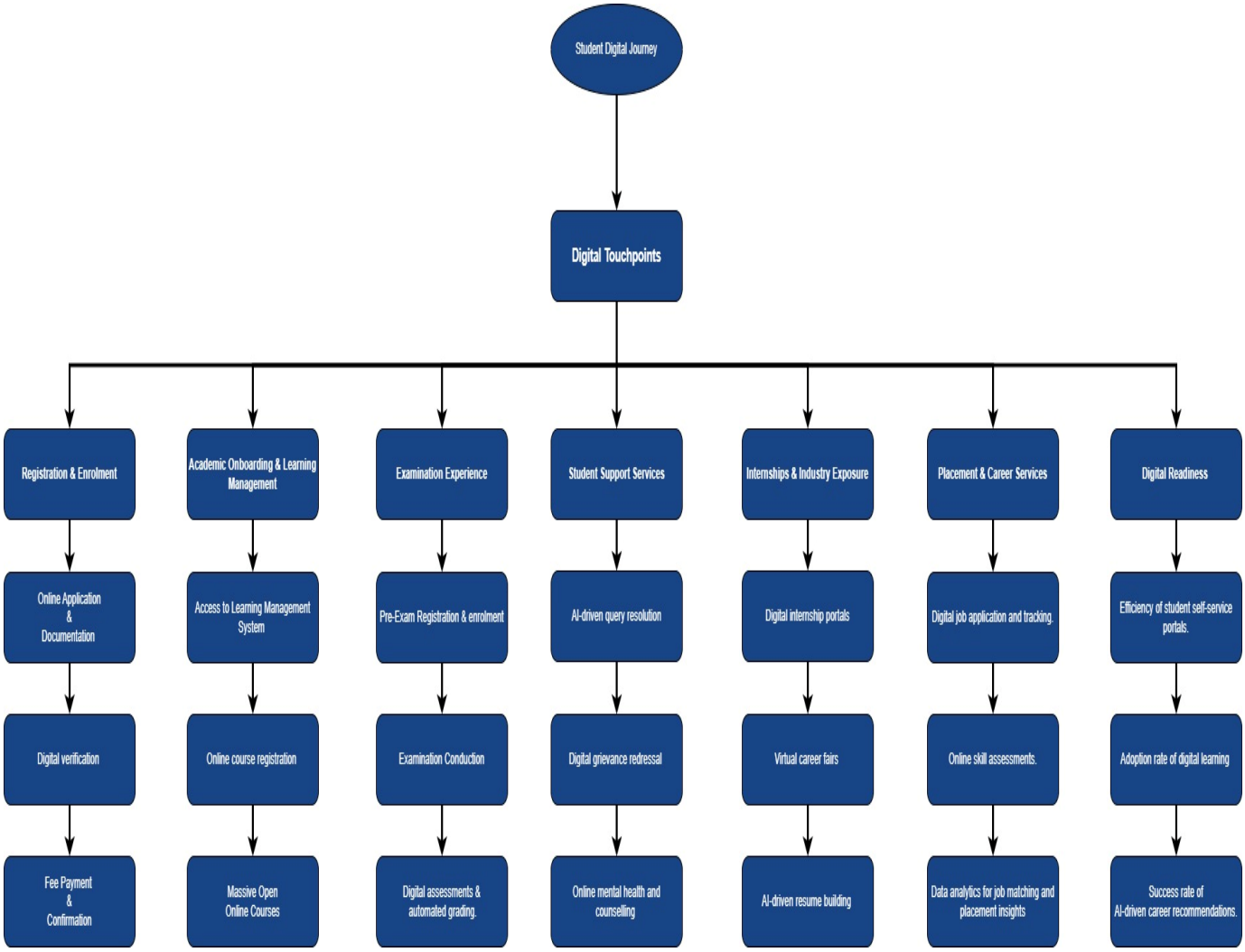
- **Across Platforms and Systems** - Support interactions between traditional, online, and distance education modes, and facilitate connections with external systems (e.g., Academic Bank of Credits).

Objective Statement

Require a flexible, secure, and integrated University Management Platform that enables decentralized control, superior UX, comprehensive data analytics, and seamless engagement across all academic units and stakeholders.

Note: The above parameters would become the assessment criteria for vendor selection

2. Student Digital Journey



1. Introduction

Overview of the student lifecycle in a digitally enabled university.

In a digitally enabled university, a student's journey begins with seamless online registration and extends to digital placements. From the moment a student applies, advanced technology ensures a smooth, efficient, and personalized experience. Digital tools such as AI-driven admission portals, cloud-based Learning Management Systems (LMS), and automated student support services streamline the academic and extracurricular experience.

The integration of digital solutions enhances academic learning through virtual classrooms, e-libraries, and AI-powered tutoring. Smart analytics provide personalized learning recommendations, while automated assessments offer instant feedback. Beyond academics,

career services leverage AI-driven job matching, virtual career fairs, and digital resume building to prepare students for successful placement.
The holistic digital ecosystem fosters engagement, efficiency, and accessibility, ensuring students have a well-supported, data-driven academic journey that aligns with industry requirements.

a. Importance of digital readiness in enhancing the student experience.

Digital readiness is a crucial factor in improving the student experience, as it ensures that students have access to seamless, efficient, and technology-driven learning and administrative processes. A well-prepared digital infrastructure allows students to complete registrations, enrol in courses, and access educational materials without delays or manual interventions.
Digital readiness enhances learning outcomes by providing students with AI-driven academic guidance, virtual classrooms, and interactive e-learning tools. With automation in place, administrative tasks such as fee payments, attendance tracking, and grading become more efficient, reducing the burden on both students and faculty.
Moreover, digitally ready universities offer improved communication channels through chatbots, online forums, and mobile apps, enabling students to receive instant support and feedback. Personalized learning experiences powered by data analytics help students identify strengths, weaknesses, and career opportunities, ensuring better academic performance and career preparedness.
In the career and placement phase, digital readiness facilitates job applications, interview preparations, and industry connections through AI-powered platforms, career portals, and digital networking events. The integration of predictive analytics ensures students are better aligned with suitable job opportunities, making the transition from education to employment smoother.
Ultimately, a digitally ready university provides a flexible, efficient, and student-centric academic journey, empowering students with the necessary tools for academic success and career advancement

The Objectives of this Document (Student Digital Journey)

This document aims to provide a comprehensive overview of the digital journey of students from registration to placement, emphasizing the importance of digital readiness in higher education. The key objectives include:

1. **Identifying Digital Touchpoints** – Mapping the critical stages in a student's academic lifecycle where digital interventions enhance efficiency and experience.

2. **Assessing Digital Readiness** – Evaluating the current level of digital infrastructure, adoption, and technological maturity in university processes.

3. **Highlighting Challenges and Solutions** – Identifying potential barriers to digital transformation and proposing effective strategies for overcoming them.

4. **Defining Key Metrics** – Establishing parameters to measure the effectiveness of digital interventions, including user engagement, automation success rates, and student satisfaction.

5. **Proposing a Digital Roadmap** – Outlining short-term and long-term strategies to enhance digital transformation and ensure continuous improvements in student services.

6. **Enhancing Student Engagement** – Demonstrating how technology can improve communication, accessibility, and support services for students.

7. **Supporting Career Readiness** – Exploring how digital platforms can facilitate internship opportunities, job placements, and career development for students.

By fulfilling these objectives, this document serves as a guide for educational institutions to create a seamless, technology-driven student experience that aligns with industry standards and future workforce demands.

2. Digital Touchpoints in the Student Journey

2.1 Registration & Enrolment

- Online application and document submission.
- Digital verification and admission process.
- Automated fee payment and confirmation.

2.2 Academic Onboarding & Learning Management

- Digital student ID issuance.
- Access to Learning Management System (LMS).
- Online course registration and scheduling.
- Massive Open Online Courses(MOOC)

2.3 Online/Offline Examination Experience

- Pre-Exam Registration and enrolment
- Examination Conduction
- Post Exam Digital assessments and automated grading.

2.4 Student Support Services

- Chatbots and AI-driven query resolution.
- Digital grievance redressal system.

- Online mental health and counselling services.

2.5 Internships & Industry Exposure

- Digital internship portals and matching systems.
- Virtual career fairs and networking events.
- AI-driven resume building and interview preparation.

