



Business School  
UNIVERSITY OF COLORADO DENVER

Information Systems Program

# Module 10

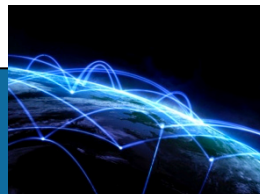
## Schema Conversion

Lesson 1: Goals and steps of logical  
database design

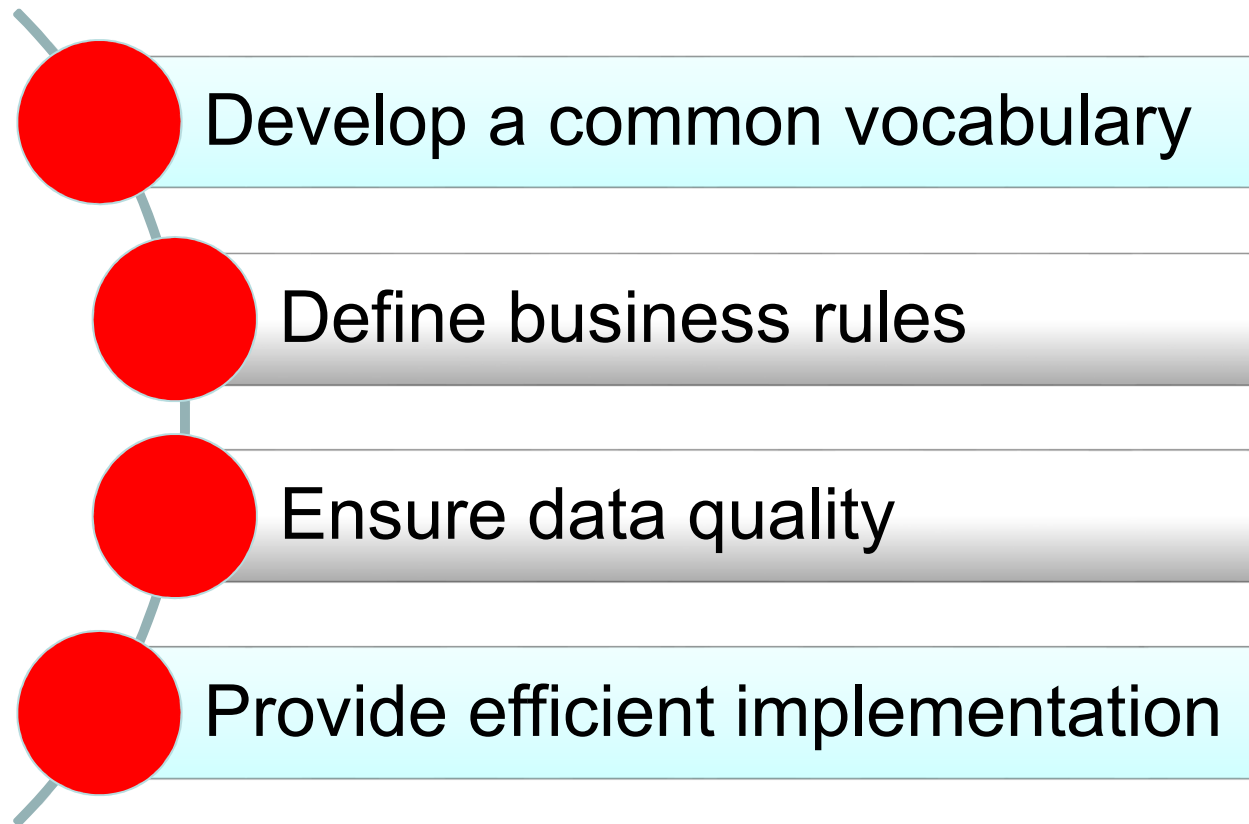


# Lesson Objectives

- Gain context for skill development
- Explain goals and steps of logical database design
- Explain the position of this module in the database development process



