

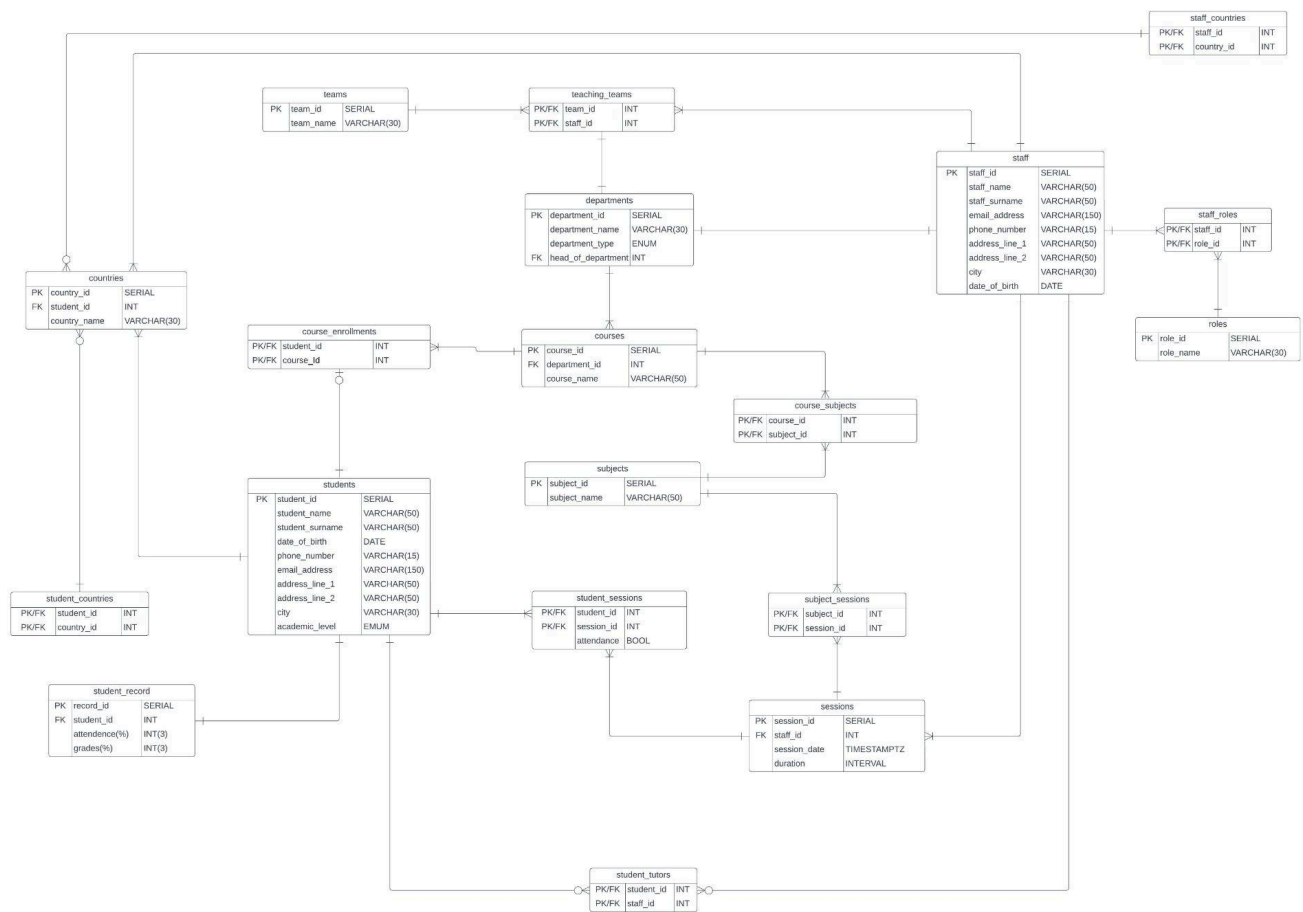


**Database Systems Development  
M30232**

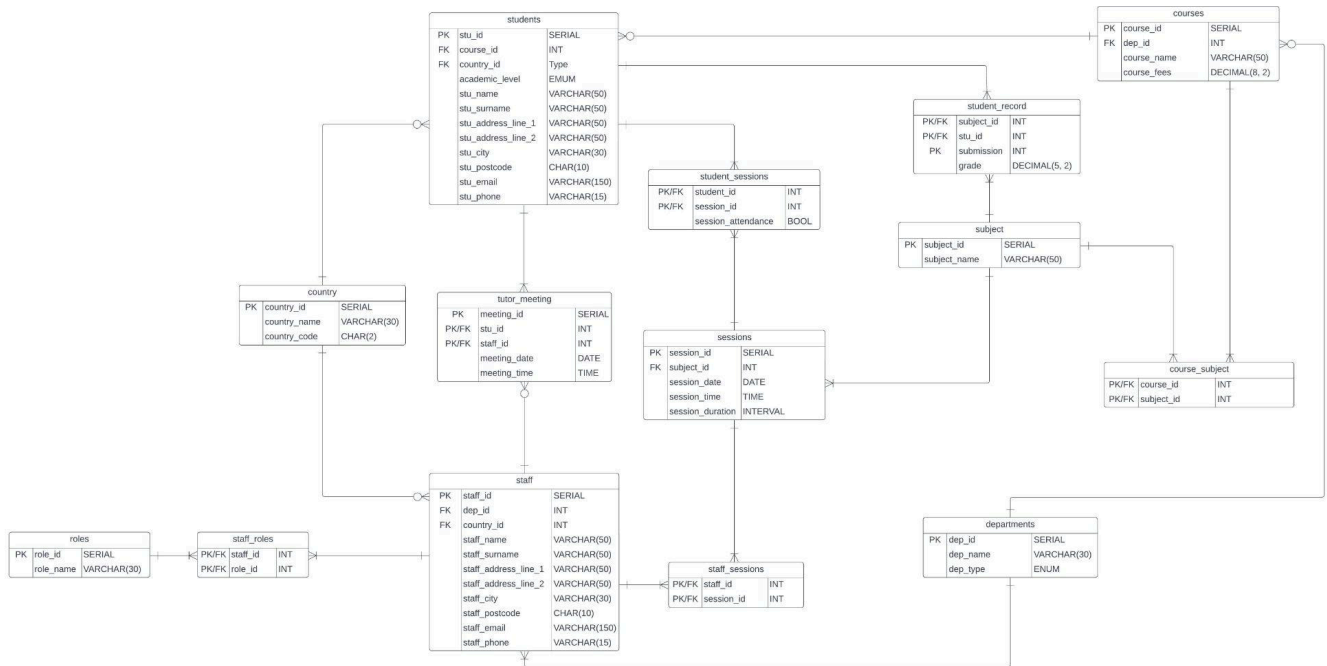
**CW2**

**Group 11**

# 1. Previous Entity Relationship Diagram (ERD)



## 2. New Entity Relationship Diagram (ERD)



## 3. Reflective Analysis

According to the feedback provided on previous coursework, we made the following changes to the ERD:

- fixed the missing relationship between the staff, students, and session entities;
- eliminated the redundant course\_enrolment entity as a 1:M relationship between the Course and Students entity will get the job done, simplifying the ERD structure while maintaining the data integrity;
- implemented naming conventions for attributes to facilitate faster query execution.

Outside of the feedback we received:

- made ERD more visually appealing so that it is more easy to navigate;
- removed teaching\_teams entity as it is not needed and changed relationship to 1:M between departments entity and staff entity;
- added postcode attributes to both the students and staff entities to improve the accuracy of address data, improving the quality of location-based queries or analyses;
- added a unique constraint to the country name attribute eliminating any duplicates and enhancing data integrity;
- introduced a fee attribute to the course entity;
- fixed country relationship with staff and student entity by removing intersection tables between staff\_countries and student\_countries and changed it to a 1:M relationship between Country and Students entities and Country and Staff entities;
- got rid of the TIMESTAMP datatype from the sessions table and changed it to two separate attributes - DATE and TIME to improve the accuracy and performances of queries and data analysis.
- changed tutor\_student to tutor\_meeting adding time and date attributes as well as meeting ID;

- handled the student\_record table a bit differently by adding the submission primary key and two composite keys of stu\_id and subject\_id, allowing a student to add submissions as well as receive grade.

