Admin Attendance Management Module – Clean Design Document

1. Purpose of the Module

The Attendance Module allows admins to:

- Track learner participation per session
- Control access to course content
- Enforce attendance-based rules (certificates, access limits)

Attendance is **always tied to a Batch and a Session**, never directly to a Course.

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2. Core Rule (Very Important)

Attendance = User + Batch + Session + Date

If any one of these is missing, the design is wrong.

4. Admin Flow (Step by Step)

Step 1: Select Course

Admin selects a course (read-only).

Step 2: Select Batch

Admin selects the batch under the course.

Why:

- Attendance rules differ per batch
- Same course can have multiple timelines

Step 3: Select Session (Date / Class)

Admin selects:

- Session date OR
- Specific live/recorded session

Attendance is **never monthly or bulk by default**.

Step 4: Mark Attendance

Admin sees list of enrolled users:

[✓] Present

[ ] Absent

Actions:

- Save attendance
- Edit attendance (if allowed)
- Lock attendance (optional)

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5. Frontend Screens (Admin)

5.1 Attendance Dashboard

Course → Batch → Session → Attendance Table

Filters:

- Date
- Session type
- Attendance status

5.2 Attendance Table (UI Fields)

Student Name

Email / ID

Attendance Status

Marked Time

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6. Attendance Rules (Business Logic)

Rule 1: One session = one attendance record per user

No duplicates.

Rule 2: Same-day multiple videos

If multiple videos exist on same day:

- Attendance is tracked **per session**
- OR aggregated (configurable)

Admin decision:

Any 1 video watched → Present

All videos watched → Present

This rule must be configurable.

Rule 3: Attendance-based access control

Examples:

- Miss 3 sessions → restrict next content
- Attendance < 75% → certificate blocked

These rules are enforced **after calculation**, not during marking.

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7. Attendance Percentage Calculation

attendance % =

(total PRESENT sessions / total sessions) * 100

Calculated:

- Per batch
- Per user

Never store percentage permanently. Always derive.

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8. Certificate Eligibility (Integration)

Certificate is generated only if:

- Course completed
- Batch completed
- Attendance ≥ required percentage (e.g., 75%)

Attendance module provides the data.
Certificate module consumes it.

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9. What Admin Can and Cannot Do

Admin CAN

- Mark / edit attendance
- View reports
- Export attendance
- Override status (if permitted)

Admin CANNOT

- Mark attendance without session
- Change attendance logic from frontend
- Bypass batch linkage

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11. One-Paragraph Summary (Use This in Docs / Interview)

“The attendance module is batch- and session-based. Admin selects a course, batch, and session to mark attendance per user. Attendance is stored per session and aggregated to calculate attendance percentage, which is later used for access control and certificate eligibility. All rules are enforced in backend, while frontend is responsible only for marking and display.”

practical design for **OFFLINE attendance management** in an LMS.
This is how it’s done in real institutes. No theory.

Offline Attendance Management – Admin Design

Core Principle

Offline attendance is still digital attendance.
Only the marking method is offline. Data stays online.

1. What “Offline” Means (Clear definition)

Offline =

- Physical classroom / lab / seminar
- No automatic tracking
- Attendance is **manually marked by admin or instructor**

Students never mark attendance themselves.

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2. Required Entities (No changes from online)

You still use the same tables:

Course → Batch → Session → Attendance

The only difference is **session type**.

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3. Session setup for Offline classes

When admin creates a session:

Session

- id

- batchId

- title

- sessionDate

- startTime

- endTime

- type = OFFLINE

- location // classroom / lab / hall

This single field (type = OFFLINE) controls behavior.

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4. Admin Flow (Offline)

Step 1: Select Course

Read-only.

Step 2: Select Batch

Mandatory.

Step 3: Create Offline Session

Admin enters:

- Date
- Time
- Location
- Topic

No video, no link.

Step 4: Mark Attendance (Manual)

Admin sees enrolled students list:

[✓] Present

[ ] Absent

Default:

- All ABSENT
- Admin marks PRESENT manually

Save → attendance locked.

