

Business Requirements Document (BRD)

Project: Question Bank Management System (QBMS)

Department: Examination Department

1. Purpose

The Question Bank Management System (QBMS) aims to digitalize and streamline the management of question papers for the college's Examination Department. It will securely store questions, organize them by branch, semester, subject, and unit, and automate the generation of question papers following predefined blueprints that align with Bloom's Taxonomy and difficulty distribution requirements.

2. Objectives

- Centralize all questions in a structured database.
- Ensure each subject (5 units) has a minimum of 15 questions per unit.
- Enable automatic generation of final exam question papers with exactly 3 questions per unit.
- Enforce difficulty and Bloom's taxonomy distribution per blueprint.
- Prevent question overlap within the same academic year while allowing reuse in subsequent years.
- Track last usage of each question for analytics and audit.
- Support multiple branches, semesters, and subjects.
- Provide secure, role-based access to faculty and exam cell staff.

3. Stakeholders

- Examination Department (Primary Owner)
- Faculty Members (Question creators, reviewers)
- Exam Cell Staff (Generate and approve papers)
- IT/Admin Team (Maintain database, backups, access control)
- Students (Indirect beneficiaries through fair exam)

4. Functional Requirements

4.1 Question Bank Management

- Store questions categorized by Branch, Semester, Subject, and Unit (1–5).
- Each question tagged with: Question Text, Unit, Marks, Difficulty (Easy, Medium, Hard), Bloom's Taxonomy Level (Remember, Understand, Apply, Analyze, Evaluate, Create), Question Type, Year of creation, Last Used (date + exam session ID).

4.2 Paper Generation

- Generate 15-question papers (3 per unit).
- Follow blueprint rules for each unit (e.g., Unit 1 → 1 Easy, 1 Medium, 1 Hard).
- Enforce global distribution ratio (e.g., 40% Easy, 40% Medium, 20% Hard).
- Support multiple versions of papers (Set A, Set B, etc.).
- Ensure no question repeats within the same academic year, but allow reuse across years.
- If blueprint constraints cannot be met, system alerts staff and suggests alternatives.

4.3 Search & Retrieval

- Search questions by subject, unit, difficulty, Bloom's level, marks, year, and usage history.

4.4 User Roles

- Admin: Manage users, configure system.
- Faculty: Add/review questions.
- Reviewer: Approve/reject questions.
- Exam Cell Staff: Generate and finalize papers.

4.5 Security

- Role-based access control, encrypted storage, audit logs.

5. Non-Functional Requirements

- Scalability: Handle questions across multiple branches and semesters.
- Performance: Generate papers within seconds.
- Usability: Faculty-friendly interface with minimal training.
- Security: Encryption, access restrictions, and audit trails.
- Backup & Recovery: Automated periodic database backup.

6. Scope & Constraints

In Scope:

- Question bank management with Bloom's taxonomy and difficulty tagging.
- Randomized + blueprint-based paper generation.
- Tracking question usage (last_used).
- Export to PDF/Word.
- Role-based access.

Out of Scope:

- Student practice tests.
- Online exam delivery.

7. Assumptions

- Each subject has 5 units only.
- Each unit has a minimum of 15 questions in the database.
- Final exams always follow the 3-questions-per-unit pattern.
- Faculty will populate and maintain the database.
- Difficulty distribution is predefined (e.g., 40/40/20).

8. Risks

- Insufficient questions per unit/difficulty may restrict paper generation.
- Unauthorized access may cause leaks.
- Incorrect tagging (difficulty/Bloom's level) may affect paper quality.
- Overuse of certain questions if faculty do not replenish the bank.

9. Success Criteria

- 100% adoption by exam department.
- Papers generated error-free and within 1 year.

Project Phases

Phase 1 – Excel Upload & Database Setup

Goal: Digitize and centralize questions.

Workflow:

1. Faculty send Excel sheets of questions via email.
2. Admin uploads Excel files into the system.
3. System parses the sheets according to the BRD structure (Branch, Semester, Subject, Unit, Marks, Difficulty, Bloom's Taxonomy, etc.).
4. Questions are validated, converted, and stored in the central database.
5. Paper generation uses the stored data with rules (3 per unit, 40/40/20 difficulty distribution, Bloom's levels, etc.).

Deliverables:

- Database schema with tagging.
- Excel import pipeline with error handling.
- Question retrieval and randomization logic for paper generation.
- Admin dashboard for upload and verification.

Phase 2 – Faculty Portal & Direct Submission

Goal: Enable faculty to directly contribute and manage questions.

Workflow:

1. Teachers log in securely using their credentials.
2. Role-based access (faculty → add/review, reviewers → approve/reject, admin → manage users).
3. Faculty enter questions directly into a web interface (instead of Excel).
4. Built-in tagging UI for difficulty, Bloom's taxonomy, unit, and metadata.
5. Question approval workflow ensures quality and consistency.

Deliverables:

- Faculty-friendly frontend (login, add/edit questions).
- Reviewer workflow for approvals/rejections.
- Search & retrieval functionality.
- Role-based security.