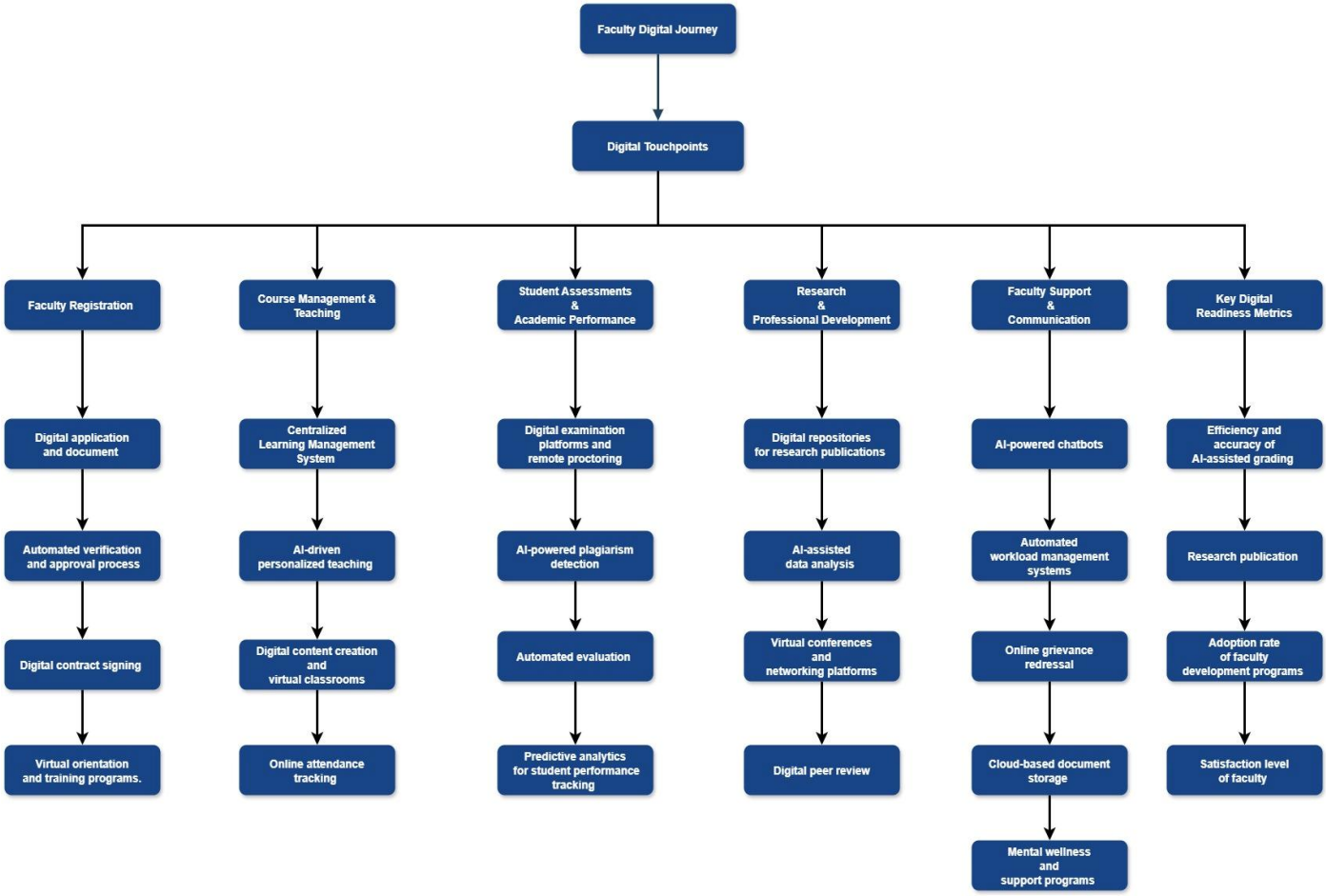
2.6 Placement & Career Services

- Digital job application and tracking.
- Online mock interviews and skill assessments.
- Data analytics for job matching and placement insights.

3. Key Digital Readiness Metrics

- Efficiency of student self-service portals.
- Adoption rate of digital learning platforms.
- Success rate of AI-driven career recommendations.

2. Faculty Digital Journey



1. Introduction

- **Overview of the faculty lifecycle in a digitally enabled university.** The faculty lifecycle in a digitally enabled university spans multiple stages, from recruitment to career progression. With the right digital infrastructure, institutions can streamline faculty onboarding, enhance teaching methodologies, support research, and provide a structured pathway for professional growth. Digital systems ensure efficiency, reducing administrative burdens and allowing faculty to focus on education and research.

- **Importance of digital readiness in enhancing faculty experience.** Digital readiness empowers faculty members by providing them with the necessary tools to teach effectively, collaborate on research, manage student engagement, and access institutional resources with ease. A well-integrated digital system enhances flexibility in course delivery, automates administrative processes, and promotes a data-driven approach to decision-making. It also fosters better communication, knowledge sharing, and overall job satisfaction. Institutions that invest in digital transformation see

improved faculty productivity, better student outcomes, and enhanced global academic collaborations.

- **Objectives of this document**
  This document aims to:
  - Identify and outline key digital touchpoints throughout the faculty lifecycle.
  - Assess the current level of digital readiness in academic institutions.
  - Highlight challenges faced by faculty in adapting to digital tools and propose effective solutions.
  - Establish key performance indicators (KPIs) to measure the success of digital interventions.
  - Present a roadmap for enhancing digital adoption in teaching, research, and professional growth.
  - Provide actionable recommendations to improve faculty experience and institutional efficiency.
  - Ensure that universities remain competitive by integrating emerging technologies in academia.

3. Digital Touchpoints in the Faculty Journey

2.1 Faculty Registration & Onboarding

- Digital application and document submission.
- Automated verification and approval process.
- Digital contract signing and HR system integration.
- Access to faculty portal and institutional resources.
- Virtual orientation and training programs.

2.2 Course Management & Teaching

- Centralized Learning Management System (LMS) for course planning.
- AI-driven personalized teaching assistants.
- Digital content creation, multimedia integration, and virtual classrooms.
- Online attendance tracking and automated grading systems.
- Interactive student engagement tools (discussion forums, live polls, etc.).

2.3 Student Assessments & Academic Performance

- Secure digital examination platforms and remote proctoring.
- AI-powered plagiarism detection and originality analysis.
- Automated evaluation and personalized student feedback.
- Predictive analytics for student performance tracking and improvement strategies.

2.4 Research & Professional Development

- Digital repositories for research publications and grant applications.
- AI-assisted data analysis for research papers and projects.
- Virtual conferences, webinars, and networking platforms.
- Institutional research funding and collaboration portals.
- Digital peer review and publication submission systems.

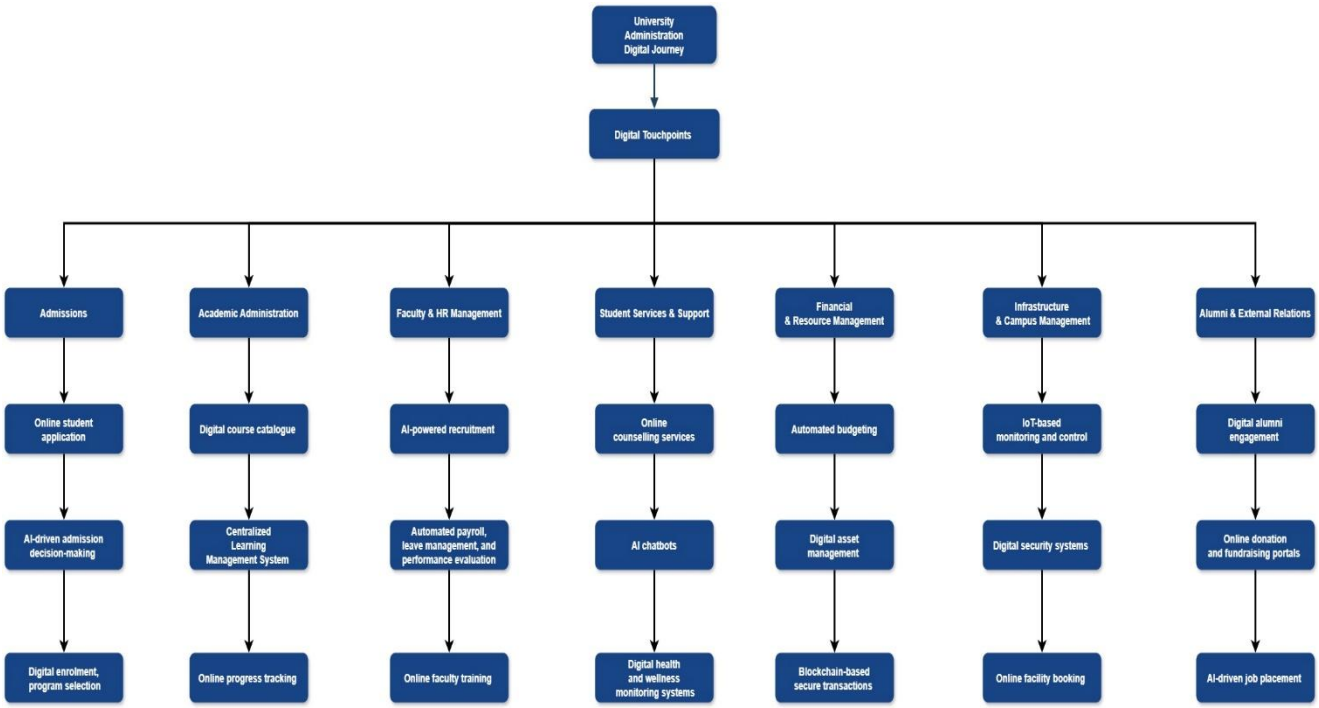
2.5 Faculty Support & Communication

- AI-powered chatbots and digital helpdesks for faculty assistance.
- Automated leave and workload management systems.
- Online grievance redressal and feedback mechanisms.
- Cloud-based document storage for syllabus, reports, and academic records.
- Mental wellness and support programs integrated into digital faculty platforms.
- Digital certification and training programs for skill enhancement.
- Smart analytics for faculty performance assessment and career progression.

