MADDA WALABU UNIVERSITY

Online Examination System

TECHNICAL SUPPORT GUIDE

For ICT Staff, Administrators, and System Managers

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SCOPE OF THIS DOCUMENT

This guide is intended for ICT support staff, system administrators, and department managers at Madda Walabu University.

It covers: system architecture overview, Firebase configuration, common error resolution, user account management, Firestore data structure, browser requirements, and escalation procedures.

For student-facing issues, refer users to the Student Guide. For exam management issues, refer to the Lecturer Guide.

1. System Overview

1.1 Technology Stack

Component	Technology / Service
Frontend Framework	Next.js 14 (React) — deployed on Vercel
Hosting / Deployment	Vercel (automatic CI/CD from Git repository)
Authentication	Firebase Authentication (email/password)
Database	Firebase Firestore (NoSQL, real-time)
UI Components	shadcn/ui with Tailwind CSS
File Exports	SheetJS (xlsx) for Excel import/export
Live URL	https://v0-mwu-examination-system.vercel.app

1.2 Firestore Collections

The system uses the following top-level Firestore collections. All data is stored in Firebase's cloud infrastructure.

Collection	Contents & Key Fields
users	All registered accounts. Fields: uid, firstName, lastName, email, role (student/lecturer/hod/admin), department, departmentCode, studentId, createdAt
departments	University departments. Fields: name, code, head, headEmail, headUserId, description, status, createdAt
courses	Courses per department. Fields: name, code, lecturerId, departmentId, createdAt
questions	Lecturer question banks. Fields: text, type, difficulty, marks, courseId, courseCode, lecturerId, answer, options (MCQ only), chapter
exams	All examinations. Fields: title, courseId, courseCode, lecturerId, questionIds[], totalMarks, duration, startDate, endDate, status, settings{}, createdAt
results	Student submissions. Fields: examId, studentId, answers{}, score, totalMarks, passed, submittedAt

2. Firebase Configuration

2.1 Firebase Project Setup

The application connects to Firebase using environment variables. These must be set in Vercel's project settings for production.

Required Environment Variables (set in Vercel Dashboard → Settings → Environment Variables)

NEXT_PUBLIC_FIREBASE_API_KEY
NEXT_PUBLIC_FIREBASE_AUTH_DOMAIN
NEXT_PUBLIC_FIREBASE_PROJECT_ID
NEXT_PUBLIC_FIREBASE_STORAGE_BUCKET
NEXT_PUBLIC_FIREBASE_MESSAGING_SENDER_ID
NEXT_PUBLIC_FIREBASE_APP_ID

2.2 Firestore Security Rules

The following rules are recommended for production. They restrict data access by role and prevent unauthorised reads/writes.

Recommended Firestore Security Rules (Firebase Console → Firestore → Rules)

```
rules_version = '2';
service cloud.firestore {
  match /databases/{database}/documents {
    // Users: can read/write their own document; admins can read all
    match /users/{userId} {
      allow read, write: if request.auth.uid == userId;
      allow read: if get(/databases/$(database)/documents/users/$(request.auth.uid)).data.role ==
'admin';
    }
    // Departments: public read, admin write only
    match /departments/{id} {
      allow read: if request.auth != null;
      allow write: if get(/databases/$(database)/documents/users/$(request.auth.uid)).data.role ==
'admin';
    }
    // Questions & Exams: lecturers read/write their own
    match /questions/{id} {
      allow read: if request.auth != null;
      allow write: if request.auth.uid == resource.data.lecturerId || request.auth.uid ==
request.resource.data.lecturerId;
    }
    match /exams/{id} {
      allow read: if request.auth != null;
      allow write: if request.auth.uid == resource.data.lecturerId || request.auth.uid ==
request.resource.data.lecturerId;
    }
    // Results: students write their own; lecturers read
    match /results/{id} {
      allow create: if request.auth.uid == request.resource.data.studentId;
      allow read: if request.auth.uid == resource.data.studentId || request.auth != null;
    }
  }
}
```

3. Issue Classification & SLA

Use the following priority levels to triage incoming support requests.

