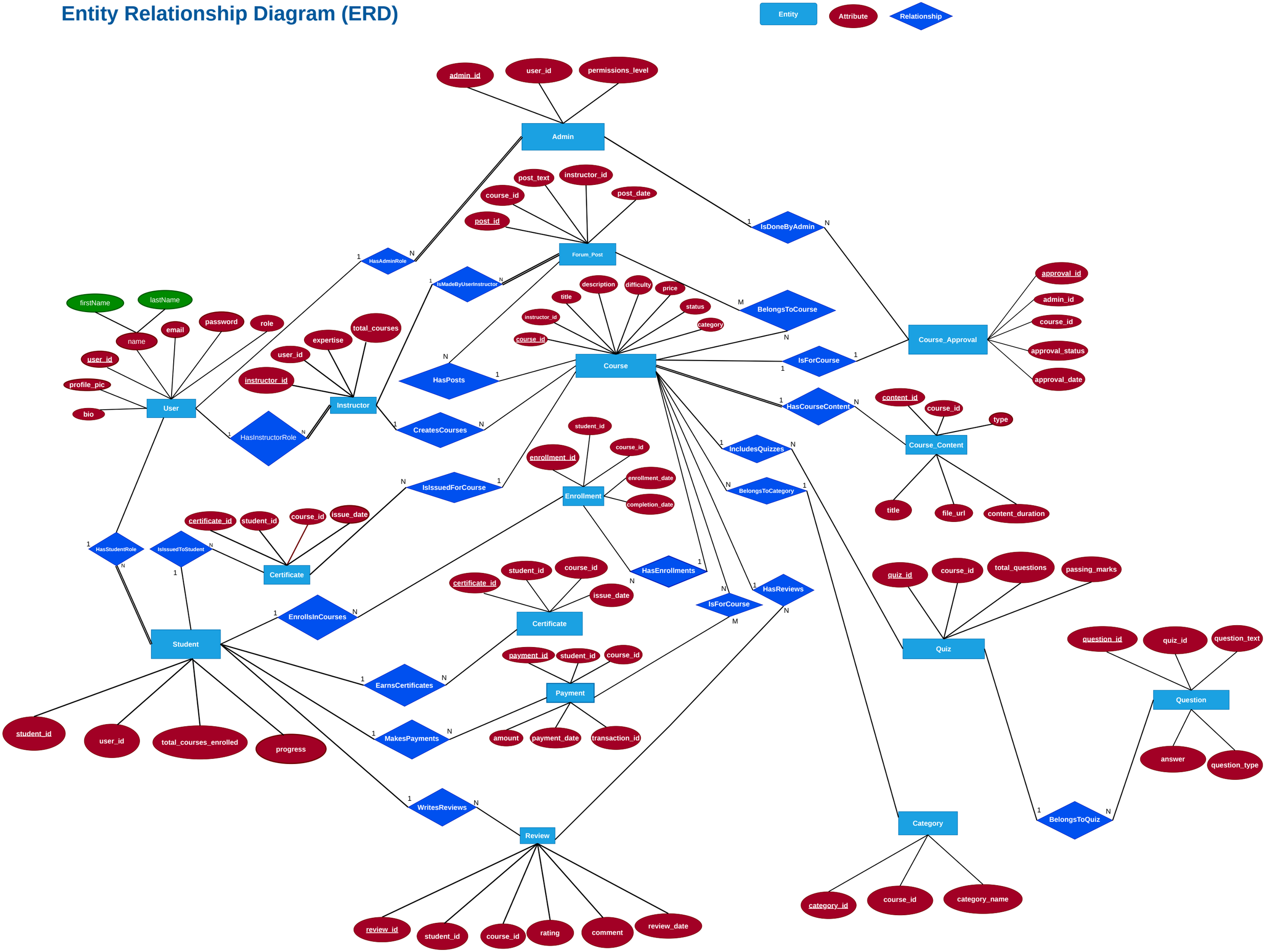
Department of Electrical & Computer Engineering
CSE 311 Database Systems
Semester: Summer'24
Section:10