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5. Bulk Attendance (Offline reality)

Offline classes often need **bulk marking**.

Allowed actions:

- Mark all PRESENT
- Mark selected ABSENT
- Upload Excel / CSV

Excel format:

StudentId | Status

101 | PRESENT

102 | ABSENT

Backend validates IDs.

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6. Late Entry / Early Exit (Optional but real)

If needed:

Attendance

- status // PRESENT | ABSENT | LATE

- remarks // "Late by 10 mins"

Do NOT overcomplicate unless required.

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7. Attendance Locking (Important)

After marking:

attendanceLocked = true

Why:

- Prevent tampering
- Required for audits
- Certificates depend on this

Only SUPER ADMIN can unlock.

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8. How Offline Affects Certificates

No difference.

Offline attendance is counted the same:

attendance % =

(PRESENT offline sessions + PRESENT online sessions)

/ total sessions

Backend does the math.

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9. Reports (Offline-specific)

Admin can view:

- Day-wise attendance
- Batch-wise summary
- Offline vs Online split

Example:

Batch A – Jan

Offline sessions: 12

Online sessions: 8

Attendance: 82

11. One-line explanation (Interview-ready)

“Offline attendance is managed by creating offline sessions and allowing admin or instructor to manually mark attendance per batch and session. Data is stored and processed the same way as online attendance.”

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12. Simple mental model (remember this)

Online = system marks

Offline = admin marks

Data = same

Rules = same

exactly how the system marks attendance automatically (ONLINE).
This is backend-driven. Frontend only sends events.

How the System Marks Attendance (Online)

Core idea

Attendance is marked by verified user activity, not by clicks.

If you mark attendance on button click, your system is weak.

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1. Prerequisites (must exist)

Before system can mark attendance, you must have:

Course → Batch → Session (ONLINE)

User enrolled in Batch

No session = no attendance.

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2. What the system tracks (signals)

The system listens to **events**:

Mandatory signals

- Session join time
- Session leave time
- User identity (auth token)
- Session ID

Optional (strong systems)

- Tab focus
- Heartbeat ping (every X seconds)
- Video progress %

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3. Live class attendance (Zoom / Meet / WebRTC)

Step-by-step

1. User clicks **Join Class**
2. Backend logs:
3. joinTime = now()
4. System tracks duration:
5. attendedMinutes = leaveTime - joinTime
6. Backend evaluates rule:
7. IF attendedMinutes >= requiredMinutes
8. → PRESENT
9. ELSE

10. → ABSENT

Example rule

requiredMinutes = 70% of session duration

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4. Recorded video attendance (most common)

Step-by-step

1. User opens video
2. Backend creates watch_session
3. Frontend sends progress events:
4. watchedSeconds
5. Backend calculates:
6. watchedPercentage
7. Rule applied:
8. IF watchedPercentage >= 80%
9. → PRESENT

No manual marking. No admin action.

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5. Backend attendance record creation

When rule passes:

Attendance

- userId

- batchId

- sessionId

- status = PRESENT

- markedBy = SYSTEM

- markedAt = now()

If rule fails after session ends:

status = ABSENT

6. Preventing cheating (important)

Real systems include:

- Heartbeat API (every 30–60 sec)
- Pause detection
- Seek skip detection
- Tab inactive timeout
- Multiple device blocking

If heartbeat stops → attendance invalid.

8. Hybrid override (admin + system)

Allowed flow:

System marks → Admin reviews → Affects certificate

Admin can override only with reason.

10. One-paragraph explanation (interview ready)

“For online sessions, attendance is marked automatically by tracking verified user activity such as join duration for live classes or watch percentage for recorded videos. Backend evaluates predefined thresholds and creates attendance records marked by the system. Frontend only sends events; all decisions happen in backend.”

11. Simple rule to remember

User activity → Backend validation → Attendance

If you want next:

- API endpoints
- DB tables for tracking
- exact thresholds
- React event code
- Spring Boot service logic

Say what to continue with.