## 4. Data Dictionary

DEPARTMENTS					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
dep_id	PK	SERIAL			
dep_name		VARCHAR(30)	NOT NULL; UNIQUE		
dep_type		ENUM	NOT NULL		('Academic', 'Non-academic')

STAFF					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
staff_id	PK	SERIAL			
dep_id	FK	INT	NOT NULL	departments.dep_id	
country_id	FK	INT	NOT NULL	country.country_id	
staff_name		VARCHAR(50)	NOT NULL		
staff_surname		VARCHAR(50)	NOT NULL		
staff_address_line_1		VARCHAR(50)	NOT NULL		
staff_address_line_2		VARCHAR(50)			

staff_city		VARCHAR(30)	NOT NULL		
staff_postcode		CHAR(10)	NOT NULL		
staff_email		VARCHAR(150)	NOT NULL; UNIQUE		
staff_phone		VARCHAR(15)	NOT NULL; UNIQUE		

STAFF_SESSIONS					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
staff_id	PK/FK	INT	NOT NULL	staff.staff_id	
session_id	PK/FK	INT	NOT NULL	sessions.session_id	

ROLES					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
role_id	PK	SERIAL			
role_name		VARCHAR(30)	NOT NULL; UNIQUE		

STAFF_ROLES					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>

staff_id	PK/FK	INT	NOT NULL	staff.staff_id	
role_id	PK/FK	INT	NOT NULL	roles.role_id	

COURSES					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
course_id	PK	SERIAL			
dep_id	FK	INT	NOT NULL	departments.dep_id	
course_name		VARCHAR(50)	NOT NULL; UNIQUE		
course_fees		DECIMAL(8, 2)	NOT NULL; CHECK(stu_tution_fees >= 1000)		

SUBJECT					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
subject_id	PK	SERIAL			
subject_name		VARCHAR(50)	NOT NULL; UNIQUE		

COURSE_SUBJECT					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>

course_id	PK/FK	INT	NOT NULL	courses.course_id	
subject_id	PK/FK	INT	NOT NULL	subjects.subject_id	

SESSIONS					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
session_id	PK	SERIAL			
subject_id	FK	INT	NOT NULL	subject.subject_id	
session_date		DATE	NOT NULL		
session_time		TIME	NOT NULL		
session_duration		INTERVAL	NOT NULL; CHECK( duration <= '2 hours' and duration >= '50 minutes')		

STUDENTS					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
stu_id	PK	SERIAL			
course_id	FK	INT	NOT NULL	courses.course_id	
country_id	FK	INT	NOT NULL	country.country_id	
stu_name		VARCHAR(50)	NOT NULL		
stu_surname		VARCHAR(50)	NOT NULL		



stu_date_of_birth		DATE	NOT NULL		
stu_address_line_1		VARCHAR(50)	NOT NULL		
stu_address_line_2		VARCHAR(50)			
stu_city		VARCHAR(30)	NOT NULL		
stu_postcode		CHAR(10)	NOT NULL		
academic_level		ENUM	NOT NULL		('Level_4', 'Level_5', 'Level_6', 'Level_7')
stu_phone		VARCHAR(15)	NOT NULL: UNIQUE		
stu_email		VARCHAR(150)	NOT NULL; UNIQUE		

STUDENT_RECORD					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
subject_id	PK/FK	INT	NOT NULL	subject.subject_id	
stu_id	PK/FK	INT	NOT NULL	students.stu_id	
submission	PK	INT	NOT NULL		
grade		DECIMAL(5, 2)	NOT NULL; CHECK(stu_tution_fees ≤ 100.00)		Enter in %.

STUDENT_SESSIONS					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
student_id	PK/FK	INT	NOT NULL	students.stu_id	

session_id	PK/FK	INT	NOT NULL	sessions.session_id	
session_attendance		BOOL	NOT NULL		

TUTOR_MEETING					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
meeting_id	PK	SERIAL			
stut_id	FK	INT	NOT NULL	students.stu_id	
staff_id	FK	INT	NOT NULL	staff.staff_id	
meeting_date		DATE	NOT NULL		
meeting_time		TIME	NOT NULL		

COUNTRY					
<i>Attribute_Name</i>	<i>KEY</i>	<i>Data Type &amp; Size</i>	<i>Domains &amp; Constraints</i>	<i>FK Reference</i>	<i>Description</i>
country_id	PK	SERIAL			
country_name		VARCHAR(30)	NOT NULL; UNIQUE		
country_code		CHAR(2)	NOT NULL; UNIQUE		

