ERD Breakdown: National In-Service Training Database

1. Lookup Tables

Lookup tables define reference data for consistent usage across the system.

- **regions**
  - Primary key: id (e.g., "northern").
  - Attributes: name.
  - Purpose: Represents geographical regions where formations and sessions are located.
- **formations**
  - Primary key: id (e.g., "corozal").
  - Foreign key: region_id → regions.id.

- ○ Attributes: name.
- ○ Purpose: Subdivision within a region, linked back to a region.
- **postings**
  - ○ Primary key: id (e.g., "CIB").
  - ○ Attributes: name.
  - ○ Purpose: Current assignment/department of an officer or facilitator.
- **ranks**

  - ○ Primary key: code (e.g., "INSP").
  - ○ Attributes: name.
  - ○ Purpose: Defines police officer ranks for consistent classification.

2. Core Entities

- **users**
  - ○ Primary key: id.
  - ○ Attributes: email (unique), password_hash, role (enum: admin/contributor/viewer), timestamps.
  - ○ Purpose: Represents system users who manage courses, import data, or administer the system.
- **officers**
  - ○ Primary key: id.
  - ○ Attributes: regulation_number (unique, optional), first_name, last_name, sex, timestamps.
  - ○ Foreign keys:
    - ■ rank_code → ranks.code
    - ■ region_id → regions.id
    - ■ formation_id → formations.id
    - ■ posting_id → postings.id
  - ○ Purpose: Stores personnel/officer records participating in courses.
- **courses**
  - ○ Primary key: id.
  - ○ Attributes: title, category (enum: mandatory/elective/instructor), default_credit_hours, description.
  - ○ Foreign key: created_by_user_id → users.id.
  - ○ Purpose: Defines training courses.
- **sessions**
  - ○ Primary key: id.
  - ○ Attributes: start_datetime, end_datetime, location_text, facilitator_notes, credit_hours_override.
  - ○ Foreign keys:
    - ■ course_id → courses.id
    - ■ region_id → regions.id (nullable)
    - ■ formation_id → formations.id

- - ■ posting_id → postings.id

    - ○ Purpose: Specific offerings of courses (scheduled events).
- **facilitators**
    - ○ Primary key: id.
    - ○ Attributes: first_name, last_name, notes.
    - ○ Foreign keys:
        - ■ officer_id → officers.id (nullable: facilitator may or may not be an officer).
        - ■ rank_code → ranks.code
        - ■ posting_id → postings.id
    - ○ Purpose: Instructors for sessions, either officers or external personnel.
- **attendance** *(junction table)*
    - ○ Primary key: id.
    - ○ Attributes: status (enum: attended/absent/excused), credited_hours, timestamps.
    - ○ Foreign keys:
        - ■ officer_id → officers.id
        - ■ session_id → sessions.id
    - ○ Constraint: UNIQUE(officer_id, session_id) prevents duplicate attendance records.
    - ○ Purpose: Tracks which officers attended which sessions and hours credited.
- **import_jobs**
    - ○ Primary key: id.
    - ○ Attributes: type (officers|courses|attendance), status (pending|running|failed|completed), error_message, timestamps.
    - ○ Foreign key: created_by_user_id → users.id.
    - ○ Purpose: Tracks batch data import operations initiated by users.

3. Junction Entities

- **session_facilitators** *(junction table)*
    - ○ Primary key: id.
    - ○ Foreign keys:
        - ■ session_id → sessions.id
        - ■ facilitator_id → facilitators.id
    - ○ Attributes: role (e.g., lead, assistant).
    - ○ Purpose: Allows sessions to have multiple facilitators, and facilitators to be assigned to multiple sessions.

- **session_feedback (junction table)**
    - ○ Primary key: id.
    - ○ Foreign keys:
        - ■ session_id → sessions.id

- - ■ facilitator_id → facilitators.id
    - ■ officer_id → officers.id
  - ○ Attributes:
    - ■ rating (numeric, e.g., 1.0–5.0)
    - ■ comments (optional text feedback)
    - ■ created_at (timestamp)
  - ○ **Purpose:** Enables officers who attend a session to provide feedback on specific facilitators. This design supports performance tracking and reporting by allowing each facilitator's average rating to be calculated over time.

4. Relationships Summary

- **Regions** have many **formations**, and may contain officers or sessions.
- **Formations** belong to one region, and can have officers or sessions.
- **Postings** categorize both officers and facilitators.
- **Ranks** apply to officers and facilitators.
- **Users** create courses and import jobs.
- **Courses** contain multiple sessions.
- Sessions occur in specific regions/formations/postings, and can have multiple facilitators (through the session_facilitators junction table).
- **Officers** attend sessions (through attendance).
- Facilitators may or may not be officers, but are linked through session_facilitators.
- **Officers** can rate facilitators for each session (through session_feedback).

5. Normalization & Constraints

- **1NF**: All attributes are atomic (no repeating groups).
- **2NF**: Composite keys avoided; all non-key attributes depend fully on the primary key.
- **3NF**: No transitive dependencies; e.g., region_id in formations prevents duplication of region data.
- **Constraints**:
    - Foreign keys enforce referential integrity (officers must belong to valid rank, formation, etc.).
    - Unique constraints prevent duplicate officer attendance or duplicate course creator emails.
    - Nullable FKs (e.g., facilitator may not have officer_id) allow flexibility.
    - Ratings use numeric validation (1–5) to ensure consistent scoring.