# Broad Goals of Database Development

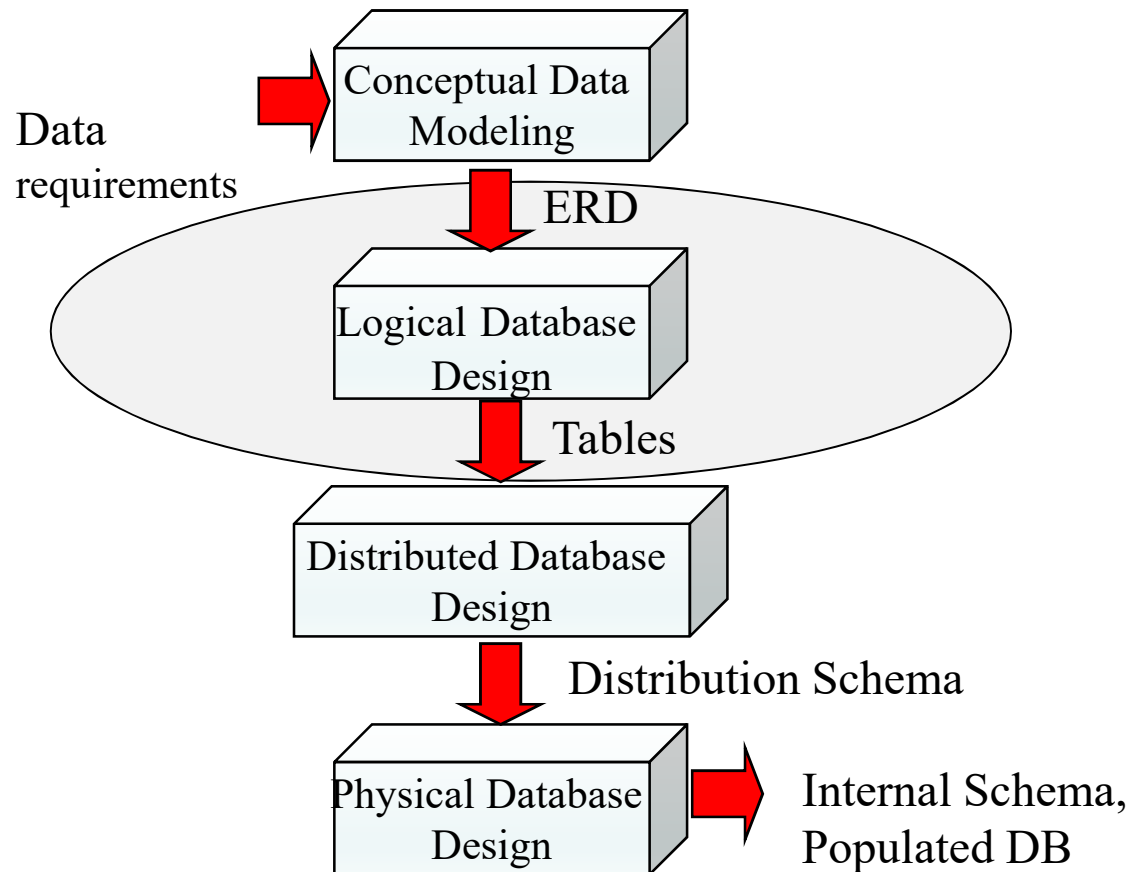


# Managing Redundancy

- Identify possible redundancy
- Eliminate unwanted redundancy
- Support organizational policies
- Update orientation



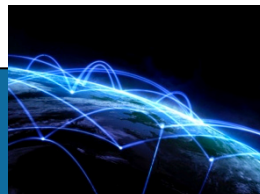
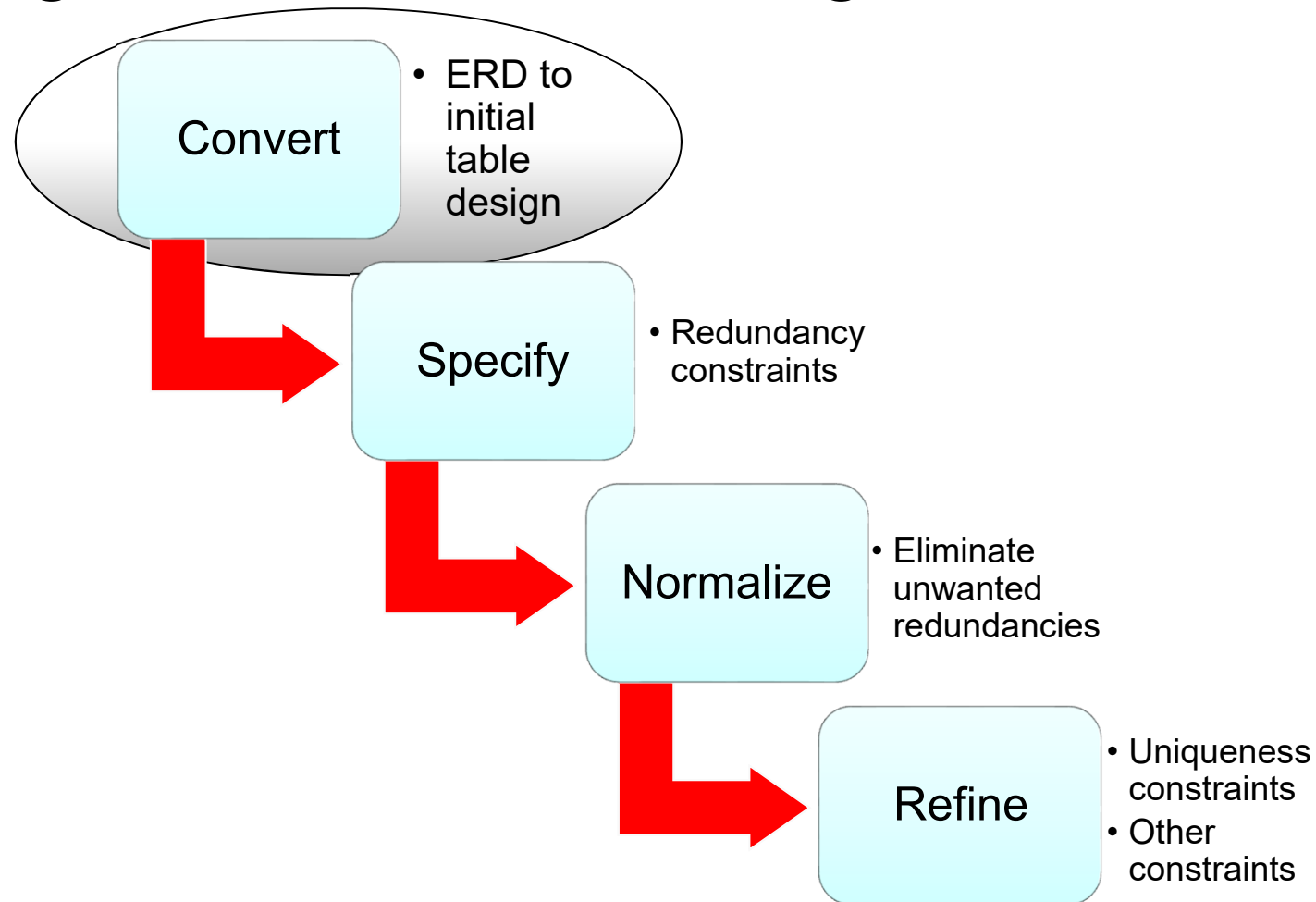
# Database Development Phases