For online class
Session duration: 60 min

Min required: 75% (45 min)

Student attended 52 min → Present

Student attended 20 min → Absent

Student joined after 15 min → Late

Correct approach for offline

1. Instructor conducts physical class
2. Instructor opens LMS → Session → Attendance
3. Instructor marks:
    - Present
    - Absent
    - Excused
4. Submits attendance
5. Admin can review later

Correct logic

- Online students → Auto attendance
- Offline students → Instructor marks manually
- Same session, different sources

source = AUTO (online)

source = MANUAL (offline)

no needof admin instructer trainer attendance

Student Attendance Form

Course Name

○ Introduction to A

○ Programming to B

○ Thesis C

Student Name

First Name

Last Name

Month

Please Select ▾

Date

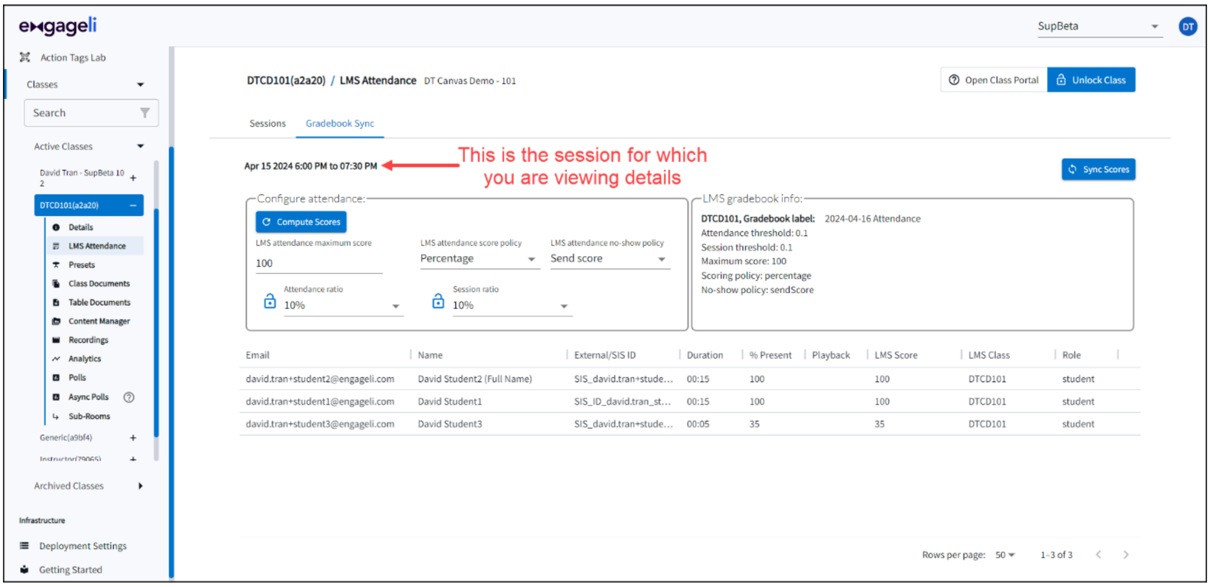
09/06/2024

Date

Status

○ Attended ○ Skipped

Record Attendance



DTCD101(a2a20) / LMS Attendance DT Canvas Demo - 101

Apr 15 2024 6:00 PM to 07:30 PM

This is the session for which you are viewing details

Configure attendance:

LMS attendance maximum score: 100

LMS attendance score policy: Percentage

LMS attendance no-show policy: Send score

Attendance ratio: 10%

Session ratio: 10%

LMS gradebook info:

DTCD101, Gradebook label: 2024-04-16 Attendance

Attendance threshold: 0.1

Session threshold: 0.1

Maximum score: 100

Scoring policy: percentage

No-show policy: sendScore

Email	Name	External/SIS ID	Duration	% Present	Playback	LMS Score	LMS Class	Role
david.tran+student2@engageli.com	David Student2 (Full Name)	SIS_david.tran+stude…	00:15	100		100	DTCD101	student
david.tran+student1@engageli.com	David Student1	SIS_ID_david.tran_st…	00:15	100		100	DTCD101	student
david.tran+student3@engageli.com	David Student3	SIS_david.tran+stude…	00:05	35		35	DTCD101	student