Mission Statement and Objectives

Mission statement

- To improve the University of Maryland's database to fully utilize course assignments, enhance degree completion rate, and meet the demand for courses and instructors.

Mission objectives

- Determine the courses and programs with the highest student enrollment in order to meet enrollment goals.
- Maximize course enrollment and graduation rates
- Track students' GPA and progress towards degree completion
- Keep track of the total number of students and their required information
- Keep track of the cities students live in to determine bus routes and stops

ER Schema and Diagram

ER Schema:

Entities, attributes and primary keys

Student (**stuId**, stuFullName, stuDateOfBirth, stuAddress, stuCity, stuState, stuZipCode, stuMajor, stuDegree)

Instructor (**insId**, insFullName, insAddress, insPhone)

Course (**crsId**, crsName, crsType, crsCredits)

Department (**dptId**, dptName, dptPhone)

Relationships, Attributes, Degrees, Participating Entities and Constraints

Teach: binary relationship

1 student to 1 or more instructors

1 instructor to 0 or more students

Enroll(enrDate): ternary relationship

1 instructor and 1 course to 1 or more students

1 student and instructor to 1 or more courses

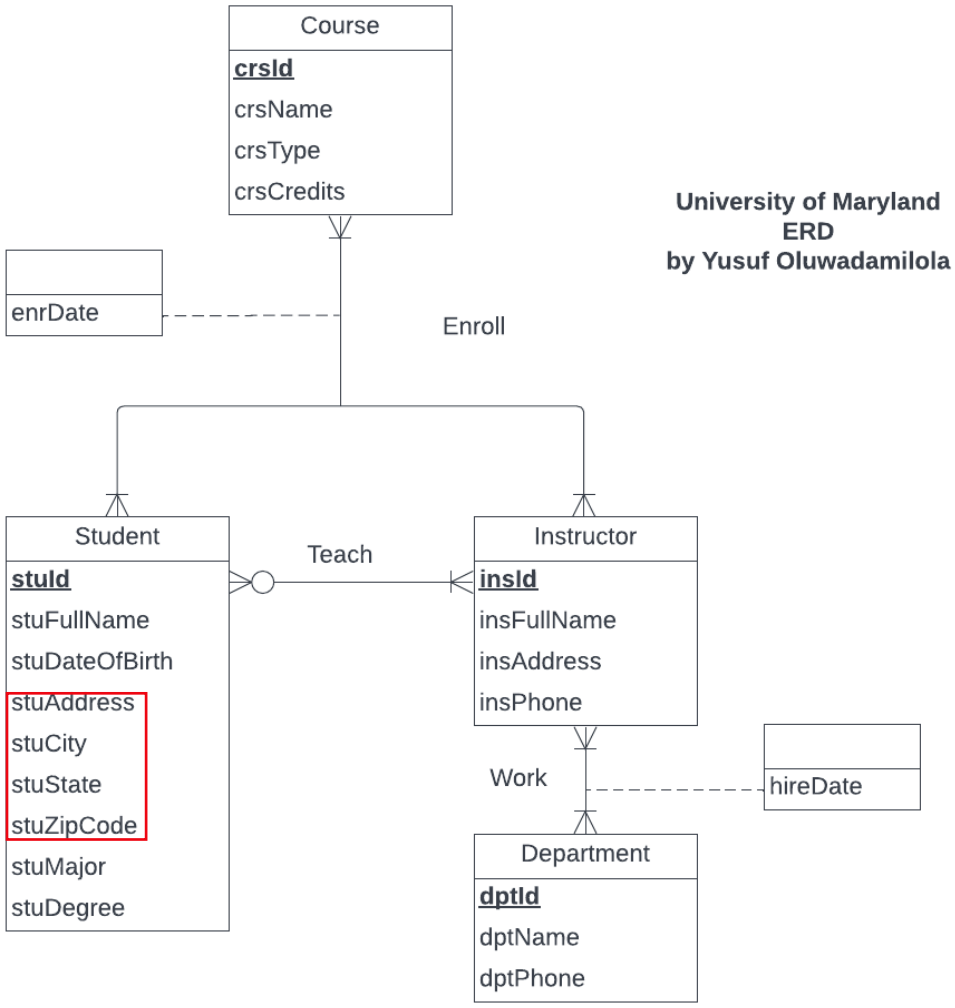
1 course and 1 student to 1 or more instructors