5

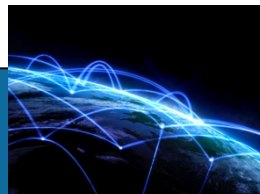


# Logical Database Design



# Summary of Logical Database Design

- Essential part of information systems development
- Two major phases, conversion and normalization
- Refinement focus





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## Schema Conversion

### Lesson 2: Conversion Rules



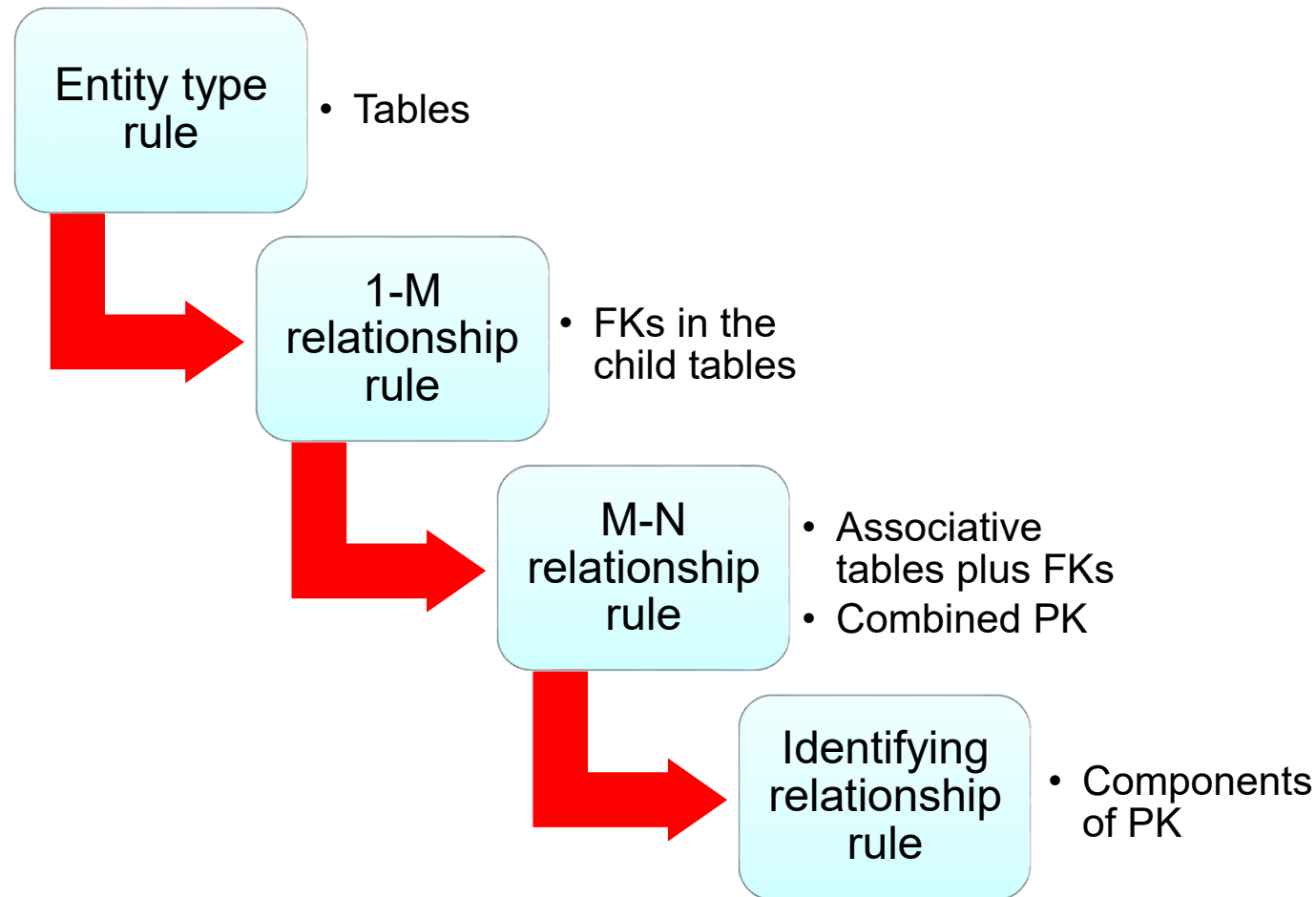


# Lesson Objectives

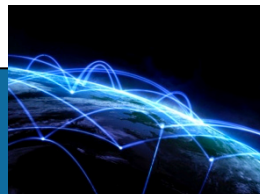
- Apply each rule
- Apply ordering of rules
- Reflect on the notation differences



