Entity Relationship Diagram-document

Name of database - Learning Recommendation System

Database Description:

This database contains 8 tables.

A. Tables and Attributes with Constraints

1. Users (ag_USERS)

- **Primary Key:** `ag_user_id (INT, PRIMARY KEY)`
- **Attributes:**
    - `ag_USER_first_name (VARCHAR(50), NOT NULL)` – Stores the first name of the user.
    - `ag_USER_last_name (VARCHAR(50), NULL)` – Stores the last name (optional).
    - `ag_USER_email (VARCHAR(60), UNIQUE, NOT NULL)` – Stores a unique email ID.
    - `ag_USER_preferences (VARCHAR(100), NULL)` – Stores user preferences.
    - `ag_USER_signup_date (DATE, NULL)` – Stores the signup date.
- **Description: Stores information about users of the platform.**

- **Relationships:**

- ○ **One-to-many with** `ag_COURSE_OUTLINES`, `ag_COMPLETION_RECORDS`, `ag_REVIEWS`, **and** `ag_RECOMMENDATIONS`.

2. Categories (ag_CATEGORIES)

- **Primary Key:** `ag_CATEGORY_ID (INT, PRIMARY KEY)`
- **Attributes:**
  - ○ `ag_CATEGORY_name (VARCHAR(50), UNIQUE, NOT NULL)` – Stores the category name.
  - ○ `ag_CATEGORY_DESCRIPTION (TEXT, NULL)` – Stores a detailed category description.
- **Description: Represents course categories for classification purposes.**
- **Relationships:**
  - ○ **One-to-many with** `ag_COURSES`.

3. Courses (ag_COURSES)

- **Primary Key:** `ag_COURSE_ID (INT, PRIMARY KEY)`
- **Attributes:**
  - ○ `ag_COURSE_NAME (VARCHAR(255), NOT NULL)` – Stores the course name.
  - ○ `ag_CATEGORY_ID (INT, NULL, FOREIGN KEY →` `ag_CATEGORIES(ag_CATEGORY_ID))` – Links courses to categories.
  - ○ `ag_COURSE_RATING (DECIMAL(3,2), CHECK BETWEEN 0 AND 5, NULL)` – Stores course rating between 0 and 5.
- **Description: Stores details of courses available for recommendation.**
- **Relationships:**
  - ○ **Many-to-one with `Categories`.**
  - ○ **One-to-many with** `ag_COMPLETION_RECORDS`, `ag_REVIEWS`, `ag_RECOMMENDATIONS`, **and** `ag_OUTLINE_RECOMMENDATIONS` .

4. Reviews (ag_REVIEWS)

- **Primary Key:** `ag_REVIEW_ID (INT, PRIMARY KEY)`
- **Attributes:**
    - `ag_USER_ID (INT, NOT NULL, FOREIGN KEY →` `ag_USERS(ag_user_id) ON DELETE CASCADE)` – Links review to a user.
    - `ag_COURSE_ID (INT, NOT NULL, FOREIGN KEY →` `ag_COURSES(ag_COURSE_ID) ON DELETE CASCADE)` – Links review to a course.
    - `ag_REVIEW_RATING (INT, CHECK BETWEEN 1 AND 5, NOT NULL)` – Stores rating between 1 and 5.
    - `ag_REVIEW (TEXT, NULL)` – Stores the review text.
- **Description: Stores user reviews and ratings for courses.**
- **Relationships:**
    - **Many-to-one with** `ag_USERS`**.**
    - **Many-to-one with** `ag_COURSES`**.**

5. Completion Records (ag_COMPLETION_RECORDS)

- **Primary Key:** `ag_RECORD_ID (INT, PRIMARY KEY)`
- **Attributes:**
    - `ag_USER_ID (INT, NOT NULL, FOREIGN KEY →` `ag_USERS(ag_user_id) ON DELETE CASCADE)` – Links to a user.
    - `ag_COURSE_ID (INT, NOT NULL, FOREIGN KEY →` `ag_COURSES(ag_COURSE_ID) ON DELETE CASCADE)` – Links to a course.
    - `ag_COMPLETION_DATE (DATE, NULL)` – Stores course completion date.
    - `ag_PROGRESS_PERCENTAGE (DECIMAL(5,2), CHECK BETWEEN 0 AND 100, NULL)` – Progress in percentage.
- **Description: Tracks course progress or completion status for users.**
- **Relationships:**
    - **Many-to-one with** `ag_USERS`**.**
    - **Many-to-one with** `ag_COURSES`**.**

6. Course Outlines (ag_COURSE_OUTLINES)

- **Primary Key:** `ag_OUTLINE_ID (INT, PRIMARY KEY)`
- **Attributes:**
  - `ag_USER_ID (INT, NOT NULL, FOREIGN KEY →` `ag_USERS(ag_user_id) ON DELETE CASCADE)` – Links outline to a user.
  - `ag_COURSE_OUTLINE_CONTENT (TEXT, NOT NULL)` – Stores outline content.
- **Description: Stores course outlines uploaded by users.**
- **Relationships:**
  - **Many-to-one with** `ag_USERS`**.**
  - **One-to-many with** `ag_OUTLINE_RECOMMENDATIONS` **.**