3. Key Digital Readiness Metrics

1. Percentage of faculty actively using LMS and digital teaching tools.
2. Efficiency and accuracy of AI-assisted grading and student feedback.
3. Research publication impact score based on digital collaboration.
4. Adoption rate of faculty development programs via digital platforms.
5. Satisfaction level of faculty with digital support services.
6. Effectiveness of online faculty networking and knowledge-sharing initiatives.

4. University Administration Digital Journey



1. Introduction

- **Overview of Administrative Lifecycle in a Digitally Enabled University-** University administration plays a crucial role in ensuring smooth operations across departments, from student admissions to faculty management and infrastructure maintenance. A digitally enabled university leverages technology to optimize these processes, improve decision-making, and enhance institutional efficiency.
- **Importance of Digital Readiness in University Management** Digital readiness equips university administrators with the necessary tools to handle tasks efficiently, reduce manual efforts, and improve service delivery. By integrating digital solutions, universities can achieve transparency, data security, and seamless communication across all stakeholders, enhancing overall institutional performance.
- **Objectives of this Document**
  - Identify key digital touchpoints in university administration.
  - Assess the current level of digital readiness within administrative processes.
  - Highlight challenges and propose solutions to improve digital adoption.

- Define key performance indicators (KPIs) for measuring digital efficiency.
- Provide a roadmap for enhancing digital integration across university functions.

2. Digital Touchpoints in University Administration

2.1 Admissions & Enrolment Management

- Online student application and document verification systems.
- AI-driven admission decision-making and automated notifications.
- Digital enrolment, program selection, and fee payment portals.

2.2 Academic Administration

- Digital course catalogue and scheduling automation.
- Centralized Learning Management System (LMS) for academic operations.
- Online attendance tracking and academic progress dashboards.

2.3 Faculty & HR Management

- AI-powered recruitment and digital onboarding systems.
- Automated payroll, leave management, and performance evaluation.
- Online faculty training and professional development platforms.

2.4 Student Services & Support

- Online student grievance redressal and counselling services.
- AI chatbots for instant query resolution and support.
- Digital health and wellness monitoring systems.

2.5 Financial & Resource Management

- Automated budgeting, payroll, and financial reporting systems.
- Digital asset management for university resources and infrastructure.
- Blockchain-based secure transactions and audit tracking.

2.6 Infrastructure & Campus Management

- Smart campus solutions with IoT-based monitoring and control.
- Digital security systems with biometric and AI-based surveillance.
- Online facility booking and campus maintenance tracking.

2.7 Alumni & External Relations

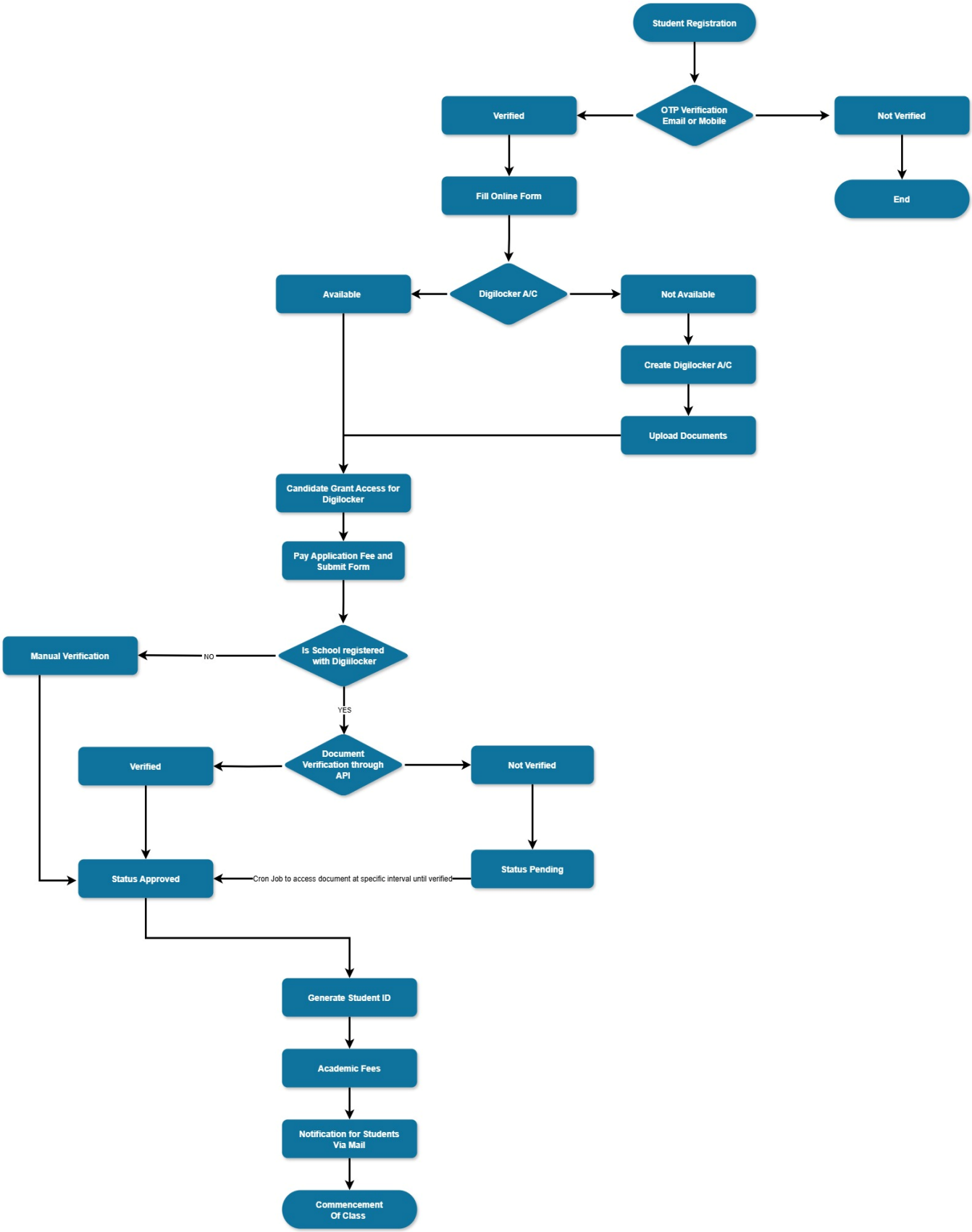
- Digital alumni engagement and networking platforms.

- Online donation and fundraising portals for institutional development.
- AI-driven job placement and career guidance systems.

3. Key Digital Readiness Metrics

- Percentage of administrative processes automated.
- Efficiency of digital enrolment and student support systems.
- Adoption rate of AI-powered decision-making tools.
- Satisfaction level of staff and students with digital services.
- Data security and compliance measures implemented.

5. Registration and Enrolment Process



For automating new student registration and document verification using **Digi Locker** and **mobile OTP verification**, here's a structured approach:

1. Workflow Overview

- **Student Registration Form**
    - Collect basic details (Name, DOB, Email, Mobile Number, etc.).
    - Validate the mobile number via OTP.
    - Fetch documents from Digi Locker for verification.
- **Mobile Number OTP Verification**
    - Use an SMS gateway (e.g., Twilio, Msg91, AWS SNS) to send OTP.
    - Validate OTP before proceeding to the next step.
- **Digi Locker Integration**
    - Students authenticate with **Aadhaar-based login** or Digi Locker credentials.
    - Fetch documents like Aadhar, 10th/12th Marksheet, Caste Certificate, etc.
    - Verify authenticity using Digi Locker API.
- **Document Validation & Approval**
    - Automated verification of fetched documents
    - Manual review (if needed) before final approval.
- **Student Enrolment Confirmation**
    - Generate a digital enrolment ID.
    - Send confirmation via Email/SMS.
        - Store verified data in the institute's database (ERP or CRM).

2. Steps for Implementation

Step 1: Student Registration Portal

- Develop a web portal/mobile app with a form.
- Capture **Name, DOB, Aadhaar Number (optional), Mobile Number, and Email**.
- Implement OTP verification before proceeding further.

Step 2: Mobile Number OTP Authentication

- Integrate an OTP service.
- Send OTP to the entered mobile number.

- Verify OTP before allowing document submission.

Step 3: Digi Locker Integration

- Use Digi Locker's **Pull API** to fetch documents.
- Create Digi Locker account if it's not created.
- Authenticate using Aadhaar-based login.
- Retrieve required documents (Marksheet, Aadhaar, etc.).
- Validate document authenticity.
- Set document verification status as **Approved or Pending**

Step 4: Enrolment Confirmation

- Generate a **Student Enrolment ID**,
- Send confirmation via Email/SMS.
- Store student data securely in the institute's database.

