ENSF 608 Project Diagrams

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Problem Statement

The goal of this project is to create an interactive web-based student registration system. This application will provide five basic functionalities for a client: register in a course, unregister from a course, show all courses, show registered courses, and search for a course. Students are not allowed to register in more than 6 courses, a course requires 8 or more students to run, a student needs to complete all prerequisites before enrolling in a course, and a course may have multiple sections. The database for this application needs to provide all the necessary data for this application and enable the program's functionality.

EER Design Justification

The Enhanced Entity Relationship (EER) diagram shown in Figure 1 was constructed to represent this program. The central entity for this EER diaram is the course entity.

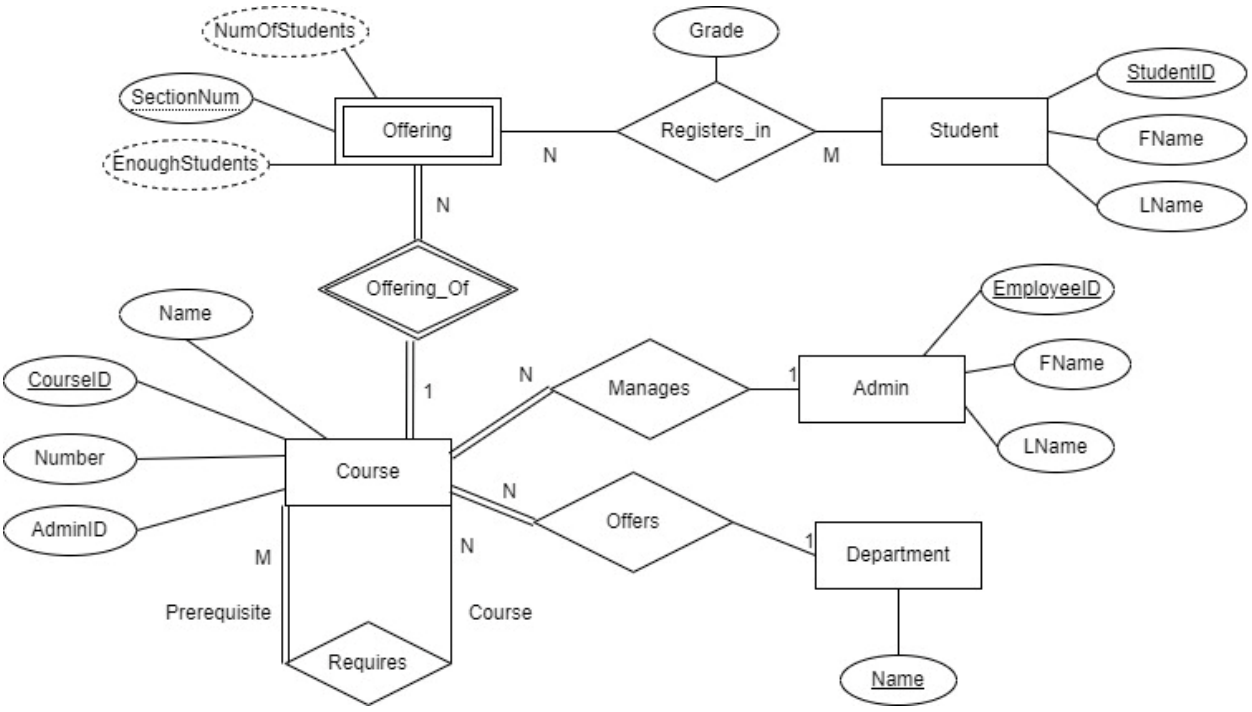

Figure 1: Student Registration System EER Diagram

The Course entity has the attributes CourseID (ENSF608), Name (ENSF) and Number (608) where the primary key is CourseID. A course can have multiple prerequisites so there is a self-referencing 'Requires' relationship. This is a many-to-many relationship because a course can be a prerequisite for multiple courses and a course can have multiple prerequisites. The relationship between course and prerequisites is partial because a course does not need to have a prerequisite but the relationship between prerequisite and course is total because a prerequisite needs to be a prerequisite for a course by definition. Courses are managed by an Admin where one administrator can manage many courses, but it could be that an admin is not presently managing any courses. The admin has the attributes EmployeeID (101), FName (Chirs), and LName (O'Dowd). Courses are offered by Department in a one-to-many relationship. It is a one-to-many relationship because a department can offer many courses, but

the department could exist without offering courses. Each Course can have 1 or more Offerings which are a weak entity of Course. The SectionNum (01) is the key attribute of the Offering entity. This entity also tracks the number of students registered in each course with the attribute NumOfStudents. The EnoughStudents derived attribute is a Boolean value determined by if the number of students registered in a course exceeds seven. The weak entity Offering has a partial many-to-many relationship with Student. It is a partial many-to-many relationship because a Student can be enrolled in zero or multiple Offerings and a Offering can have zero or many students. The registration relationship has an attribute grade to show if the student has completed the course and the result. A Student has the attributes FName (Braydon), LName (Hart) and StudentID which is a unique number that serves as the primary key.

Relational Data Model Diagram

The Relational Data Model diagram in Figure 2 was mapped using the EER diagram in Figure 1.