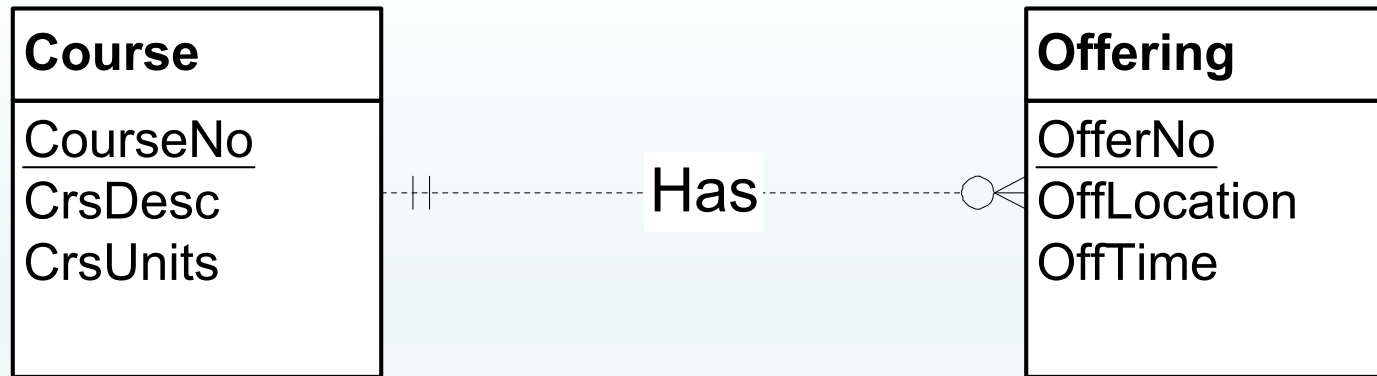
# Conversion Rule Application



10



# Application of Basic Rules (I)



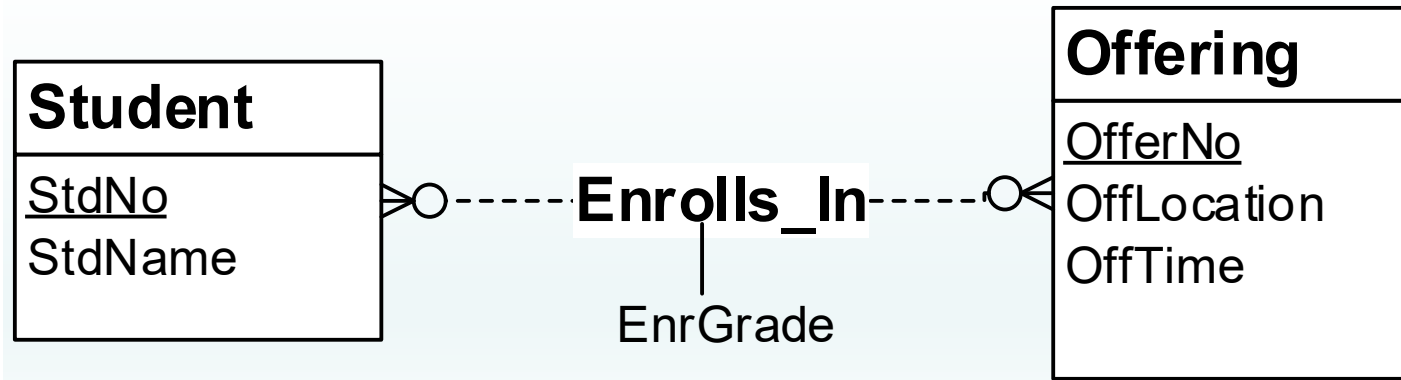
```
CREATE TABLE Course (... , PRIMARY KEY (CourseNo) )
```

```
CREATE TABLE Offering (... , PRIMARY KEY (OfferNo), FOREIGN KEY  
(CourseNo) REFERENCES Course, CONSTRAINT CourseNo NOT  
NULL)
```

11



# Application of Basic Rules (II)

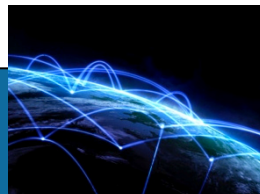


```
CREATE TABLE Student (... , PRIMARY KEY (StdNo) )
```