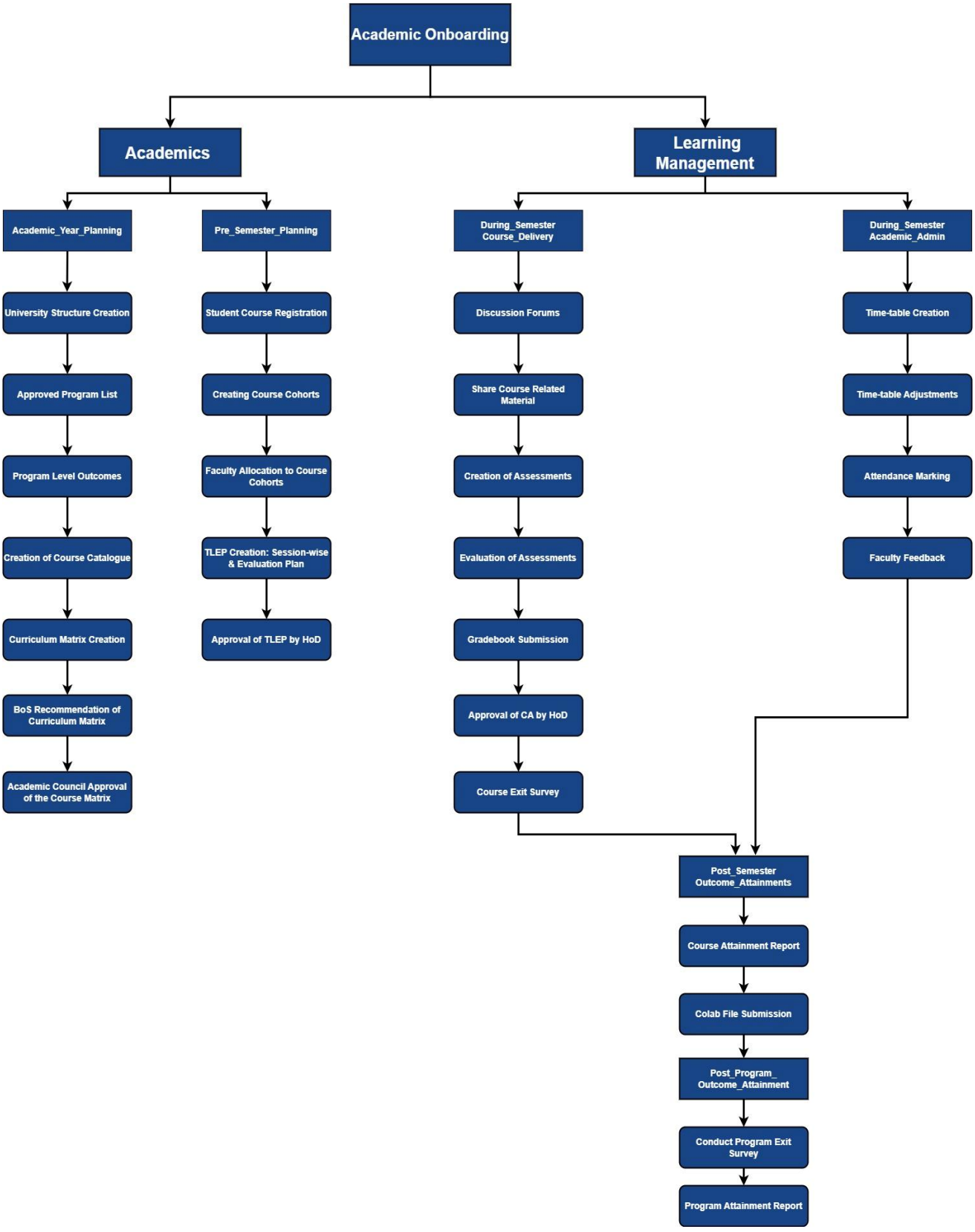
3. Integration Requirements

SMS Gateway Subscription: For OTP verification **Digi Locker**
API Access: Apply for API integration via Digii Locker Development Portal

4. Benefits

Faster onboarding: Reduces paperwork & manual verification.
Secure & Reliable: Documents fetched from Digi Locker are tamper-proof.
Cost-effective: Reduces manpower & operational costs.
User-friendly: Mobile-first approach makes it accessible to students.

6. Academic Onboarding and Learning Management



1. Academic Onboarding

- **Course Selection**

1. **Student Choice**: After successful registration, students select their desired courses from a list of available programs.
2. **Curriculum Integration**: The system will display available electives and core courses with their details.
    1. **Prerequisite Checks**: Automatically validate prerequisites for each course, e.g.

1. Fee payment,
2. Attendance
3. If a subject has separate course codes for theory and practical, students registered for the theory course will be automatically enrolled in the practical course.
4. To enrol in an advanced course, students must first complete the foundation course; otherwise, they will not be eligible for registration.
5. The system must verify credit requirements before allowing a student to enrol in a semester.

- **Fee Payment**

1. **Payment Integration**: The student will be prompted to pay tuition and registration fees via an integrated **Payment Gateway** .
2. **Payment Confirmation**: Once payment is successful, the system updates the status and provides a digital receipt.

- **Classroom Assignment**

1. **Course Enrollment Confirmation**: After fee payment and course selection, the system confirms the enrollment.
2. **Classroom Assignment**: The student is assigned to virtual or physical classrooms based on the courses selected.
3. **Class Schedule(Time Table)**: The system provides a calendar with upcoming class schedules, including live sessions and assignment deadlines. Following are the features:
    1. **Automated Course & Faculty Scheduling** – AI-powered allocation to avoid conflicts.
    2. **Classroom & Resource Booking** – Efficient utilization of lecture halls and labs.
    3. **Batch & Section-wise Timetable** – Customized schedules for different student groups.

4. **Real-time Updates & Notifications** – Alerts for schedule changes or cancellations.
5. **Faculty Workload Management** – Ensures balanced teaching hours distribution.

- **Student Attendance Integration** – Links with attendance tracking systems.
- **Conflict Detection & Resolution** – Identifies and fixes overlapping schedules.
- **Exam & Assessment Scheduling** – Dedicated slots for tests and evaluations.
- **Customizable Time Slots** – Supports different academic structures (semester, trimester).

▪ **Learning Management System (LMS) Integration**

- **Course Materials Access**

1. **LMS Access**: Once enrollment is confirmed, students are granted access to the **Learning Management System (LMS)**.

2. **Course Materials**: Students can download or view PDFs, videos, lecture slides, readings, and other resources through the LMS platform.

3. **Digital Libraries**: If applicable, the student can access academic journals and articles.

- **Lectures & Discussions**
  - **Live Lectures**: Students attend live online classes (via Zoom, MS Teams, etc.) or in-person lectures (if applicable).
  - **Discussion Forums**: Students can engage in discussions with instructors and peers through message boards, group chats, or forums.
  - **Lecture Recording**: Access to recorded lectures for students who missed live sessions.

- **Assignments & Exams**

1. **Assignment Submission**: Students submit assignments directly through the LMS. For auto-gradable assignments (like quizzes or multiple-choice questions), the system will grade them automatically.
2. **Exam Registration**: Students can register for upcoming exams and view exam schedules.
3. **Proctored Exams**: Remote students can take exams with AI-based proctoring to prevent cheating (if required).

- **Performance Tracking**

- **Data Collection:**
    - Gather student performance data, including grades, quiz scores, assignment results, and exam marks.
    - Ensure data is up-to-date and accurate within the Grade Book system.
- **Trend Analysis:**
    - Analyze student performance trends over time using historical data.
    - Identify patterns, such as improvement, decline, or consistency in grades.
    - Use visual reports, charts, and graphs for better insights.
- **Performance Evaluation:**
    - Compare results with predefined benchmarks and grading criteria.
    - Highlight areas where students excel or need improvement.
    - Generate summary reports showcasing key performance indicators.
- **HoD Review and Approval:**
    - Submit the trend analysis report to the Head of the Department (HoD) for review.
    - HoD evaluates the findings, verifies accuracy, and provides feedback.
    - Once approved, grades and insights are finalized in the Grade Book.
- **Automatic Notifications:**
    - After HoD approval, the system triggers automatic notifications to students and faculty.
    - Notifications include graded assignments, upcoming quizzes, and exam results.
    - Students receive alerts via email or the learning portal.
- **Final Grade Book Update:**
    - Approved grades and feedback are officially recorded in the Grade Book.
    - Students can access their updated academic records through the portal.

- **Academic Progress Monitoring & Feedback**
- **Continuous Assessment**

- **Frequent Quizzes**: Short quizzes throughout the semester to track knowledge retention.
- **Peer Reviews**: For group assignments or projects, students can provide feedback to each other.
- **AI Insights**: AI-powered systems monitor the student's progress and suggest resources or interventions if a student is struggling.

- **Automated Student Feedback to Faculty Process**

Automation in student feedback collection ensures efficiency, accuracy, and transparency while reducing manual effort. Here's how an automated system can streamline the process:

1. Automated Feedback Form Distribution

1. The system generates feedback forms based on course and faculty details.
2. Forms are automatically assigned to students through the Learning Management System (LMS) or student portal.
3. Predefined templates ensure consistency in feedback collection.