UPDATE-1

Project Name: SkillPro - CS Knowledge Hub

S.M Karimul Hassan ID: 2212688642 Update: Entity Relationship Diagram (ERD)	**Submitted To** **Tushar Basak** **Lab Instractor** **Department of Electrical & Computer Engineering**
Shahriar Jaman ID: 2231236042 Update: ERD to Relational Mapping	

Entity Relationship Diagram (ERD)



ERD to Relational Mapping by using a mapping algorithm

FOREIGN KEY

PRIMARY KEY

Course_content

content_id	course_id	type	title	file_url	content_duration

Question

question_id	quiz_id	question_text	question_type	answer

Quiz

quiz_id	course_id	total_questions	passing_marks

Category

category_id	course_id	category_name

Payment

payment_id	student_id	course_id	amount	payment_date	transaction_id

Forum_For_Course

post_id	course_id

Forum_Post

post_id	course_id	post_text	instructor_id	post_date

Course_Approval

approval_id	admin_id	course_id	approval_status	approval_date

User

user_id	firstName	lastName	email	password	role	profile_pic	bio

Course

course_id	instructor_id	title	description	difficulty	price	status	category

Instructor

instructor_id	user_id	expertise	total_courses

Review

review_id	student_id	course_id	rating	comment	review_date

Certificate

certificate_id	student_id	course_id	issue_date

Enrollment

enrollment_id	student_id	course_id	enrollment_date	completion_date

Student

student_id	user_id	total_courses_enrolled	progress

Admin

admin_id	user_id	permissions_level

Why Further Normalization is Unnecessary

The current database design does not require further normalization for the following reasons:

1. Minimal Redundancy: The entities in the database, such as User, Instructor, and Student, are organized to avoid data duplication. For instance, user information (e.g., name, email) is stored only once in the User table and is referenced via foreign keys in related tables like Instructor and Student. This minimizes redundancy and improves data management efficiency.
2. Logical Structure: The database schema is structured in a way that ensures clear relationships between entities. Foreign keys are used to maintain the relationships between tables, such as the connection between User and Instructor or Course and Student. This ensures that data is organized logically and is easy to retrieve through well-defined relationships.
3. Optimized Query Performance: The current schema allows for efficient querying without unnecessary repetition of data. For example, retrieving all courses created by a specific instructor or all courses a student is enrolled in can be done without redundant data being stored in multiple places.
4. Data Consistency: By using foreign keys to link related entities, the risk of data inconsistency is reduced. All related data (such as user details, course information, and enrollments) are managed through relationships between tables, ensuring data integrity.

Given these factors, the database design already adheres to the principles of normalization, ensuring that it is both efficient and consistent. Therefore, further normalization is unnecessary in this case.

Database Table Structure for SkillPro Online Learning Platform

1.User

user_id	firstName	lastName	email	password	role	profile_pic	bio

2.Instructor

instructor_id	user_id	expertise	total_courses

3.Student

student_id	user_id	total_courses_enrolled	progress

4.Course

course_id	instructor_id	title	description	difficulty	price	status	category

5. Course_content

content_id	course_id	type	title	file_url	content_duration

6. Category

category_id	course_id	category_name

7. Quiz

quiz_id	course_id	total_questions	passing_marks

8. Question

question_id	quiz_id	question_text	question_type	answer

9.Certificate

certificate_id	student_id	course_id	issue_date

10. Enrollment

enrollment_id	student_id	course_id	enrollment_date	completion_date

11. Payment

payment_id	student_id	course_id	amount	payment_date	transaction_id

12. Review

review_id	student_id	course_id	rating	comment	review_date

13. Admin

admin_id	user_id	permissions_level

14. Course_Approval

approval_id	admin_id	course_id	approval_status	approval_date

15. Forum_Post

post_id	course_id	post_text	instructor_id	post_date