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## **CST688 Practical Training Management System (PTMS)**

### **Software Requirements Specification (SRS)**

**Version:** 1.0 • **Owner:** Program Coordinator (CST688) • **Prepared for:** UiTM Faculty/School

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#### **1. Executive Summary**

**Vision.** Provide a single portal to manage the full LI lifecycle—from eligibility and application to approvals, reporting duty, and completion—replacing scattered Google Forms/Classroom tracking and manual document handling.

#### **Primary Outcomes**

- One portal for **students, coordinators, and industry supervisors**.
- **Automated document generation** (SLI-01/03/04; BLI-03/04; DLI-01) from structured data.
- **Dashboards + review queues + notifications**.
- **Compliance** with personal data protection and secure file storage.

#### **Out of Scope (v1)**

- Timesheets/attendance logging.
  - Final internship *grading* workflow (optional in v2).
  - Complex SIS real-time integration (start with CSV import).
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#### **2. Stakeholders & Personas**

- **Students (UiTM)** – Apply, upload, track, download docs, submit reporting duty (BLI-04).
  - **LI Coordinator (Faculty)** – Configure session, review documents, approve, issue SLI-03, manage exceptions.
  - **Industry Supervisor (Company)** – Confirm reporting duty, fill/sign BLI-04.
  - **Admin/IT** – User/role management, integrations, backups, security and compliance.
  - **Program Head (optional)** – Read-only analytics.
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#### **3. Roles & Permissions (RBAC Matrix)**

Capability	Student	Coordinator	Supervisor	Admin	Program Head
Log in & view own data	✓	✓	✓	✓	✓

Capability	Student	Coordinator	Supervisor	Admin	Program Head
Create/submit application		✓			
Upload BLI-02/Offer Letter/BLI-03 HC	✓				
Generate SLI-01/SLI-04 (student triggered)	✓		✓ (override)		
Review/approve & issue SLI-03		✓			
Fill/sign BLI-04 (secure link)			✓		
Manage templates & sessions	✓			✓	
Manage users/roles/integrations			✓		
View analytics	Limited	✓		✓	✓
Access audit logs	Read		✓	Read	

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#### 4. Assumptions & Constraints

- **Eligibility rule:**  $\geq 113$  credits passed before applying (configurable).
  - Official LI dates follow **SLI-03** only.
  - LI beyond **14 weeks** requires explicit **risk acknowledgment**.
  - Institutional Google Workspace available (Drive, Classroom).
  - PDPA-compliant handling of personal data (purpose limitation, consent, retention).
  - System should be mobile-friendly; bandwidth constraints considered.
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#### 5. Functional Requirements

##### 5.1 Authentication & Identity

- FR-1: Support **UiTM SSO (OIDC/SAML)**; fallback email/password + MFA.
- FR-2: On first login, capture consent to PDPA notice and ToS.
- FR-3: Role assignment: Student / Coordinator / Supervisor / Admin / Program Head.
- FR-4: Session timeout and refresh tokens.

##### 5.2 Eligibility & Session Setup

- FR-5: Admin/Coordinator can create **Session** (year/semester, deadlines, minCredits (default 113), min/max weeks).

- FR-6: Eligibility data import via CSV (matricNo, creditsEarned, status).
- FR-7: Student dashboard shows **eligibility**; disables application if ineligible.

### 5.3 Application Wizard (Student)

- FR-8: **Step 1 – BLI-01** form (personal, academic, program, contact, internship preference).
  - Generate **SLI-01 (PDF)** from template.
- FR-9: **Step 2 – Upload BLI-02 or Offer Letter**.
  - File validation (PDF, JPG/PNG; ≤10 MB).
  - Enforce naming: [BLI-02] Full Name or [OfferLetter] Full Name.
- FR-10: **Step 3 – BLI-03 online + hardcopy** scan upload.
- FR-11: **Step 4 – Rejected Offer (optional)** → Generate **SLI-04** (template) and store.
- FR-12: **Step 5 – Download SLI-03 + DLI-01** package after approval.
- FR-13: **Step 6 – BLI-04** submission after reporting duty (e-sign support).
- FR-14: Attach **Study Plan** and **DLI-01** where required.

### 5.4 Document Management

- FR-15: Templates manager for **SLI-01/03/04, BLI-03/04, DLI-01** (versioned DOCX/PDF).
- FR-16: Merge fields mapping; stamp metadata (student name, matric, session, version).
- FR-17: Storage back-end (Google Drive or S3-compatible).
  - Folder per session → per student → /generated and /uploads.
- FR-18: Virus scan (if infra allows) and basic malware detection (MVP: MIME/type/size checks).
- FR-19: **Preview** PDFs/images inline.

