

Mississippi State University

Group Project Part 2

Web-based Course Waiting List Maintainer: Relational Schema and DDL

CSE 4503/6503 Database Management Systems

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ERD

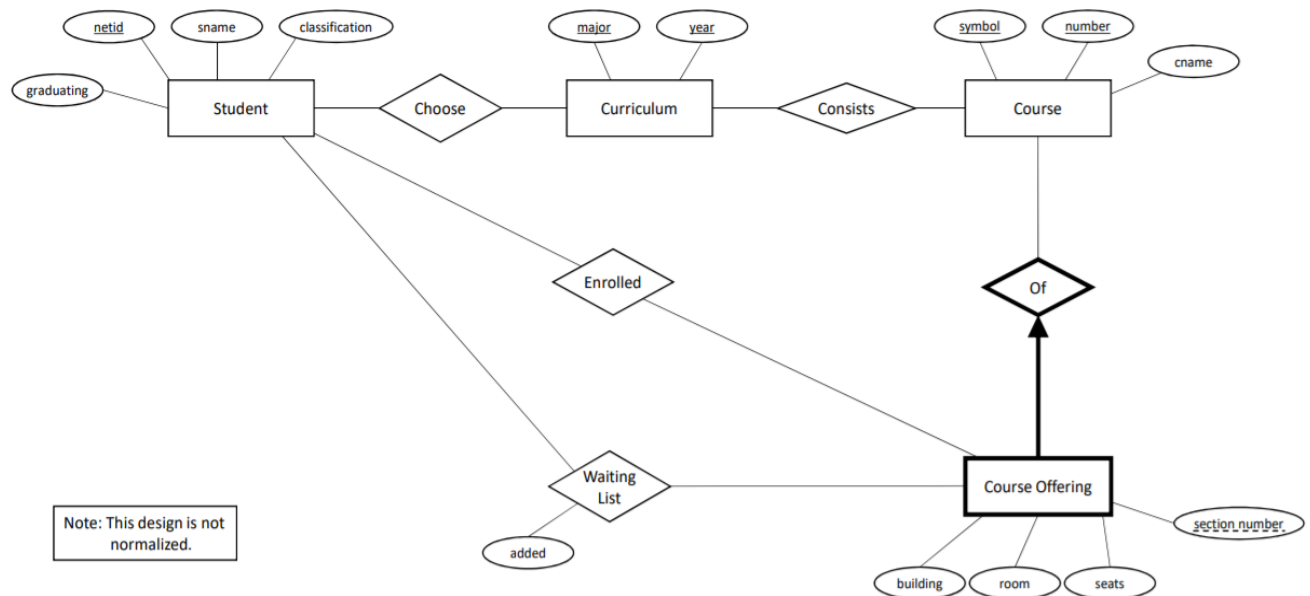


Figure 1.1 ERD PROJECT 1: Course Waiting List Maintainer (Markham, 2021)

Let us suppose Student and Curriculum have **N:1 relationship** i.e., consider the same relationship set “choose” exists between entity sets student and curriculum. Here students are many side entity sets while curriculum is one side entity set which means many students can choose one curriculum.

Student(netid, sname, classification, graduating)

Curriculum(major, year, S_netid)

Also, let us consider that curriculum and course have **1:N relationship** i.e, the same relationship set “consists” exists between entity sets curriculum and course. Here one curriculum can consist of many courses.

Curriculum(major, year, c_symbol, c_number)

Course(symbol, number, cname)

Let us consider Student and CourseOffering has **M:N relationship** in relation to the relationship set enrolled. Many students can be enrolled in many courses offered. Also, Student and CourseOffering has M:N in regard to the relationship set WaitingList. Since, Waiting list and enrolled are redundant. It's the same data twice with the exception of the attribute “ added” in the waiting list. Many students can be enlisted in the waiting list for course offering. Course offering is a weak entity type so the relationship schema between these two entities would look like:

Student(netid, sname, classification, graduating)

CourseOffering(section_number, building, room, seats)

WaitingList(netid, section_number, added)

CourseOffering is the weak entity set dependent on the entity set Course. The identifying relationship is **M:1** with no descriptive attribute. Relational schema for weak entity-set includes primary key for strong entity-set and there is no need to create relational schema for identifying relationship.

