



Business School  
UNIVERSITY OF COLORADO DENVER

Information Systems Program

# Module 11

## Normalization Concepts and Practice

### Lesson 1: Modification Anomalies



# Lesson Objectives

- Define modification anomaly
- Provide examples of modification anomalies
- Understand processing orientation for avoiding modification anomalies



# Modification Anomaly

- Unexpected side effect from a row operation
- Must insert, modify, and delete more data than desired
- Caused by excessive redundancies
- Strive for one fact in one place



# Big University Database Table

<u>StdNo</u>	StdClass	<u>OfferNo</u>	OffYear	EnrGrade	CourseNo	CrsDesc
S1	JUN	O1	2017	3.5	C1	DB
S1	JUN	O2	2017	3.3	C2	VB
S2	JUN	O3	2018	3.1	C3	OO
S2	JUN	O2	2017	3.4	C2	VB



# Anomaly Examples

- To insert a course (C4), must know student and offering
- Update multiple rows to change the description of course C2
- A row deletion can cause inadvertent removal of related entities. Deleting third enrollment row (S2, O3) loses details about O3 and C3.



# Summary

- Modification anomaly: unwanted side effect from a row operation
- More rows impacted than anticipated
- Motivation for normalization process to remove excessive redundancies