Priority	Response Target	Examples

Critical	Immediate (< 1 hr)	Exam in progress that students cannot access; authentication system down; Firestore permissions blocking all writes
High	Same day (< 4 hrs)	Lecturer cannot create exam; results not saving; wrong role assigned to user account
Medium	Next business day	Question bank import failing; department list not appearing on registration; password reset emails not arriving
Low	Within 3 days	UI display issues; slow page load; incorrect user name/ID on profile

4. Common Issues & Resolutions

4.1 Authentication Problems

Issue	Resolution Steps
User cannot log in (correct credentials)	1. Verify the account exists in Firebase Console → Authentication → Users. 2. Check if the account is disabled. 3. Ask the user to use Forgot Password to reset.
Password reset email not received	1. Confirm the email address is correct in Firebase Auth. 2. Ask the user to check spam/junk folder. 3. In Firebase Console, resend the reset email manually.
Email already in use error on registration	The email is already registered. Direct the user to login or use Forgot Password. Do not create a duplicate account.
Wrong role assigned (e.g. student sees lecturer dashboard)	In Firebase Console → Firestore → users → find the document by uid → manually update the role field.
Lecturer registered with non-@mwu.edu.et email	The registration page rejects non-institutional emails for lecturers. If an exception is needed, create the account manually in Firebase Console.

4.2 Department & Course Problems

Issue	Resolution Steps
Registration page shows no departments	The departments collection in Firestore is empty or the security rules deny public read. Check Firestore → departments and your security rules.

Lecturer's courses don't appear when creating an exam	Check that the courses documents have a lecturerId field matching the lecturer's Firebase UID. The UID is in Firebase Auth, not the Employee ID.
HoD assignment not working	Verify the user's email in the users collection matches exactly what was entered in the department form. Check the role field was updated to 'hod'.
Department shows wrong student/lecturer count	The admin dashboard counts by filtering users by role. If counts are wrong, check users collection for documents missing the role field.

4.3 Question Bank Problems

Issue	Resolution Steps
Non-MCQ questions don't save	This was a known bug (options: undefined breaks Firestore). Ensure the latest version of question-bank/page.tsx is deployed — it conditionally omits the options field for non-MCQ types.
Excel import adds 0 questions	The Course column in the Excel file must exactly match a course code in Firestore. Check for typos, extra spaces, or case differences. Also verify the lecturer has courses assigned.
Duplicate question warning appears	The system checks for exact text matches. If the question is genuinely different, the lecturer can proceed past the warning. If it's a true duplicate, advise them to edit the original instead.
Questions don't appear in Create Exam	Questions are filtered by courseId. Confirm the question's courseId matches the course selected in the exam form. Check the Firestore document directly if needed.

4.4 Exam & Submission Problems

Issue	Resolution Steps
Exam selection checkboxes don't work	This was a known bug (double-toggle from div onClick + label). Ensure the latest version of create-exam/page.tsx is deployed.
Exam not visible to students	Check: (1) exam status is Active, not Scheduled; (2) exam startDate has passed; (3) student's courseId matches the exam's courseId.
Auto-submit did not trigger	Auto-submit is client-side. If the student closed the browser before time expired, it may not have fired. Check the results collection for a partial submission. Contact the lecturer to decide on re-sit policy.
Student submitted twice (one-attempt bypass)	The oneAttemptOnly flag is enforced client-side in this version. Check the results collection for duplicate entries with the same

	examId + studentId and remove the invalid one via Firestore Console.
Results not showing to student	Confirm: (1) the lecturer has released results (exam status = Graded); (2) showResults is enabled in exam settings; (3) the result document exists in the results collection.