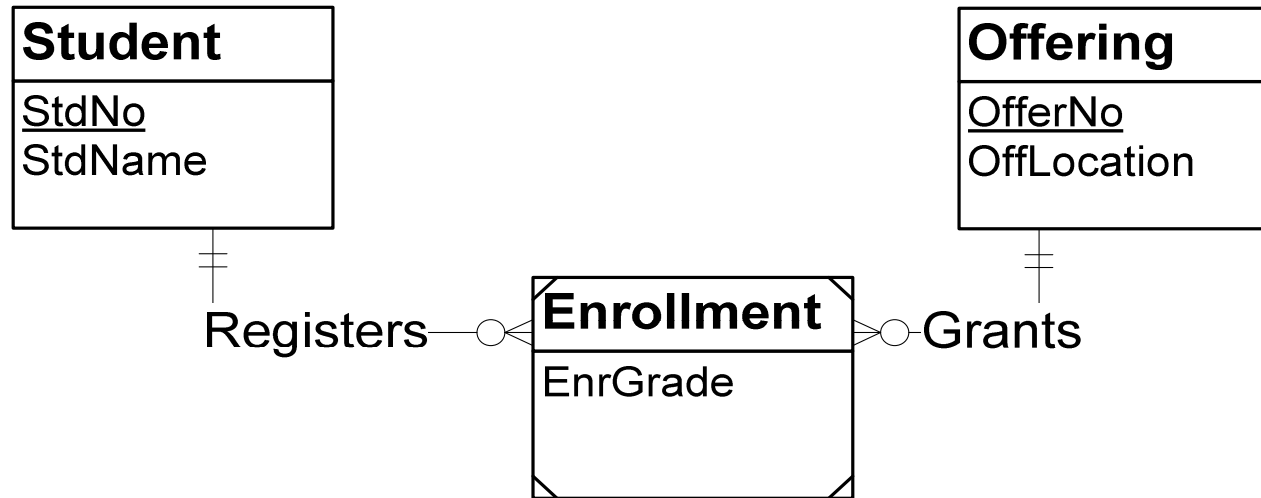
```
CREATE TABLE Offering (... , PRIMARY KEY (OfferNo) )
```

```
CREATE TABLE Enrollment (... , PRIMARY KEY (StdNo,  
OfferNo), FOREIGN KEY (StdNo) REFERENCES Student,  
FOREIGN KEY (OfferNo) REFERENCES Offering )
```

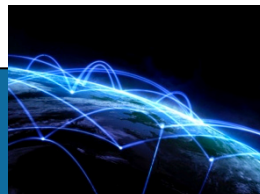
12



# Application of Basic Rules (III)

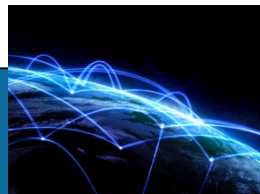


- Same conversion result as the previous example but different application of rules
  - 3 applications of the entity type rule
  - 2 applications of 1-M relationship rule
  - 2 applications of the identifying relationship rule



# Summary

- Most conversion using the basic rules
- Knowledge of conversion rules clarifies notation differences
- Database design tools perform conversion





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## Schema Conversion

### Lesson 3: Conversion problems



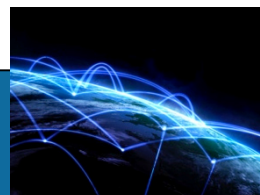
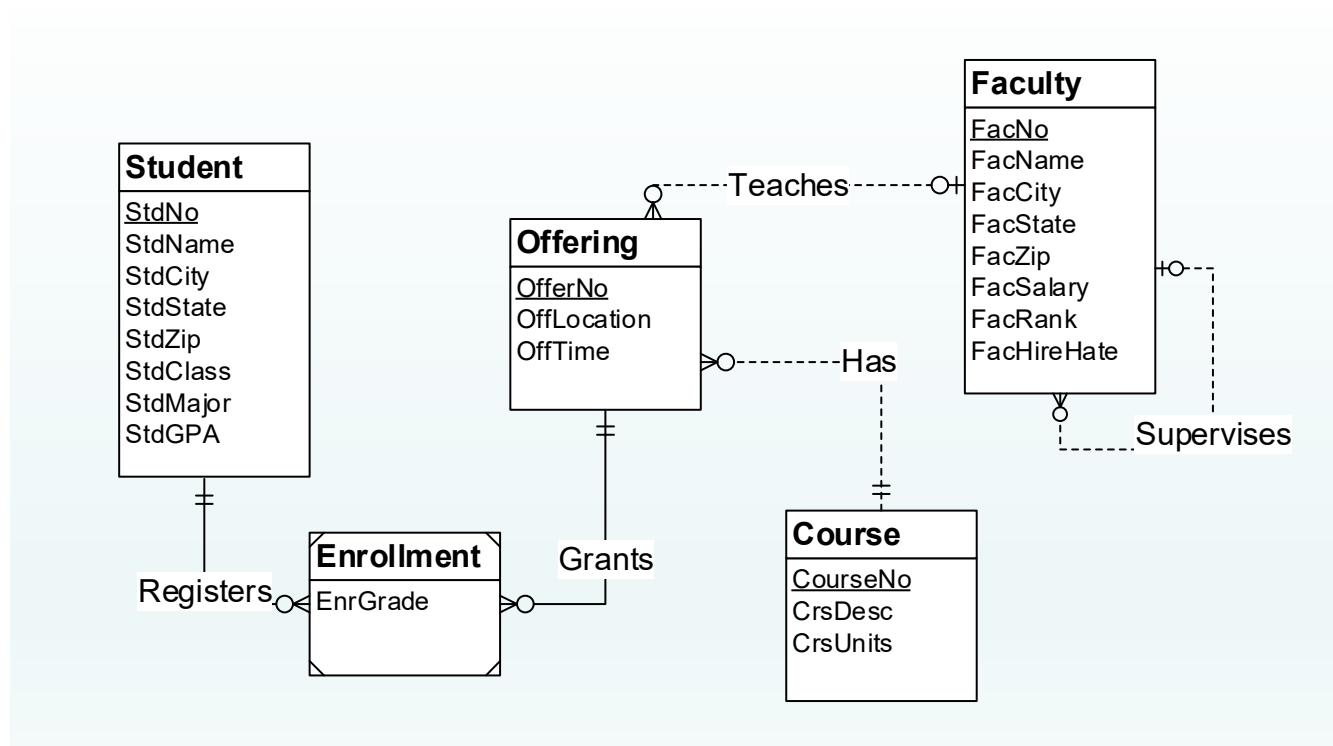
# Lesson Objectives