### 5.5 Reviews & Approvals (Coordinator)

- FR-20: **Queues**: Pending Review, Changes Requested, Approved (Await SLI-03), Overdue.
- FR-21: **Review BLI-02/Offer Letter** → Approve or Request Changes (comment is mandatory).
- FR-22: Validate **BLI-03** (online + hardcopy) before approval.
- FR-23: **Issue SLI-03** (set official start/end dates); system bundles **DLI-01 + SLI-03** for student.
- FR-24: Handle **SLI-04** cases (rejected offers) and re-application loops.

### 5.6 Reporting Duty & Supervisor Portal

- FR-25: System issues a **secure link** for each supervisor (tokenized; expires; one-student scope).
- FR-26: Supervisor **confirms reporting duty** and **fills/signs BLI-04** (typed/drawn signature).
- FR-27: Coordinator verifies BLI-04; system marks **Reported** and locks SLI-03 dates.

## 5.7 Notifications & SLA

- FR-28: Email (and optional WhatsApp/SMS) for key events: submission received, changes requested, approval, SLI-03 ready, BLI-04 due, overdue reminders.
- FR-29: Reminder cadence: T-14, T-7, T-3, T-1 days to critical deadlines (configurable).
- FR-30: Escalations for items pending > N days (configurable) to coordinator.

## 5.8 Integrations

- FR-31: **Google Drive** (preferred); fallback local/S3.
- FR-32: **Google Classroom** enrollment verification (optional; soft rule).
- FR-33: Telegram link surfaced (Taklimat post).
- FR-34: Email gateway (institutional SMTP or service API).

## 5.9 Search, Reports & Exports

- FR-35: Full-text search across students, company names, document numbers.
- FR-36: Coordinator **analytics**: funnel (eligible → applied → approved → reported), exceptions.
- FR-37: **Exports**: CSV/XLSX of applications; ZIP “evidence package” per student.

## 5.10 Admin, Security & Audit

- FR-38: User, role, and session management; forced password reset.
- FR-39: **Audit log** for data changes, reviews, and template versions.
- FR-40: **Data retention** rules (e.g., 7 years); archival/export tooling.
- FR-41: PDPA banner and privacy notice; consent records.

## 6. Detailed Form Specifications (v1)

These reflect common data found on UiTM LI forms. Adjust the final list to match official templates.

### 6.1 BLI-01 (to generate SLI-01)

- **Student**: Full Name, Matric No, IC/Passport, Program, Faculty, Phone, UiTM Email.
- **Academic**: Credits Earned, CGPA, Session (e.g., March 2026), Campus.

- **Company (target/placed):** Name, Address, Industry, Supervisor Name, Email, Phone (optional at this stage).
- **Declarations:** Accuracy, PDPA consent (required).
- **Validations:** Required fields except optional company; email format; phone 10–15 digits.

#### **6.2 BLI-02 / Offer Letter Upload**

- File type PDF/JPG/PNG; ≤10 MB; must contain **company name, address, start date, end date/scope**.
- Auto OCR checks (optional later); MVP: Coordinator checks completeness.

#### **6.3 BLI-03 (Online) + Hardcopy**

- **Inputs:** Company Details (definitive), Supervisor Contact, Internship Period, Role/Tasks summary, Emergency Contact.
- **Validations:** Dates must be within session window; start < end; phone/email formats.

#### **6.4 SLI-03 (Issued)**

- Generated by coordinator after approval. **Fields:** official LI dates, company, student info, coordinator signature block.
- Immutable after issue (version locked).

#### **6.5 BLI-04 (Reporting Duty)**

- Supervisor confirms first-day reporting, signs (typed/drawn), date, remarks.
- Student countersigns (optional, if required by faculty).
- E-sign image embedded, with signer's name and timestamp.

#### **6.6 SLI-04 (Rejection Notice)**

- Student selects company; system fills template; unique reference number; auto-file naming.

#### **6.7 DLI-01 & Study Plan**

- DLI-01 attached in package; Study Plan uploaded by student; both required before SLI-03 package download.

### **7. Workflows & State Machines**

#### **7.1 Application States**

DRAFT → SUBMITTED → UNDER\_REVIEW → APPROVED → SLI\_03\_ISSUED → REPORTED (BLI-04) → COMPLETED

Branches: CHANGES\_REQUESTED, OFFER\_REJECTED (SLI-04), REJECTED.