- **Notification & Reminders**

1. Students receive automated email/SMS/portal notifications with links to the feedback form.
2. Reminder notifications are triggered if students haven't submitted responses by a set deadline.
3. Notifications can be personalized based on student name, course, and faculty.

- **Anonymous & Secure Submission**

1. The system allows students to submit feedback anonymously, ensuring unbiased responses.
2. Responses are encrypted and stored securely to maintain data integrity.

- **Automated Data Collection & Processing**

1. Once submitted, feedback responses are instantly stored in the database.
2. AI/ML-based text analysis can be used to extract key sentiments and insights.
3. The system generates real-time reports summarizing ratings, comments, and trends.

- **Auto-Generated Reports for Faculty & HoD**

1. The system compiles feedback into structured reports with graphical analysis.

2. Reports are automatically shared with faculty members and Heads of Departments (HoD) via email or dashboards.
3. AI-driven insights suggest areas of improvement based on feedback trends.

- **Automated Review & Action Tracking**

1. Faculty members can acknowledge feedback and log actions taken for improvement.
2. The system tracks follow-up actions and sends periodic updates on progress.
3. HoDs and academic committees can monitor trends and intervene where necessary.

- **Massive Open Online Courses (MOOC)**

1. Self-Paced Learning with Faculty Support

1. Students learn independently using study materials (e-books, recorded lectures, online resources).
2. Faculty members provide structured guidance, assignments, and periodic assessments

2. **Flexible Course Structure**

1. Can be part of **Choice Based Credit System (CBCS)** or **Online Distance Learning (ODL)**.
2. Designed for **working professionals** or students needing flexible schedules.

- **Credit-Based System**
  1. Institutions can **assign credits** for GSS courses, typically ranging from **2 to 4 credits**.
  2. Students complete assignments, projects, or research work to earn these credits.

- **Assessment & Evaluation**

  1. Regular faculty check-ins (virtual or in-person) for monitoring progress.
  2. **Assessment methods**:
     - Online quizzes, reports, and self-reflection assignments.
     - Final evaluation based on research papers, case studies, or viva exams.

- **Blended Learning Approach**
  - Integrates **e-learning platforms (LMS), MOOCs (SWAYAM, NPTEL), and university-provided resources**.

- Encourages students to use **open educational resources (OERs)**.

Note- UGC Guidelines for Credit Transfer via SWAYAM

- ***Maximum Credit Limit***
  - ***Up to 40%*** *of the total course credits in a semester can be earned through* ***SWAYAM*** *and transferred to the university degree.*
  - *These credits* ***must align*** *with the existing university curriculum.*
- ***Course Selection & Approval***
  - *Students must choose courses that are* ***approved by UGC/AICTE/NBA/NAAC*** *and listed on SWAYAM.*
  - *Universities must* ***pre-approve*** *the courses eligible for credit transfer.*
- ***Evaluation & Certification***
  - *Students must complete* ***assignments, quizzes, and final exams*** *as per the course requirements.*
  - *A* ***proctored final exam*** *(conducted online or in-person) is mandatory for credit transfer.*
  - *Upon successful completion, SWAYAM issues a* ***digital certificate*** *and credit score.*
- ***Credit Mapping & Integration***
  - *After course completion, universities verify the student's performance and map the credits.*
  - *The institution integrates the credits into the* ***student's transcript*** *without altering the grading pattern.*

- **Guided Self Study**

Objective

To enable students who missed their semester exams due to attendance shortages or failed in regular exams to complete the course and appear for the exam in the following semester. The system ensures structured learning, backlog management, automated student tracking, and accurate academic records.

System Features & Requirements

3. Eligibility Criteria Management

4. The system shall automatically track students who:

1. Did not meet the minimum attendance requirement for a semester.
2. Failed their regular exams.

5. The system shall generate a list of eligible students for backlog courses.

Automated Backlog Course Identification

1. The system shall identify students requiring backlog courses.
2. The system shall notify eligible students via:
    1. Email
    2. Student Portal
    3. SMS
3. The system shall display a list of backlog courses for each student.

Student Self-Registration for Backlog Course

1. The system shall allow students to log in to the portal and register for backlog courses.
2. The registration period shall be configurable (dynamic) based on institutional policies.
3. Once registered, students shall be assigned to the GSS program.
4. The system shall assign a faculty mentor for each backlog course.

Class Scheduling & Learning Modes

1. The system shall support three modes of learning:
    1. **Offline Classes** – Conducted in designated classrooms.
    2. **Online Classes** – Live sessions via LMS, recorded lectures, and discussion forums.
    3. **Self-Paced Learning** – Study materials, video lectures, and assignments.
2. The system shall schedule classes on **weekends and spare times** to prevent clashes with second-semester courses.
3. The system shall track and record attendance for backlog classes.
4. The system shall ensure students meet a minimum attendance percentage to be eligible for the backlog exam.

Assessment Structure

1. The system shall align backlog assessments with regular course assessments.
2. The system shall support:

1. **Assignments & Quizzes** – Weekly and bi-weekly.
2. **Mid-Semester Exam** – Internal exam.
3. **Final Backlog Exam** – Conducted separately from regular exams.

Backlog Exam Management

1. The system shall schedule backlog exams separately from regular exams.
2. The system shall verify exam eligibility based on attendance and assignment completion.
3. The backlog exam format shall be identical to the regular course exam.

Grade Sheet, SGPA & Transcript Management

Automated Backlog Grade Sheet Management

1. The system shall generate a separate **backlog grade sheet**.
2. The system shall record backlog exam marks separately.

Automated SGPA Calculation & Update

1. The system shall recalculate **SGPA (Semester Grade Point Average)** based on the latest backlog scores.
2. The system shall replace the previously recorded SGPA with the updated SGPA after backlog exam completion.
3. If a student fails again, the previous grade shall remain until the next attempt.

Automated Transcript Update

1. The system shall update the transcript **automatically** when a student clears a backlog exam.
2. The system shall distinctly mark backlog subjects in the transcript but consider only the latest score for SGPA calculation.

Final Exam & Completion

1. The system shall allow students to sit for **1st Semester backlog exams in the 2nd Semester** per the backlog exam schedule.
2. The system shall update **credits, grades, SGPA, and transcript** upon passing the backlog exam.