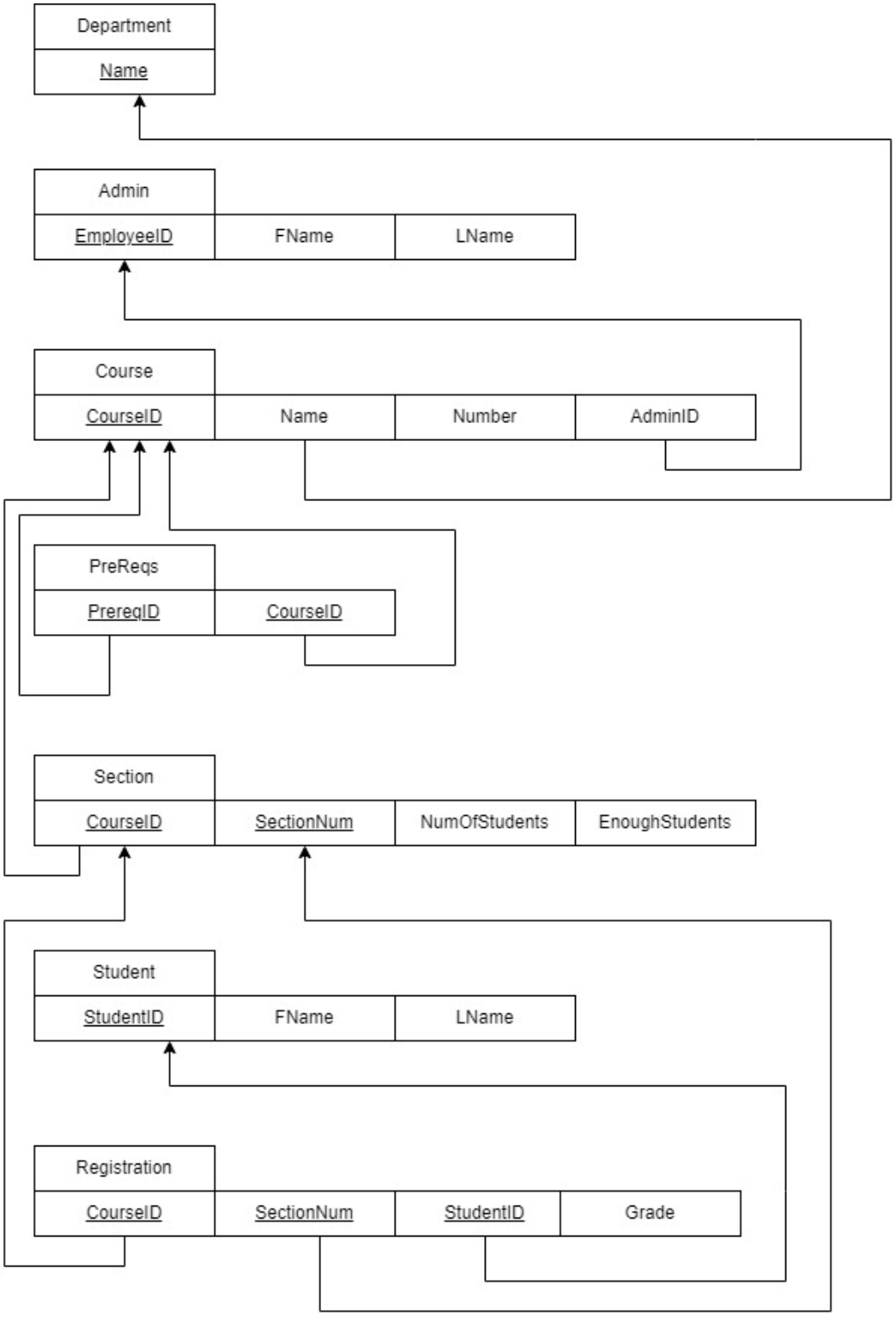

Figure 2: Student Registration Relational Data Model Diagram

The Department entity only has the attribute Name. It is underlined to show that it is the primary key.

The Admin entity has the attributes EmployeeID, FName, and LName. The EmployeeID attribute is underlined to show that it is the primary key.

The Course Entity has the attributes Name, Number, CourseID and AdminID. CourseID is underlined to show that it is the primary key. The Name attribute is a foreign key that references the primary key of the Department attribute. The AdminID attribute is a foreign key that references the primary key of the Admin attribute.

The Prereqs entity has the attributes CourseID and PrereqID where both attributes participate in the super key for the entity. CourseID and PrereqID are foreign keys that reference CourseID in the Course table.

The Offering table has the attributes CourseID, SectionNum, NumOfStudents, and EnoughStudents. The CourseID attribute is a foreign key that references the CourseID attribute in the Course table. The CourseID and SectionNum constitute the super key.

The Student table has the attributes FName, LName, and StudentID which is the primary key for the Student table.

The Registration Table is a mapping of the binary Registers_in relationship. This table has the attributes CourseID, StudentID , SectionNum and Grade. The Grade value can be null to show that the student is enrolled in a course, but the course has not started yet. The CourseID and SectionNum are the referenced as one foreign key from the Section table because they constitute the Super Key in that table. StudentID is a foreign key referencing the StudentID in the Student table.