7. Recommendations (ag_RECOMMENDATIONS)

- **Primary Key:** `ag_RECOMMENDATION_ID (INT, PRIMARY KEY)`
- **Attributes:**
  - `ag_USER_ID (INT, NOT NULL, FOREIGN KEY →` `ag_USERS(ag_user_id) ON DELETE CASCADE)` – Links recommendation to a user.
  - `ag_COURSE_ID (INT, NOT NULL, FOREIGN KEY →` `ag_COURSES(ag_COURSE_ID) ON DELETE CASCADE)` – Links recommendation to a course.
  - `ag_RECOMMENDATION_LOGIC (TEXT, NOT NULL)` – Stores recommendation logic.
- **Description: Represents recommendations provided to users based on their preferences and history.**
- **Relationships:**
  - **Many-to-one with** `ag_USERS`**.**
  - **Many-to-one with** `ag_COURSES`**.**

8. Outline Recommendations (ag_OUTLINE_RECOMMENDATIONS)

- **Primary Key:** `ag_RECOMMENDATION_ID (INT, PRIMARY KEY, AUTO_INCREMENT)`
- **Attributes:**
  - `ag_OUTLINE_ID (INT, NOT NULL, FOREIGN KEY → ag_COURSE_OUTLINES(ag_OUTLINE_ID) ON DELETE CASCADE)` – Links recommendation to an outline.
  - `ag_COURSE_ID (INT, NOT NULL, FOREIGN KEY → ag_COURSES(ag_COURSE_ID) ON DELETE CASCADE)` – Links recommendation to a course.
  - `ag_MATCH_SCORE (DECIMAL(5,2), CHECK BETWEEN 0 AND 100, NULL)` – Stores matching score percentage.
- **Description: Represents recommendations based on user-uploaded course outlines.**
- **Relationships:**
  - **Many-to-one with** `ag_COURSE_OUTLINES`
  - **Many-to-one with** `ag_COURSES`.

B. Relationships in Detail

1. **Users → Reviews (1:M)**

   - A **User** can write multiple **Reviews**, but each **Review** belongs to only one **User**.
   - **Foreign Key:** `ag_USER_ID` in `ag_REVIEWS` references `ag_USERS.ag_user_id`.
2. **Users → CompletionRecords (1:M)**

   - A **User** can complete multiple **Courses**, but each **CompletionRecord** belongs to only one **User**.
   - **Foreign Key:** `ag_USER_ID` in `ag_COMPLETION_RECORDS` references `ag_USERS.ag_user_id`.
3. **Users → Recommendations (1:M)**

   - A **User** can receive multiple **Course Recommendations**, but each **Recommendation** is linked to only one **User**.
   - **Foreign Key:** `ag_USER_ID` in `ag_RECOMMENDATIONS` references `ag_USERS.ag_user_id`.

4. **Courses → Reviews (1:M)**

   ○ A **Course** can have multiple **Reviews**, but each **Review** is linked to only one **Course**.
   ○ **Foreign Key:** `ag_COURSE_ID` in `ag_REVIEWS` references `ag_COURSES.ag_COURSE_ID`.

5. **Courses → CompletionRecords (1:M)**

   ○ A **Course** can be completed by multiple **Users**, but each **CompletionRecord** is linked to only one **Course**.
   ○ **Foreign Key:** `ag_COURSE_ID` in `ag_COMPLETION_RECORDS` references `ag_COURSES.ag_COURSE_ID`.

6. **Courses → Recommendations (1:M)**

   ○ A **Course** can be recommended to multiple **Users**, but each **Recommendation** is linked to only one **Course**.
   ○ **Foreign Key:** `ag_COURSE_ID` in `ag_RECOMMENDATIONS` references `ag_COURSES.ag_COURSE_ID`.

7. **Categories → Courses (1:M)**

   ○ A **Category** can have multiple **Courses**, but each **Course** belongs to only one **Category**.
   ○ **Foreign Key:** `ag_CATEGORY_ID` in `ag_COURSES` references `ag_CATEGORIES.ag_CATEGORY_ID`.

8. **Users → CourseOutlines (1:M)**

   ○ A **User** can create multiple **Course Outlines**, but each **Outline** is linked to only one **User**.
   ○ **Foreign Key:** `ag_USER_ID` in `ag_COURSE_OUTLINES` references `ag_USERS.ag_user_id`.

9. **CourseOutlines → OutlineRecommendations (1:M)**

   ○ A **Course Outline** can have multiple **Outline Recommendations**, but each **Recommendation** is linked to only one **Outline**.
   ○ **Foreign Key:** `ag_OUTLINE_ID` in `ag_OUTLINE_RECOMMENDATIONS` references `ag_COURSE_OUTLINES.ag_OUTLINE_ID`.

10. **Courses → OutlineRecommendations (1:M)**

● A **Course** can be linked to multiple **Outline Recommendations**, but each **Recommendation** is tied to only one **Course**.
● **Foreign Key:** `ag_COURSE_ID` in `ag_OUTLINE_RECOMMENDATIONS` references `ag_COURSES.ag_COURSE_ID`.