Work(hireDate): binary relationship

1 instructor to 1 or more department

1 department to 1 or more instructors

ER Diagram:



Relational schema

Relations:

Student(**stuId**, stuFullName, stuDateOfBirth, stuAddress, stuCity, stuState, stuZipCode, stuMajor, stuDegree)
Instructor (**insId**, insFullName, insAddress, insPhone)
Teach (***stuId***, ***insId***)
Course (**crsId**, crsName, crsType, crsCredits)
Department (**dptId**, dptName, dptPhone)
Enroll (***stuId***, ***crsId***, ***insId***, enrGrade,enrDate)
Work(***insId***, ***dptId***, hireDate)

Business rules Referential integrity

Referential Integrity:

Relation	Foreign Key	Base Relation	Primary Key	Business Rule	Constraint: ON DELETE	Business Rule	Constraint: ON UPDATE
Teach	*stuId*	Student	stuId	R1	CASCADE	R2	CASCADE
Teach	*insId*	Instructor	insId	R3	CASCADE	R4	CASCADE
Enroll	*stuId*	Student	stuId	R5	SET TO NULL	R6	CASCADE
Enroll	*crsId*	Course	crsId	R7	CASCADE	R8	CASCADE
Enroll	*insId*	Instructor	insId	R9	CASCADE	R10	CASCADE
Work	*insId*	Instructor	insId	R11	CASCADE	R12	CASCADE
Work	*dptId*	Department	dptId	R13	CASCADE	R14	CASCADE

Business Rules:

[R1] When a student is no longer in the database, the instructor information should be deleted.
[R2] When the information about a student is changed in the database, the corresponding instructor information should be changed accordingly.
[R3] When an instructor is no longer in the database, the student information should be deleted from the database.
[R4] When the information of an instructor is changed in the database, the corresponding student information should be changed.
[R5] When a student drops or completes a course, the instructor and course information is set to null.
[R6] When a student's information is changed in the database, then the course and instructor information is also changed.
[R7] When a course is dropped or deleted from the database, the student and instructor information is also deleted.
[R8] When a course is changed in the database, the student and instructor information is also changed.
[R9] When an instructor is deleted from the database, the corresponding student and course are also deleted.
[R10] When an instructor is changed in the database, the corresponding student and course are also changed.
[R11] When an instructor is deleted from the database, the corresponding department information is also deleted.
[R12] When an instructor is changed in the database, the corresponding department is also changed.
[R13] When a department is deleted in the database, the corresponding instructor is also deleted.
[R14] When a department is changed in the database, the corresponding instructor is also changed.

Sample Data and description

Description

Enroll: Students register for courses and record enrollment dates. Instructors in the department teach students in courses.
Work: Instructors are employed by the department of the university and the hire date of employment is recorded.

Sample data

Instructor	
insId	I283555
insFullName	Paul Shapiro
insAddress	57 St Louis Lane Southampton, MD 20740
insPhone	2402009295

Students	
stuId	S113237690
stuFullName	Tom Silva
stuDateOfBirth	1994-08-25
stuAddress	519 Carriage St.Wyoming
stuCity	College Park
stuState	MD
stuZipCode	20742
stuMajor	Medicine
stuDegree	Undergraduate

Teach	
stuId	S113237690
insId	I917369

Course	
crsId	ECON626
crsName	Computational Economics
crsType	Economics
crsCredits	3

Department	
dptId	D233
dptName	Economics
dptPhone	2402457213

Enroll	
stuId	S113237690
crsId	I283555
insId	ECON626
enrGrade	4
enrDate	2022-05-06

Work	
insId	I283555
dptId	D254
hireDate	2001-04-25