- Practice on moderate size ERDs
- Gain insight about notation differences

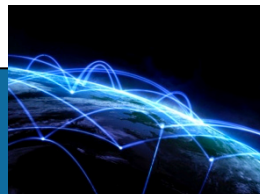
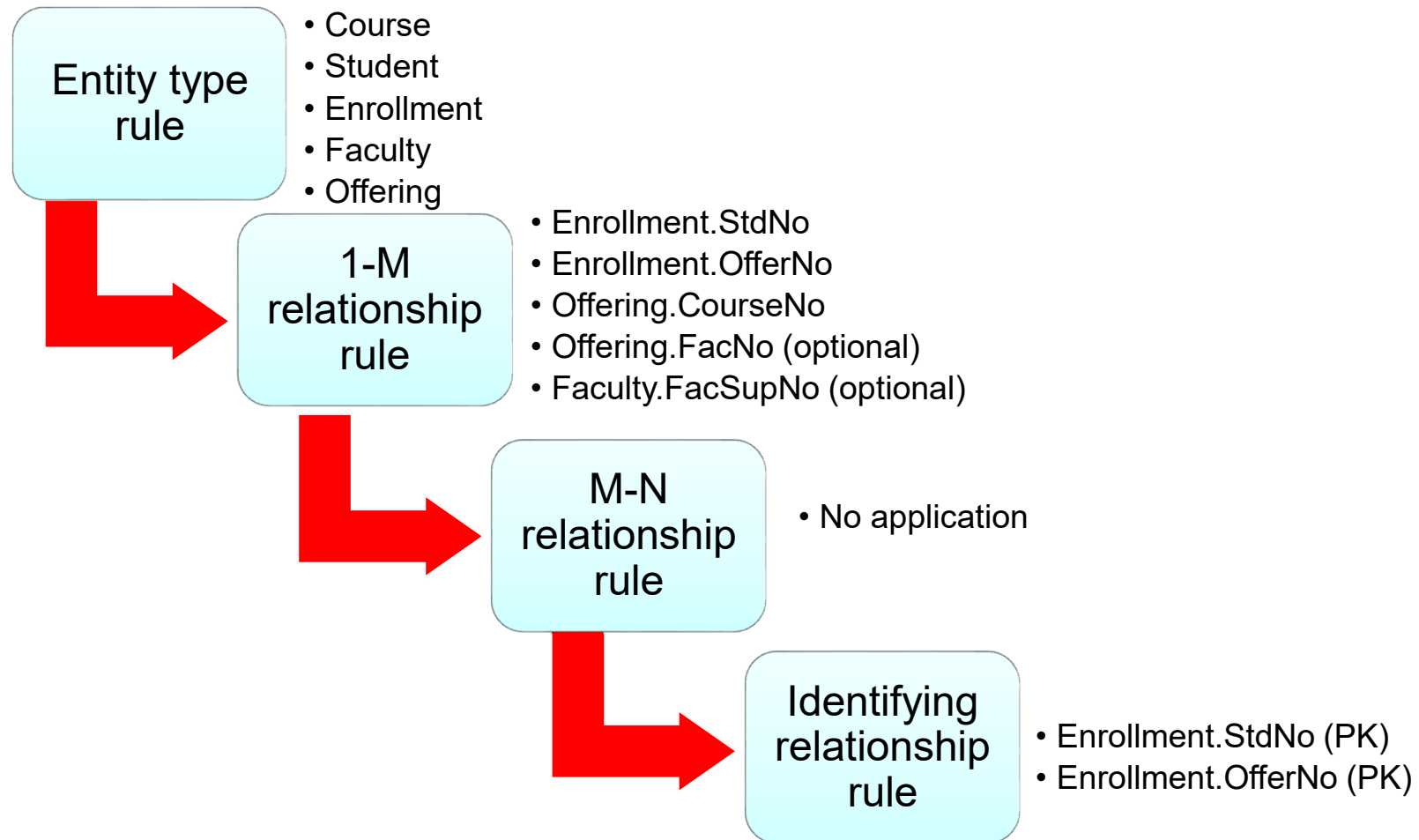