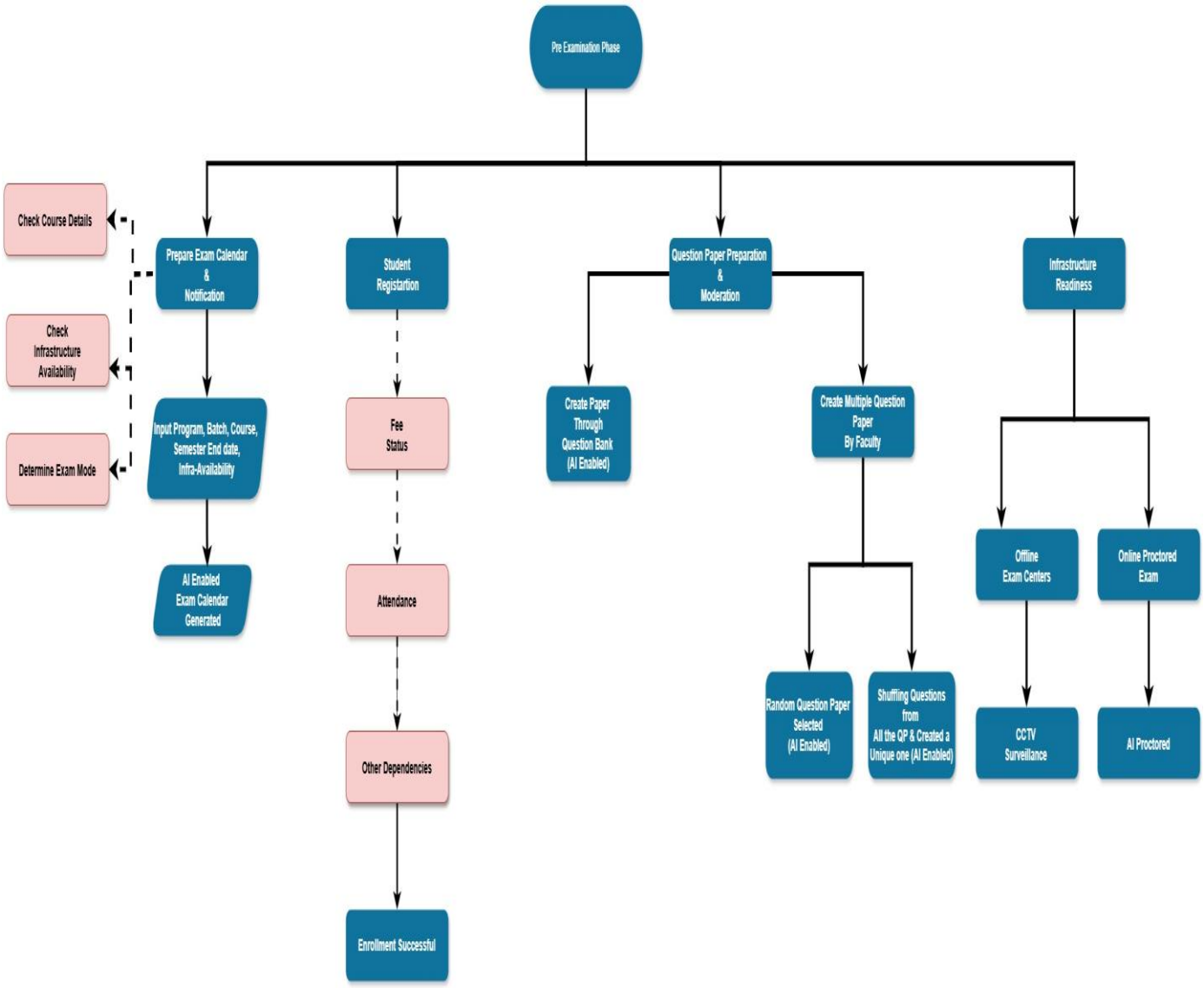
System Integration & Reporting

1. **LMS Integration:** Seamless integration with Learning Management Systems (LMS) for online courses.
2. **Student Information System (SIS) Integration:** Ensures real-time updates in student records.
3. **Reporting & Dashboards:** Admin panel to monitor backlog student performance, attendance, and SGPA updates.

4. **Notifications & Alerts:** Automatic alerts for registration deadlines, class schedules, and exam eligibility.

▪ Examination Experience (Online / Offline)

1. Pre-Examination Phase



1. **Exam Calendar & Notification**

- The university releases an exam schedule well in advance, ensuring transparency and preparedness.
- The schedule includes details such as the mode of examination (offline, online, or hybrid), dates, syllabus, and examination center details (if applicable).
- An automated system should be implemented to generate the exam calendar dynamically based on:
    - The academic program, batch, and course structure.
    - Semester start and end dates.
    - Availability of examination infrastructure.
    - Mode of examination (offline, online, or hybrid).

Dependencies:

1. Availability of necessary infrastructure (exam halls, online servers, etc.).
2. Details of courses taught in the specific semester.
3. Mode of examination, determined based on feasibility and regulations.

1. **Student Registration & Hall Ticket Issuance**

- Students register for exams through the university's online portal.
- The system verifies eligibility criteria (**fee payment, attendance requirements, etc**.).
- Digital hall tickets are automatically generated and issued with QR codes to enhance security and prevent fraud.
- Automated verification ensures students meet the following prerequisites before registration:

Dependencies:

1. Fee clearance status.
2. Minimum attendance requirement.

1. **Exam Mode Selection (Flexible & Inclusive)**

- Final-year and terminal exams should be conducted in offline, online, or hybrid mode, depending on feasibility and university guidelines.
- Intermediate students may be assessed through:
    - Internal assessments.
    - Project-based evaluations.
    - Previous semester performance.
- Universities should ensure inclusivity by offering accommodations for students with disabilities and those from remote locations.

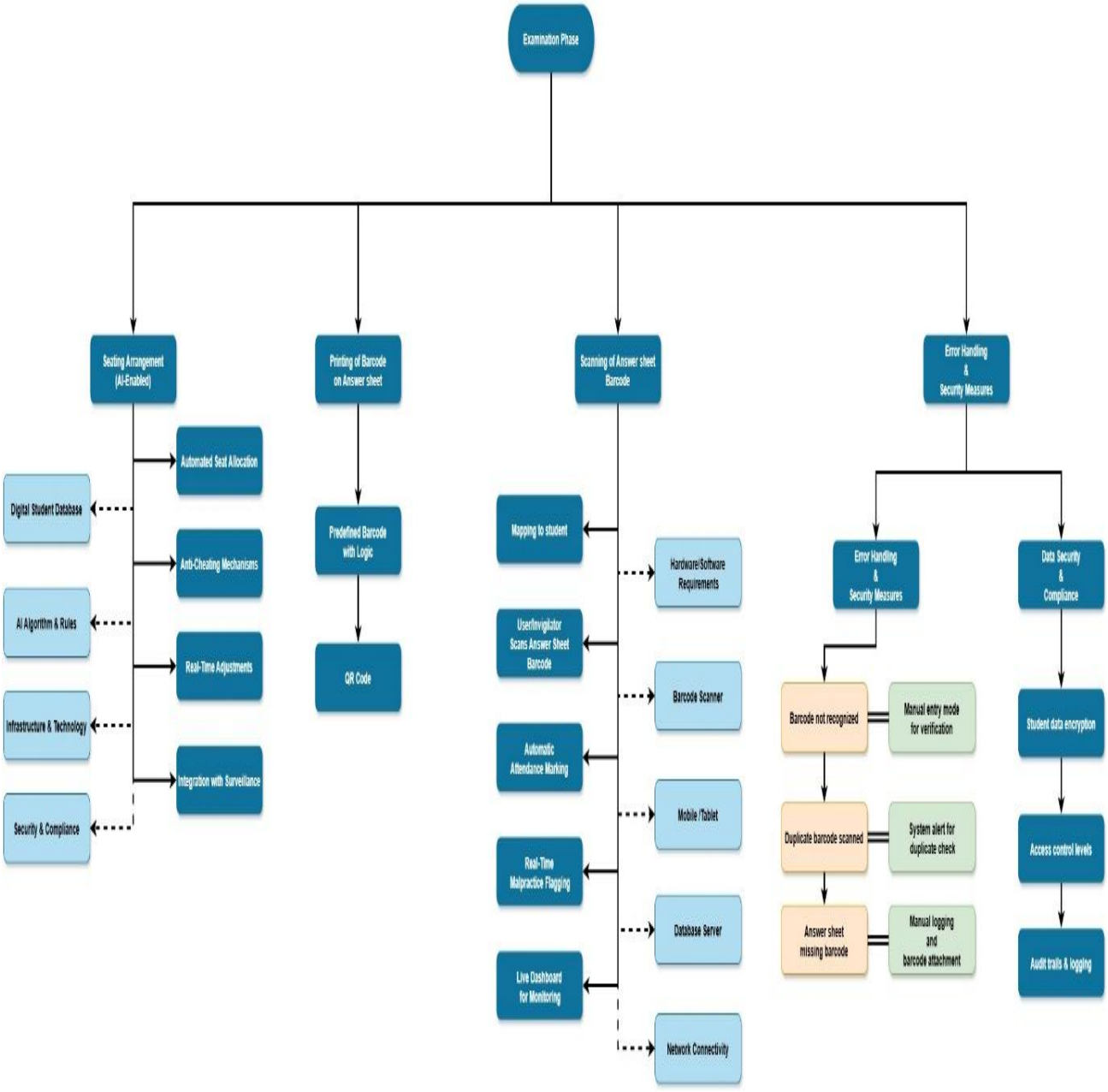
2. Question Paper Preparation & Moderation

- A secure online portal should be used for setting, reviewing, and moderating question papers.
- Multiple faculty members can contribute by creating different question papers. AI will then:
    - Randomly select a question paper for each exam session.
    - Generate a unique question paper by shuffling questions from various faculty-prepared papers.
    - Select or generate questions from a predefined question bank to ensure uniformity and fairness.
- AI-based plagiarism detection should be integrated to ensure uniqueness and maintain academic integrity.
- Randomization techniques should be employed to prevent question paper leaks and duplication.

3. Infrastructure Readiness

1. **For Offline Exams:**
    1. Adequate examination centres should be available, equipped with seating arrangements as per UGC norms.
    2. CCTV surveillance should be mandatory to ensure exam integrity.
    3. Invigilators should be appointed to monitor student behaviour and prevent misconduct.
2. **For Online Exams:**
    1. Universities should deploy proctored exam platforms with AI-driven monitoring.
    2. Features such as face recognition, browser lockdown, and screen recording should be implemented to prevent malpractice.
    3. AI should detect anomalies such as multiple faces, suspicious activities, or switching of browser windows.

3. Examination Phase



- **AI-Enabled Seating Arrangement**

  In **AI-enabled seating arrangement** leverages artificial intelligence to optimize the allocation of seats in an examination hall, ensuring fairness, security, and efficiency. The system considers various factors such as student roll numbers, subject codes, exam halls, and invigilation needs. It minimizes the chances of malpractice by strategically placing students from different subjects or roll number groups apart.

  Key Features:

  - **Automated Seat Allocation:** AI assigns seats dynamically based on predefined rules.
  - **Anti-Cheating Mechanisms:** Ensures that students with similar subject papers or roll numbers are not seated nearby.
  - **Real-Time Adjustments:** The system can accommodate last-minute changes, such as absentee students or room modifications.
  - **Integration with Surveillance:** AI can integrate with CCTV monitoring to detect anomalies in seating patterns.