#### **7.2 Key Business Rules**

- BR-1: **Eligibility** needed to unlock application (defaults to 113 credits).
  - BR-2: Can't proceed to Step 5 until **BLI-03 online + hardcopy** are submitted and **coordinator approves**.
  - BR-3: Official dates **always** from **SLI-03**.
  - BR-4: **>14 weeks** requires acknowledgment checkbox + statement shown to student.
  - BR-5: Coordinator can rollback from SLI\_03\_ISSUED only by creating a **new version** (audit required).
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## 8. Data Model (Conceptual)

### Entities

- User(id, name, email, role, matricNo, program, phone)
- Eligibility(userId, creditsEarned, isEligible, checkedOn, source)
- Session(id, name, year, semester, deadlinesJSON, minCredits, minWeeks, maxWeeks)
- Application(id, userId, sessionId, companyId, status, startDate, endDate, agreedBeyond14Weeks:boolean, createdAt, updatedAt)
- Company(id, name, address, industry, contactName, contactEmail, contactPhone)
- Document(id, applicationId, typeEnum, fileUrl, version, signedBy, signedAt, status)
- FormResponse(id, applicationId, formTypeEnum, payloadJSON, submittedAt, verifiedBy)
- Review(id, applicationId, reviewerId, decisionEnum, comments, decidedAt)
- Notification(id, userId, type, channel, payloadJSON, sentAt, status)
- AuditLog(id, actorId, action, resourceType, resourceId, beforeJSON, afterJSON, timestamp)

### Enums

- DocumentType = {SLI\_01, SLI\_03, SLI\_04, BLI\_02, BLI\_03, BLI\_03\_HARDCOPY, BLI\_04, DLI\_01, OFFER\_LETTER, STUDY\_PLAN}
  - Decision = {APPROVE, REQUEST\_CHANGES, REJECT}
  - Channel = {IN\_APP, EMAIL, WHATSAPP, SMS}
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## 9. API Contract (High-Level)

REST; all endpoints require auth unless noted; JSON; application/json.

- POST /auth/login (if not SSO)
- GET /me

- GET /eligibility/:userId

## **Applications**

- POST /applications → create (returns applicationId)
- GET /applications/:id → detail
- PATCH /applications/:id → update status/fields
- POST /applications/:id/forms/bli-01 → save BLI-01 (payload JSON)
- POST /applications/:id/documents?type=BLI\_02|OFFER\_LETTER|BLI\_03\_HARDCOPY|... (multipart)
- POST /applications/:id/generate/sli-01 → returns Document
- POST /applications/:id/generate/sli-03 (coordinator only)
- POST /applications/:id/generate/sli-04
- POST /applications/:id/submit/bli-03
- POST /applications/:id/submit/bli-04 (supervisor signed payload or file)

## **Reviews**

- GET /reviews?status=UNDER REVIEW
- POST /reviews/:applicationId/decision (APPROVE/REQUEST\_CHANGES/REJECT + comment)

## **Reports & Exports**

- GET /reports/cohort?sessionId=...
- GET /exports/applications.csv
- GET /applications/:id/evidence.zip

## **10. Non-Functional Requirements (NFRs)**

### **Security**

- TLS 1.2+; strong password policy or SSO.
- RBAC with least privilege; short-lived JWT + refresh tokens.
- Encrypt PII at rest; secrets in managed vault.
- OWASP Top 10 enforced; file upload scanning.

### **Privacy & Compliance**

- PDPA (Malaysia) principles: consent, purpose limitation, data minimization, retention schedule, data subject rights.
- Consent banner on first login; privacy notice accessible.

## Performance

- P95 page load < **2.5s** (Wi-Fi); P95 doc generation < **5s**.
- Concurrency target: **200+** users; queue workers for heavy tasks.

## Availability

- Uptime **99.5%** during intake windows.
- Nightly backups; DR runbook; RPO ≤ 24h; RTO ≤ 8h.

## Usability & Accessibility

- Mobile-friendly; **WCAG 2.1 AA** (labels, contrast, keyboard nav).
- Localization: **English / Malay**; date/time/number formats localized.

## Observability

- Request logs, error tracking, metrics (APM).
  - Audit trail for all changes to application or documents.
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## 11. Integrations (Details)

- **Google Drive:**
  - Folder structure: /PTMS/{SESSION}/{MATRIC}-{NAME}/uploads/generated.
  - Share permissions: private to system service account; public links disabled by default.
- **Google Classroom** (optional MVP):
  - Store classroom code; allow manual “I’m enrolled” if API isn’t granted yet.
- **Email/WhatsApp:**
  - Institutional SMTP or a service API (e.g., SendGrid), WhatsApp Business API (consent-based).

## Fallbacks

- If Drive fails: temporary local storage → retry queue.
  - If Classroom not available: portal banner with enrollment instructions.
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## 12. Deployment & Environments

- **Stack (suggested):**
  - Frontend: **Next.js (React + TS)**, Tailwind, React Hook Form + Zod.
  - Backend: **Node.js (NestJS) or .NET 8 Web API** (either is fine); Prisma/EF Core.
  - DB: **PostgreSQL**; Redis for queues.