# University Database ERD



# Conversion Rule Application



# University Database Table Design

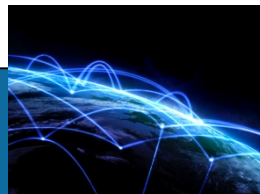
```
CREATE TABLE Course (... , PRIMARY KEY (CourseNo) )
```

```
CREATE TABLE Student (... , PRIMARY KEY (StdNo) )
```

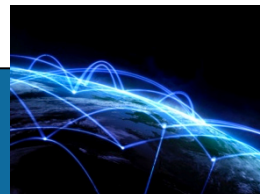
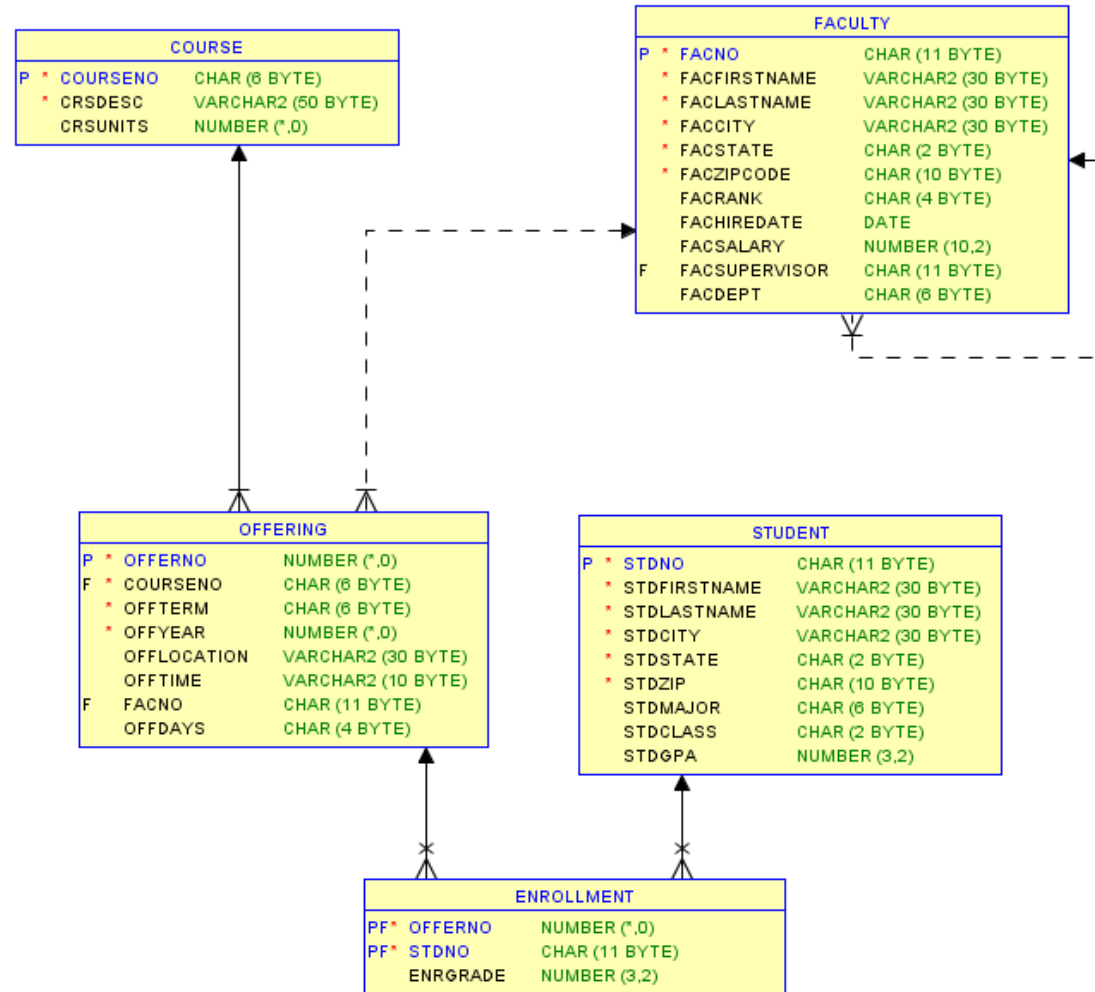
```
CREATE TABLE Faculty (... , PRIMARY KEY (FacNo) , FOREIGN  
KEY (FacSupNo) REFERENCES Faculty )
```

```
CREATE TABLE Offering (... , PRIMARY KEY (OfferNo) ,  
FOREIGN KEY (CourseNo) REFERENCES Course , FOREIGN  
KEY (FacNo) REFERENCES Faculty , CONSTRAINT CourseNo  
NOT NULL )
```