  Prerequisites

  To implement an AI-driven seating system, the following prerequisites must be met:

  - **Digital Student Database:**
    - Student details (name, roll number, subject, exam centre, special needs).
    - Exam hall capacity and seating layout.
  - **AI Algorithm & Rules:**
    - Predefined rules for seating allocation (e.g., randomization, subject-wise separation).
    - AI model trained to handle conflicts, last-minute changes, and hall reshuffling.
  - **Infrastructure & Technology:**
    - Examination halls equipped with QR code scanning for automated verification.
    - Integration with biometric attendance (optional).
    - Surveillance integration for AI-based anomaly detection.
  - **Security & Compliance:**
    - Ensuring compliance with UGC and university guidelines.
    - Secure system access for exam coordinators and administrators.

By implementing an **AI-enabled seating arrangement**, universities can enhance fairness, efficiency, and security in examinations while reducing administrative workload.

- **Printing of Barcode on Answer sheet**

----------Predefined Barcode with Logic- ----------

Type	Best Use Case
QR Code	Stores more data, better for advanced digital tracking
1D Barcode (Code 128, Code 39)	Faster scanning, suitable for numerical IDs
2D Barcode (Data Matrix)	Can encode text, numbers, and links to digital records

- **Scanning of Answer sheet Barcode via scanner and Mapping to student**

To streamline examination processes and improve efficiency, scanning answer sheet barcodes and mapping them to students can help automate data entry, reduce human errors, and ensure transparency in result processing. Below is a detailed breakdown of the implementation:

- **User/Invigilator Scans Answer Sheet Barcode**
  - The invigilator scans the answer sheet barcode using a handheld or fixed scanner.
  - The system prompts the invigilator to scan the student ID card
- **Automatic Attendance Marking**
  - The system cross-checks the scanned answer sheet barcode with the student database.
  - If a match is found:
    - Attendance is marked as "Present".
  - If no answer sheet is scanned for a registered student:
    - Marked as "Absent" after a defined cutoff time.
- **Real-Time Malpractice Flagging**
  - While scanning, the invigilator gets an option to mark a student for malpractice.
  - The system prompts for malpractice reasons (dropdown or text entry), such as:
    - Using unauthorized material
    - Impersonation
    - Copying from another student
  - Once flagged, the student's status is instantly updated in the examination system.
  - Alerts are sent to exam controllers and administrators for immediate action.

- **Live Dashboard for Monitoring**
    - The system provides an instant report showing:
        - Present students with scanned answer sheets
        - Absent students (no answer sheet scanned)
        - Students flagged for malpractice
    - The exam controller can take immediate corrective actions (e.g., investigating malpractice cases).

Benefits

- Eliminates Separate Attendance Marking – Scanning the answer sheet automatically records attendance.
- Real-Time Malpractice Monitoring – Authorities get instant malpractice reports for quicker decisions.
- Reduces Manual Work – No need to manually track absent students or flag misconduct later.
- Enhanced Exam Security – Prevents impersonation and unauthorized activities.

Prerequisites for Implementation

A. Hardware Requirements

Component	**Purpose**
Barcode Scanner	To scan barcodes printed on answer sheets
Mobile /Tablet	To process scanned data and store it in a database
Database Server	To store student and exam records
Network Connectivity	Required for real-time cloud-based mapping

B. Software Requirements

Software	**Purpose**
Barcode Scanning Software	Captures and processes scanned barcode data
Student Information System (SIS) / ERP	Stores student details and maps answer sheets to students
Database Management System (DBMS)	MySQL, PostgreSQL, or cloud-based databases to store student records
Integration APIs	If connecting to an existing examination or ERP system
Automation Tools	To streamline barcode scanning, validation, and mapping

Special Provisions for PwD (Persons with Disabilities)?

- **Error Handling & Security Measures**

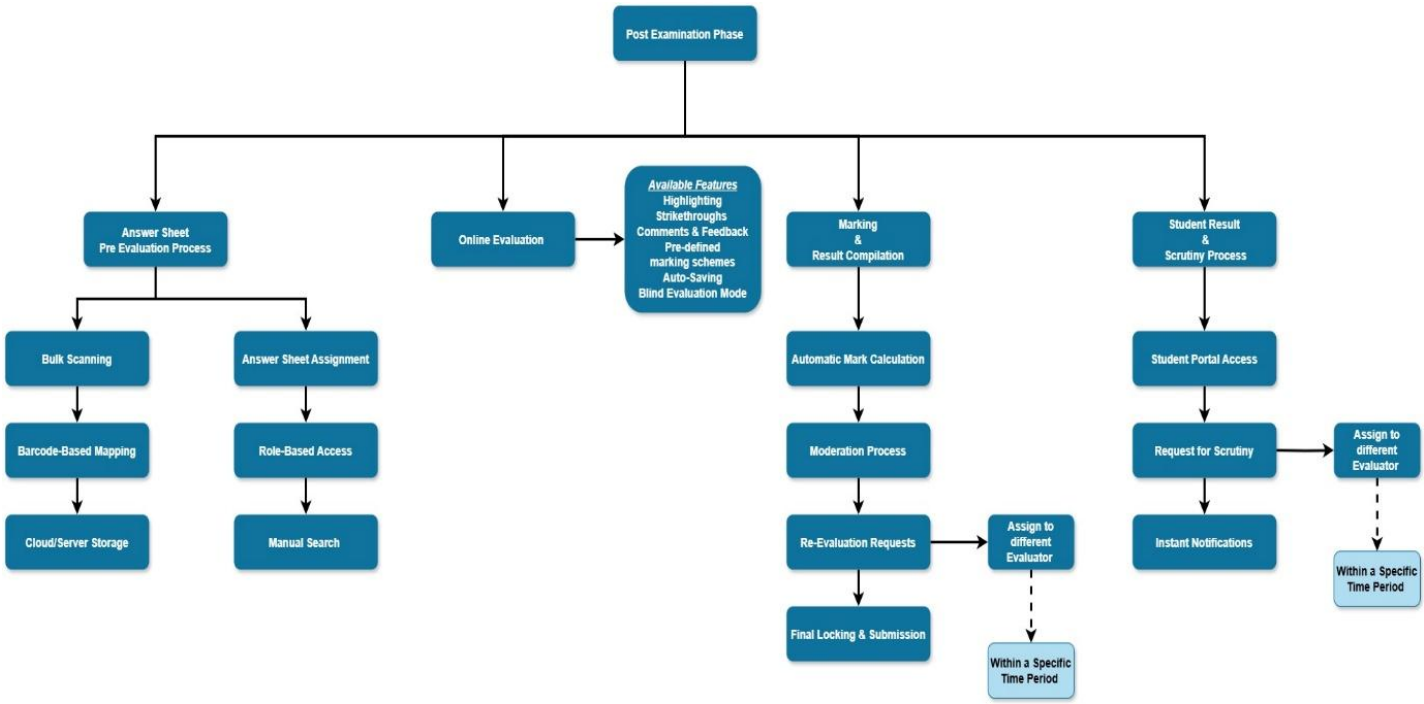
A. Error Handling

Issue	Solution
Barcode not recognized	Manual entry mode for verification
Duplicate barcode scanned	System alert for duplicate check
Answer sheet missing barcode	Manual logging and barcode attachment

B. Data Security & Compliance

- **Student data encryption** to prevent unauthorized access.
- **Access control levels** to restrict who can view/edit scanned data.
- **Audit trails & logging** for tracking barcode scans and changes.

4. Post- Examination Phase



- **On-Screen Answer Sheet Evaluation Process**

  On-screen evaluation allows faculty to digitally evaluate scanned answer sheets, reducing manual errors, improving transparency, and enabling faster result processing.

  Key Features:

  Answer Sheet Scanning & Uploading

  - **Bulk Scanning**: High-speed scanners scan physical answer sheets.
  - **Barcode-Based Mapping**: Each scanned sheet is linked to a **unique Barcode ID**.
  - **OCR Processing (Optional)**: Converts handwriting into searchable text.
  - **Cloud/Server Storage**: Scanned answer sheets are stored securely.

  Note- OCR -Optical Character Recognition. It is a technology that converts text from images into machine-readable text.

  Faculty Login & Answer Sheet Assignment

1. **Role-Based Access**: Only authorized faculty can evaluate answer sheets.
2. **Automated Answer Sheet Distribution**: System assigns sheets based on **subject and faculty availability**.
3. **Manual Search Option**: Faculty can retrieve answer sheets using **Barcode ID, Student ID or USN**.

- **Digital Evaluation Process**

  Key Features:

  1. For faculty

  1. **Question-wise Navigation**: Move between questions quickly.
     Annotation Tools:
  2. **Highlighting** (Important sections of the answer)

3. **Strikethroughs** (Mark incorrect parts)
4. **Comments & Feedback** (For student reference) **Pre-defined marking schemes** for objective and subjective questions.
5. **Auto-Saving**: Progress is saved **in real-time** to prevent data loss.
6. **Blind Evaluation Mode** : Hides student details for unbiased grading.