- Storage: Google Drive API (or S3-compatible).
  - CI/CD: GitHub Actions; containerized with Docker; deploy to Azure App Service or AWS ECS/Fargate.
  - **Environments:** Dev → Staging → Prod (with separate DBs & storage buckets).
  - **Secrets:** Managed via Azure Key Vault/AWS Secrets Manager.
  - **Versioning:** SemVer for app; templates versioned per session.
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### 13. Testing Strategy

- **Unit tests** for validation, utilities, and API handlers.
- **Integration tests** for document generation and uploads.
- **E2E tests** (Playwright/Cypress) for student/coordinator flows.
- **UAT** checklist with real templates and dummy data.
- **Accessibility tests** (axe-core).
- **Browser/device matrix:** Chrome/Edge/Firefox; iOS Safari; Android Chrome.

### Acceptance Criteria (examples)

- AC-01: Ineligible students (credits < minCredits) cannot create an application; see guidance card.
  - AC-02: BLI-02 upload enforces type/size and stores with normalized file name.
  - AC-03: Coordinator can issue SLI-03 only after BLI-02 & BLI-03 are present and valid.
  - AC-04: Student receives email within 60 seconds after SLI-03 issuance.
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### 14. Operations & Runbook

- **Daily:** Review error logs; check failed jobs; verify email queue is empty.
  - **Weekly:** Template/version audit; storage quota check; backup verification.
  - **Monthly:** Access review; delete expired supervisor links.
  - **Retention:** Archive session data after 12 months; purge PII after **7 years** (configurable).
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### 15. Migration Plan (from Current Setup)

#### Phase 0 (Bridge)

- Continue Google Forms this cycle; **import responses nightly**.
- Save uploads to Drive using system structure.

#### Phase 1 (MVP)

- Native BLI-01, BLI-02 uploads, BLI-03 online + HC, SLI-01/03 generation, BLI-04.
- Coordinator console, email notifications.

## Phase 2

- e-Sign, Classroom verification, WhatsApp reminders, analytics.

## Phase 3

- SIS credits API (replace CSV), evaluations, certificates.
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## 16. Success Metrics (KPIs)

- 90%+ of students complete **all steps** without manual coordinator intervention.
  - 50% reduction in coordinator processing time per application.
  - SLA: 95% of notifications delivered < 2 minutes.
  - <1% failed document generations per session.
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## 17. Risks & Mitigations

- **Google API quotas** → Queue + retries; nightly backoff; caching.
  - **Template drift** → Lock template per session; checksum; change log.
  - **Privacy breaches** → Strict RBAC; no public links; audit logs.
  - **Peak load** → Horizontal scale; background workers for PDF/zip.
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## 18. Delivery Plan for the Intern (10 Weeks)

1. **W1:** Requirements, sitemap, ERD, clickable prototype.
  2. **W2:** Auth + RBAC + shell dashboards.
  3. **W3:** Application Wizard Steps 1–2 + SLI-01 gen + uploads.
  4. **W4:** Step 3 + review queues (BLI-02/03).
  5. **W5:** SLI-03 issuance + packaging + Drive integration.
  6. **W6:** Supervisor portal + BLI-04 e-sign + verify.
  7. **W7:** Notifications + reminders + basic analytics.
  8. **W8:** Hardening (validation, edge cases, >14 weeks ack).
  9. **W9:** Tests (unit/integration/E2E), accessibility pass.
  10. **W10:** Docs, deployment, handover & training.
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## **19. Glossary**

- **BLI** – Borang Latihan Industri (application forms).
  - **SLI** – Surat Latihan Industri (official letters).
  - **DLI** – Dokumen Latihan Industri (supporting docs).
  - **HC** – Hardcopy (scanned).
  - **PDPA** – Personal Data Protection Act (Malaysia).
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## **20. Appendices**

### **A. Field Validation Cheatsheet**

- **Email:** RFC 5322 pattern; **Phone:** ^[0-9+()\\-\\s]{10,15}\$
- **Dates:** ISO 8601; startDate < endDate; within session.
- **Files:** PDF/JPG/PNG; ≤10 MB; antivirus scan if infra provides.

### **B. File Naming Conventions**

- Generated: SLI-01\_{Matric}\_{Name}\_v{n}.pdf
- Uploads: [BLI-02] {Name}.pdf / [OfferLetter] {Name}.pdf
- Packages: PTMS\_{Matric}\_{Name}\_SLI-03\_Package.zip

### **C. Notification Templates (EN / BM)**

- **Subject:** CST688: Your SLI-03 is ready
  - **Body (EN):** “Hi {Name}, your SLI-03 has been issued. Download your package here: {link}. Official dates: {start}–{end}.”
  - **Body (BM):** “Salam {Name}, SLI-03 anda telah dikeluarkan. Muat turun di: {link}. Tarikh rasmi: {start}–{end}.”
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