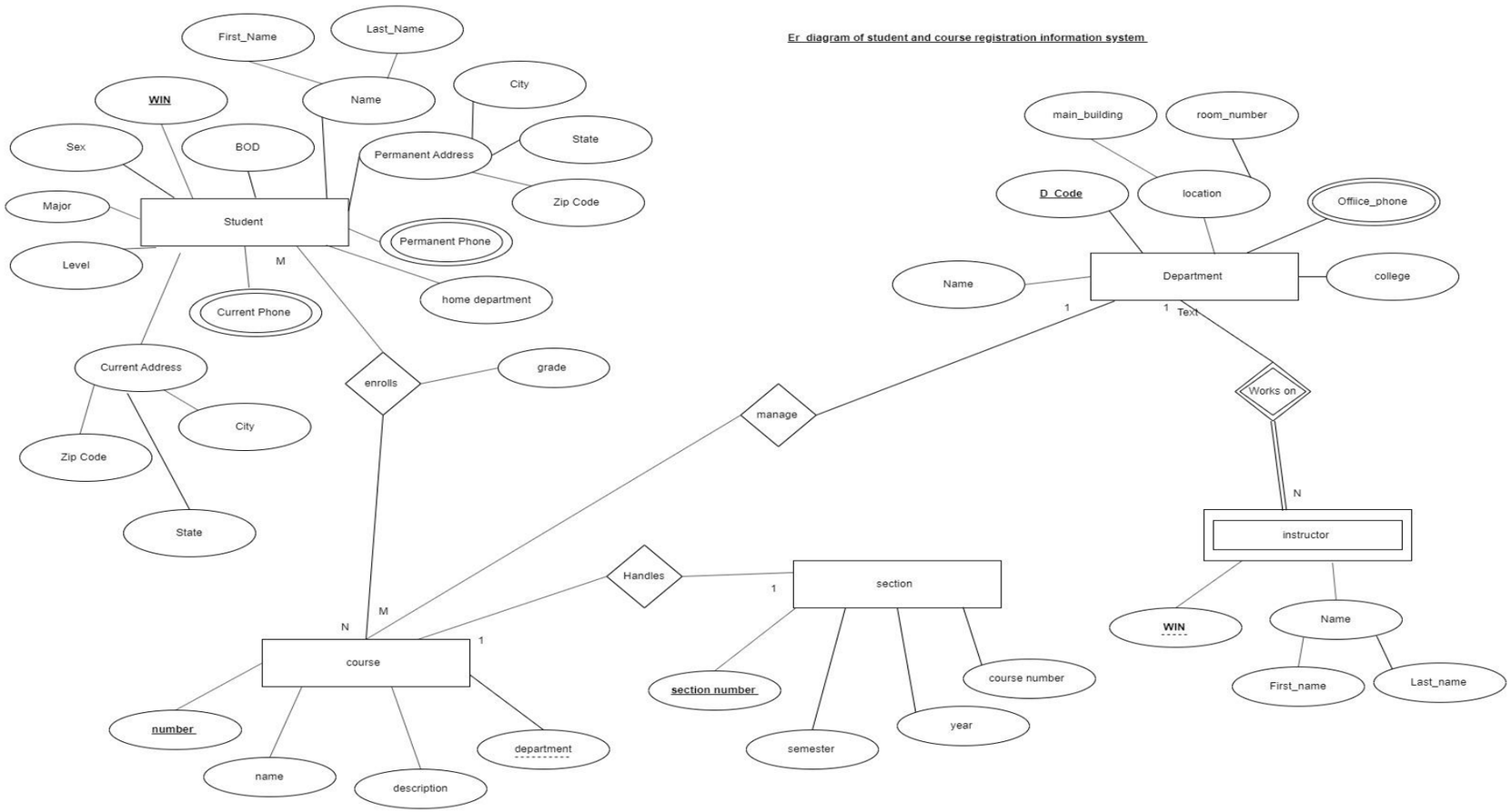
Chad Hirsch
CS4430
DUE: 11/12/19

# ER Diagram



Chad Hirsch
CS4430
DUE: 11/12/19

# Part 1

Student Table

| WIN | First_Name | Last_Name | Sex | BOD | Major | Lavel | Current_city | C_Zip_code | C_State | Permenet_city | P_Zip_code | P_State | C_Phone | P_Phone | coures_number | grade |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Course table

| **Course_number** | name | description | department_id |
|---|---|---|---|

Section Table

| **Section_number** | Semester | year | course_number |
|---|---|---|---|

Department_ table

| **Department_code** | Name | mani_building | room_number | college | Office_phone |
|---|---|---|---|---|---|

Instructor_table

| **WIN** | First_Name | Last_name | Department_code |
|---|---|---|---|

Chad Hirsch
CS4430
DUE: 11/12/19

01. Student_table

```
CREATE TABLE Student (
    WIN int NOT NULL, First_Name String,Last_Name String,Sex String,P_Zip_code int,
      P_State String,C_Phone String ,P_Phone String ,coures_number String,grade String,BOD DATE,
      MajorLavel String, Current_city String .C_Zip_code String,C_State String,
      Permenet_city String

    PRIMARY KEY (WIN),

);
```

02. Course table

```
CREATE TABLE Course (
    Course_number int NOT NULL, Name String,Description String, department_id int

    PRIMARY KEY (Course_number),

CONSTRAINT department_id FOREIGN KEY (Department_code)
    REFERENCES Department(Department_code)

);
```

**03.** Section Table

```
CREATE TABLE Section (
    Section_number int NOT NULL, Semester String, year DATE, co_number int
```

Chad Hirsch
CS4430
DUE: 11/12/19

```
PRIMARY KEY (Section_number),CONSTRAINT co_number FOREIGN KEY (Course_number)
    REFERENCES Department(Course_number)
);
```

04. Department_ table

```
CREATE TABLE Section (
    Department_code int NOT NULL, Name String, mani_building int, room_number int , college string , Office_phone string

PRIMARY KEY (Department_code)
);
```

05. Instructor table

```
CREATE TABLE Instructor (
    WIN int NOT NULL, Department_code NOT NULL, First_Name String, Last_Name String


    PRIMARY KEY (WIN),

CONSTRAINT department_id FOREIGN KEY (Department_code)
    REFERENCES Department(Department_code)
```

Chad Hirsch
CS4430
DUE: 11/12/19
Part 2

## 1. C → D, C → A, B → C

i. Candidate keys: B

ii. R is in 2NF but not 3NF

iii. C → D, and C → A both cause violations of BCNF. One way to obtain a

(lossless) join preserving decomposition is to decompose R into AC, BC, and CD

## 2. B → C, D → A

i. Candidate keys: BD

ii. R is in 1NF but not 2NF

iii. Both B → C, and D → A cause BCNF violations. One possible decomposition: AD, BC, BD is BCNF and lossless and join-preserving

## (c) ABC → D, D → A

i. Candidate keys: ABC, BCD

ii. R is in 3NF but not BCNF

iii. No BCNF decomposition.

## (d) A → B, BC → D, A → C

i. Candidate keys: A

ii. R is in 2NF but not 3NF

iii. BC → D violates BCNF, split up R as in: BCD, ABC