- **Marking & Result Compilation**
  - **Automatic Mark Calculation**: Total marks are calculated based on faculty input.
  - **Moderation Process**: Senior evaluators can review and suggest changes.
  - **Re-Evaluation Requests**: If scrutiny is requested, the sheet is assigned to another faculty for review.
  - **Final Locking & Submission**: Once verified, marks are locked and submitted to the exam system.

- **Student Result & Scrutiny Process**
  - **Student Portal Access**: After evaluation, students can view their answer sheets online on demand basis. (without faculty details). by default, it will not be accessible to student.
  - **Request for Scrutiny**: Students can apply for **re-evaluation** with proper justification
  - **Instant Notifications**: Students get updates on **scrutiny status & result changes**.

Student Support Services

Objective

The purpose of this project is to automate the documentation of student support processes, ensuring efficient handling of student queries, improved response times, and better knowledge management. Automation will help reduce manual workload, standardize documentation, and provide real-time tracking of support cases.

Scope

- Automate documentation of student queries, complaints, and requests.
- Implement a self-service system for students to track and resolve their issues.
- Standardize report generation and knowledge base management.
- Ensure integration with existing Student Information Systems (SIS), ticketing platforms, and communication tools.

Stakeholders

1. Primary Stakeholders

1. **Students** (End-users submitting queries)
2. **Student Support Team** (Advisors, counselors, and administrators handling support requests)
3. **IT Team** (Responsible for automation and integration)
4. **Academic Departments** (Handling course-related inquiries)

1. Secondary Stakeholders

1. **University Administration** (Monitoring and compliance)
2. **Legal & Compliance Teams** (Ensuring adherence to data security regulations)
3. **External Vendors** (Providing automation tools or third-party integrations)

4. **Functional Requirements**

4.1 Automated Ticketing & Case Management

- Auto-generation of support tickets when a student submits a request.
- Automatic case assignment to the right department.
- Real-time status tracking for students.
- Automated notifications and reminders for pending cases.

4.2 Self-Service Portal

- Chatbot integration for handling common queries.
- Searchable knowledge base for FAQs and documentation.
- Submission of support requests with predefined categories.

4.3 Workflow Automation

I. Rule-based escalation for unresolved tickets.
II. Predefined templates for common support responses.
III. Integration with email and messaging platforms for auto-replies.

4.4 Documentation & Reporting

- Auto-population of support case details in standard formats.
- Version control for knowledge base updates.
- Real-time dashboards for tracking student support performance.

4.5 Integration with Existing Systems

- Sync with SIS for student data retrieval.
- API-based integration with third-party ticketing and CRM tools.
- Connection with university communication platforms (e.g., email, SMS, mobile apps)

5. Workflow & Process Automation

5.1 Typical Student Support Process (Automated)

- **Student submits a query** (via chatbot, self-service portal, or email).
- **System auto-generates a ticket** and assigns it to the appropriate team.
- **Knowledge base suggests solutions** (if applicable) before escalation.
- **Support staff provides a resolution** and updates the case.
- **System documents the resolution** and updates knowledge base if needed.
- **Automated notifications** keep students informed of progress.
- **System generates reports** for performance tracking.

Internship and Industry Exposure

Objective:

To design and implement an automated system for managing student **internships, industry visits, live projects, and guest lectures**, ensuring a seamless experience for students, faculty, and companies. The system will facilitate **internship applications, approval processes, tracking, and evaluations** while also supporting **industry exposure programs** such as **guest lectures, site visits, and consulting assignments**.

Scope:

- **Internship Management:** End-to-end workflow from registration to certification, integrating AI-based recommendations and real-time tracking.
- **Industry Exposure:** Organizing structured visits, live projects, expert sessions, and networking events.
- **Digital Integration:** Seamless connection with university portals, AI-driven analytics, and secure digital documentation.
- **Scalability:** Ability to accommodate **various internship models (mandatory, elective, remote, and hybrid)** and industry collaborations.

Stakeholders

- **Students** – Apply, track, and complete internships and industry programs.
- **Faculty Coordinators** – Approve internships, mentor students, and monitor progress.
- **T&P Cell (Training & Placement)** – Manage industry collaborations, internship listings, and student placements.
- **Companies/Recruiters** – Offer internships, provide mentorship, and evaluate student performance.
- **IT Team** – Develop, integrate, and maintain the system.
- **University Administration** – Ensure compliance with academic regulations and credit mapping.

Functional Requirements

A. Internship Management System

1. Student Registration & Application

- Secure login with **Student ID & OTP Authentication**.
- Internship listings with **advanced filters (company, industry, domain, duration, stipend, skill-based matching, etc.)**.
- AI-driven internship recommendations based on student profiles and academic performance.
- Resume & Statement of Purpose (SOP) submission with template guidance.
- Integration with **LinkedIn profiles and professional portfolios**.

2. Internship Approval Workflow

- **Automated Matching:** AI-based screening for eligibility criteria.
- **Faculty Review:** Approval or rejection based on curriculum alignment.
- **T&P Cell Verification:** Ensuring compliance with university policies.
- **Company Offer Management:** Integration with employer dashboards for real-time application tracking.
- **Digital Offer Letter Submission & Verification**.

3. Monitoring & Reporting

- Students submit **weekly/monthly progress reports** via an interactive dashboard.
- Faculty provide **structured feedback, grading, and mentorship**.
- Automated **reminders for pending reports and approvals**.
- Integration with a **performance analytics module** to track learning outcomes.

4. Completion & Certification

- Final internship report submission with structured templates.
- **Company Performance Evaluation Integration:** Supervisor feedback mechanism.
- Digital **Certificate Issuance via DigiLocker & blockchain-based credentialing**.
- **Credit Transfer Mapping:** Automatic synchronization with university records.

B. Industry Exposure System

1. Industry Visit Management

- Registration portal for students and faculty coordinators.
- Approval workflow for university and company permissions.

- **Logistics management module** (transport, scheduling, attendance tracking, feedback collection).
- **AI-based Industry Visit Recommendation Engine** to suggest relevant visits based on coursework.

2. Guest Lectures & Webinars

- Speaker onboarding and event scheduling automation.
- **Real-time registration tracking and automated reminders**.
- Student attendance tracking with biometric or QR-based authentication.
- Post-session **assessment quizzes & feedback collection**.
- **Certificate of Participation Issuance** for students and faculty attendees.

3. Live Projects & Consulting Assignments

- Company collaboration portal for **real-world problem statements**.
- Student team formation with **skill-based matchmaking**.
- Dedicated mentor dashboard for **progress tracking and communication**.
- Project submission with **peer review mechanisms**.
- Industry evaluation and final **certification or credit allocation**.

▪ Placement and Career Services

Objective:

To design and implement an automated system for managing **campus placements, career counselling, job applications, and employer engagements**, ensuring a seamless experience for students, recruiters, and the placement cell.

Scope:

- **Placement Management:** End-to-end workflow from job postings to final selection.
- **Career Development:** Resume building, mock interviews, and skill enhancement.
- **Recruiter Engagement:** Employer registration, job listings, and candidate tracking.

- **Digital Integration:** AI-driven job recommendations, resume screening, and analytics.

Stakeholders

- **Students** – Apply for jobs, track applications, and prepare for interviews.
- **Placement Cell** – Manage employer interactions, schedule drives, and oversee approvals.
- **Employers/Recruiters** – Post job openings, shortlist candidates, and conduct interviews.
- **Faculty Mentors** – Guide students in career development and resume building.
- **IT Team** – Develop and maintain the system.

Functional Requirements

A. Placement Management System

1. Student Registration & Profile Management

- Secure login with **Student ID & OTP Authentication**.
- Profile creation with **academic details, resume, projects, certifications, and skillsets**.
- AI-driven **resume evaluation and enhancement suggestions**.
- Integration with **LinkedIn, GitHub, and other professional platforms**.

2. Job Listings & Application Process

- Centralized **job board with advanced filters** (company, industry, role, location, package, etc.).
- **AI-based job recommendations** based on student profiles.
- One-click job applications with resume and cover letter attachments.
- **Application tracking dashboard** for students and recruiters.

3. Recruitment Drive Management

- **Automated scheduling of placement drives**, online tests, and interviews.
- Slot booking system for students to choose interview timings.
- **Virtual interview integration** with platforms like Zoom, MS Teams.
- Real-time notifications and reminders for upcoming placement events.

4. Selection & Offer Management

- Recruiter **shortlisting & selection workflow**.
- **Automated offer letter generation and acceptance tracking**.
- Digital documentation and integration with **DigiLocker for verification**.

B. Career Development & Training

1. Resume Building & Skill Assessment

A. AI-powered **resume analyzer** with improvement suggestions.

B. Access to pre-built templates and **automated formatting tools**.

C. **Skill assessment tests** and personalized **career path recommendations**.

2. Mock Interviews & Soft Skills Training

- AI-based **mock interview simulations** with instant feedback.
- Soft skills training modules covering **communication, leadership, and aptitude**.
- Peer reviews and **mentor feedback integration**.

3. Career Counselling & Guidance

- One-on-one mentorship booking system.
- Webinars and expert sessions on **career trends and job market insights**.
- **AI-driven career path recommendations based on student preferences**.