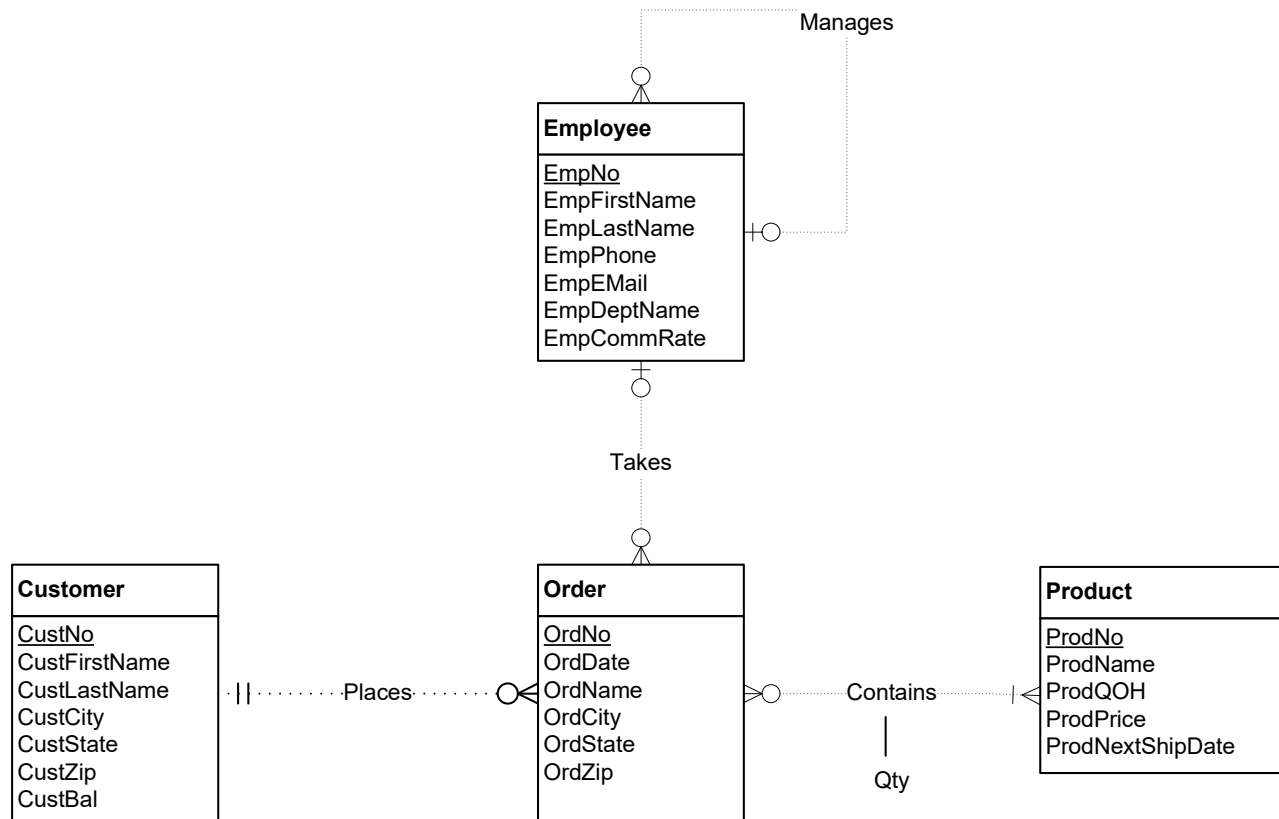
```
CREATE TABLE Enrollment (... , PRIMARY KEY (OfferNo ,  
StdNo) , FOREIGN KEY (OfferNo) REFERENCES Offering ,  
FOREIGN KEY (StdNo) REFERENCES Student )
```



# University Database Relational Diagram

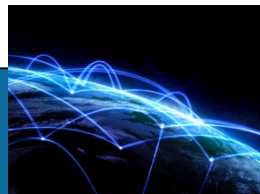


# Practice Conversion Problem

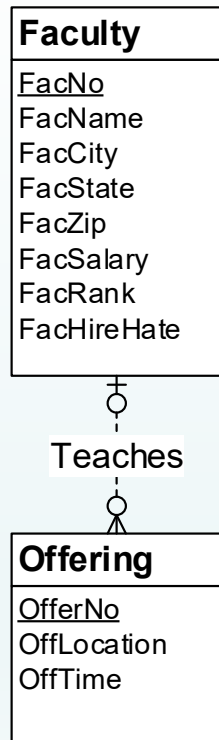


# Summary

- Apply rules on practice and graded problems
- Knowledge of conversion rules clarifies notation differences



# Common Conversion Error



## Incorrect application of 1-M relationship rule

```
CREATE TABLE Faculty(..., PRIMARY KEY (FacNo), FOREIGN KEY (OfferNo) REFERENCES Offering, ... )
```

## Correct application of 1-M relationship rule

```
CREATE TABLE Offering (..., PRIMARY KEY (OfferNo), FOREIGN KEY (FacNo) REFERENCES Faculty, ... )
```