Course(number, symbol, cname)

CourseOffering(c_number, section_number, building, room, seats)

Relational Schema

The finalized mapping of the ERD from figure 1.1 to the relationship schema is given below:

Student(netid, sname, classification, graduating)

Curriculum(major, year, S_netid, c_symbol, c_number)

Course(symbol, number, cname)

CourseOffering(c_number, section_number, building, room, seats)

WaitingList(netid, section_number, added)

The **figure 1.2** shows the relationship schema model for the given relationship:

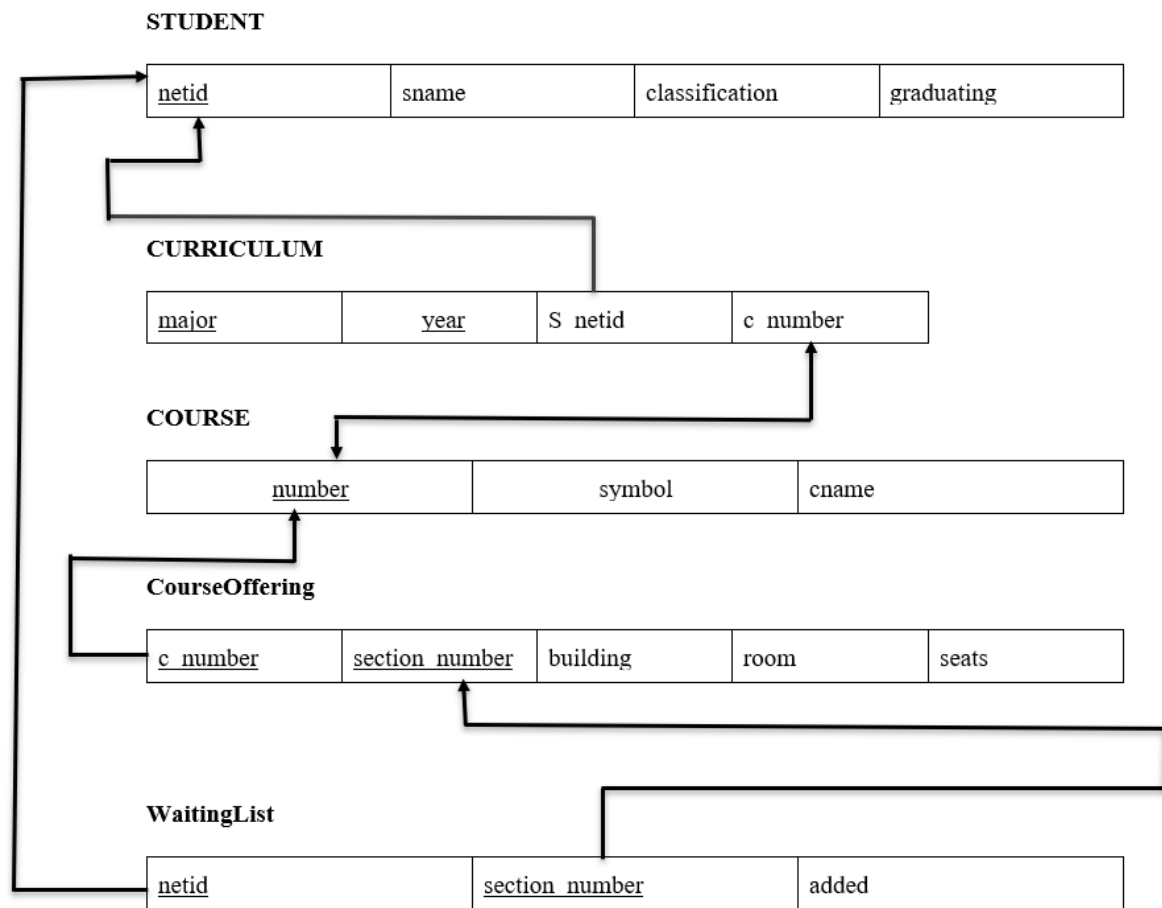


Figure 1.2 Relationship Schema Model

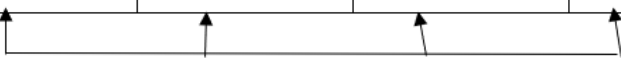
Normalization

The above relation is already in 1NF form since there are no composite or multivalued attributes.

Figure 1.3 represents the above schema in 2NF normalized form. The 2NF relationship exists between section_number, building, room and seats as they are partially dependent.

CourseOffering

<u>C_number</u>	<u>section_number</u>	building	room	seats
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Section

<u>section_no</u>	building	<u>room</u>	seats
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Figure 1.4 represents the above relationship schema in 3NF normalized form.

The primary keys for each entities are as follows:

STUDENT: netid

CURRICULUM: major

WaitingList: netid, section_number

COURSE: number

ENROLLED: netid, section_number

CourseOffering: section_number

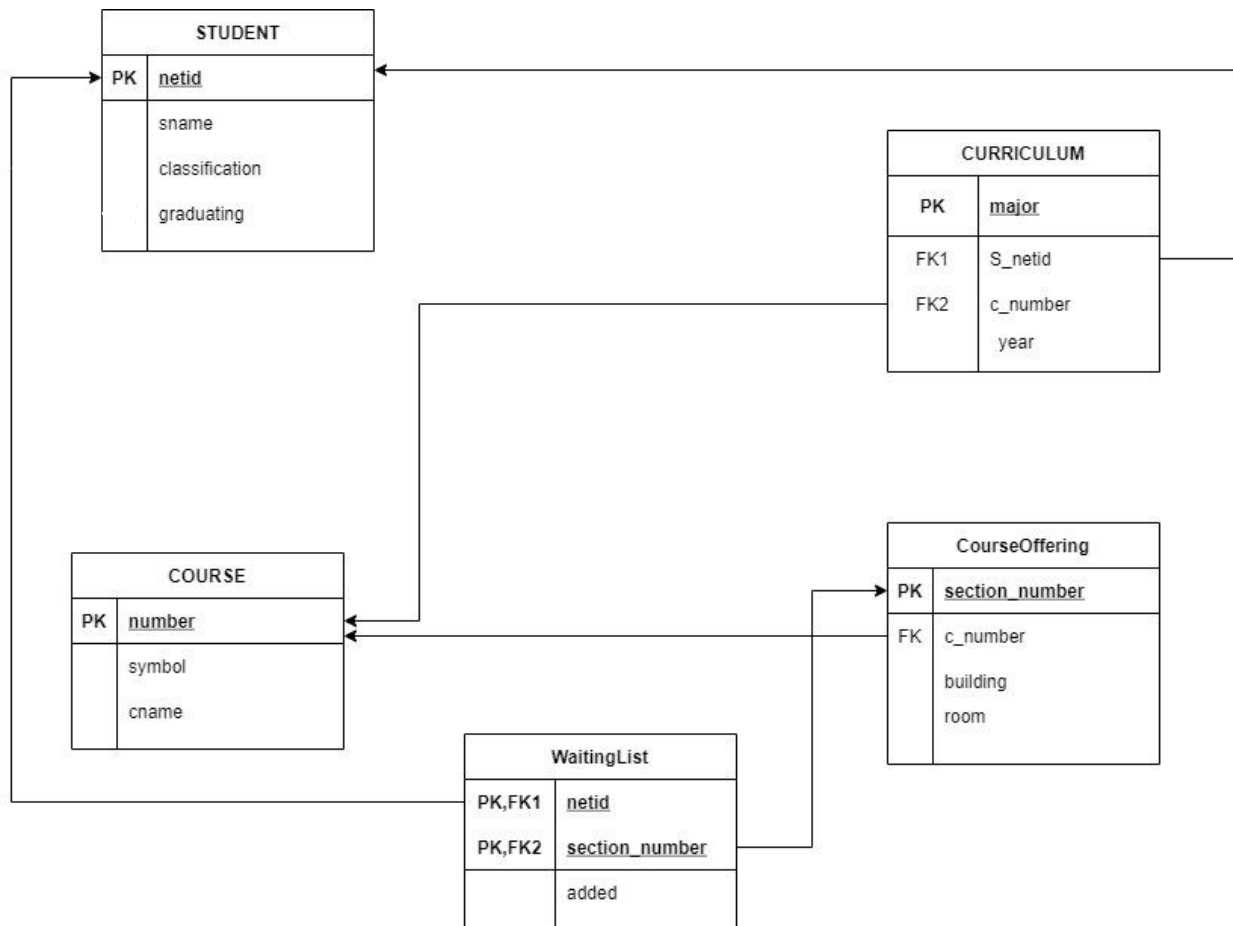


Figure 1.3 3NF Normalized Form(Third normal form (3NF), 2018)

Create Table Statements

CREATE TABLE STUDENT

(netid varchar(15) not null,

sname varchar(25) not null,

classification varchar(7) not null,

graduating int ,

PRIMARY KEY(netid)

);

CREATE TABLE CURRICULUM

(major varchar(40) not null,

S_netid varchar(15) not null,

c_number int not null,

year int not null,

PRIMARY KEY(major),

FOREIGN KEY (S_netid) REFERENCES STUDENT(netid),

FOREIGN KEY (c_number) REFERENCES COURSE(number),

);

CREATE TABLE COURSE

(number int not null,

symbol varchar(15) not null,

cname varchar(35) not null,

PRIMARY KEY(number)

);

CREATE TABLE CourseOffering

(section_number int not null,

c_number int not null,

building varchar(45) not null,

room int ,

PRIMARY KEY(section_number),

FOREIGN KEY (c_number)

);

```
CREATE TABLE WaitingList
(netid          varchar(15)  not null,
section_number  int          not null,
added          varchar(15)  not null,
PRIMARY KEY(netid),
FOREIGN KEY (netid) REFERENCES STUDENT(netid),
FOREIGN KEY (section_number) REFERENCES CourseOffering(section_number)
);
```


References

Markham, Leann. (2021). *Part_1_Sample_Solution*. DBMS.

YouTube. (2018, February 8). *Third normal form (3NF) | database normalization | DBMS*.

YouTube. Retrieved October 19, 2021, from

https://www.youtube.com/watch?v=aAx_JoEDXQA.