5. User Account Management

5.1 Manually Creating an Admin Account

Admin accounts cannot be created through the registration page. Create them directly in Firebase.

- In Firebase Console, go to Authentication → Users → Add user. Enter the email and a temporary password.
- Copy the UID of the new user.
- In Firestore → users, create a new document with the UID as the document ID.
- Set the fields: firstName, lastName, email, role: 'admin', createdAt (timestamp).
- The user can then log in and reset their password via Forgot Password.

5.2 Resetting a User's Role

- Find the user in Firestore → users (search by email or scroll by uid).
- Click the role field and update it to the correct value: student, lecturer, hod, or admin.
- The change takes effect on the user's next login or page refresh.

5.3 Deleting a User Account

- Delete the user from Firebase Console → Authentication → Users (removes login access).
- Also delete or anonymise the corresponding document in Firestore → users to remove profile data.
- Decide whether to keep or delete the user's associated questions, exam results, and submissions.

> ⚠ **Data Retention**
> Deleting a user does NOT automatically delete their Firestore data (questions, results, submissions).
> You must manually remove or anonymise related documents if required by your data protection policy.

6. Browser & Device Requirements

Requirement	Specification
Supported browsers	Google Chrome 90+, Mozilla Firefox 90+, Microsoft Edge 90+, Safari 14+ (Mac/iOS)
Not supported	Internet Explorer (any version)
Minimum screen width	768px (tablet); 1024px recommended for lecturer/admin features
Internet connection	Minimum 2 Mbps stable connection. Unstable connections may cause exam submission failures.
JavaScript	Must be enabled. The system does not function without JavaScript.
Cookies	Must be enabled for Firebase Authentication session management.
Pop-ups	Must be allowed from the exam domain for dialog boxes (course change warnings, delete confirmations).

Recommended Student Setup for Exams

Device: Laptop or desktop computer (phones are functional but not recommended for essay questions).
Browser: Google Chrome (latest version) with all extensions disabled during the exam.
Connection: Wired ethernet preferred over Wi-Fi for stability during exam submissions.
Preparation: Close all other tabs and applications before beginning an exam.

7. Deployment & Updates

7.1 Deployment Process

- The application is deployed on Vercel from a Git repository (GitHub).
- Every push to the main branch triggers an automatic production deployment.
- Deployment status can be monitored at: https://vercel.com (log in with the project owner's account).
- If a bad deployment is pushed, use the Vercel dashboard to instantly roll back to the previous deployment.

7.2 Applying a Code Fix

- Code changes are made in the Next.js project source files (e.g. app/lecturer/create-exam/page.tsx).
- After editing, commit the change to Git and push to the main branch.
- Vercel automatically rebuilds and redeploys (typically within 60 seconds).
- Verify the fix at the production URL after deployment completes.
- Run a smoke test: register a test user, create a question, create an exam, and confirm the fixed behaviour.

8. Escalation Contacts

Issue Category	First Contact	Escalate To
Firebase Auth / Firestore	ICT Support Desk	Firebase Console admin or MWU ICT Director
Vercel deployment failures	ICT Support Desk	Vercel project owner / developer
Code bugs requiring a fix	ICT Support Desk	System developer / GitHub repository maintainer
Data privacy / GDPR concern	ICT Director	University Data Protection Officer
Exam integrity violation	Course lecturer	Academic Registrar / Dean of Faculty
System-wide outage	ICT Director	Vercel Status (status.vercel.com) + Firebase Status (status.firebase.google.com)

🚨 **Emergency Contact During Examinations**

If the system becomes unavailable DURING a live exam, ICT staff should:
1. Immediately check Vercel and Firebase status pages for outages.
2. Contact the relevant lecturer(s) to inform students and pause the exam if possible.
3. Document the exact time of failure and duration for academic record purposes.
4. After restoration, work with the lecturer to determine if affected students need a re-sit.
5. File an incident report with the ICT Director within 24 hours.