



MIS407: DATABASE CONCEPTS

Credit Hours: 3

Contact Hours: This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

Faculty Information: Faculty contact information and office hours can be found on the faculty profile page.

COURSE DESCRIPTION AND OUTCOMES

COURSE DESCRIPTION:

This course covers the basics of relational databases, including basic terminology and concepts, database integrity, and normalization. The relational model will be examined in detail in order to appreciate database structure, integrity, and manipulation. Current relational database management systems will be explored and contrasted, as will basic relational database design and SQL programming.

COURSE OVERVIEW:

Decision-making is becoming increasingly a data-driven process. The futuristic concepts like AI (artificial intelligence) are a reality. It is hard to find a business or any other entity that does not utilize some form of data in daily bases. In assessing issues like risks, opportunities, competitors, growth, and acquisitions, managers and executives turn to data. To try and establish patterns and trends in fighting diseases, doctors turn to data. To predict election results, political gurus turn to data. For those reasons and many more we gather, store, structure, and manipulate data to enhance the decision-making process. A database is the core of such processes. Considering the considerable amount of data that we collect and process in databases, it is essential that we structure them in a way that it is easy to access, process, and store. Database systems take care of all those components.

In this course, we will learn some of the critical database concepts that can help a professional understand how to create a logical and physical structure for a reliable database. This course will provide some querying tools and SQL programming that will help students with building database objects like tables and queries. This course will cover some key terminology and concepts. Critical Thinking Assignments will be hands-on activities where students will create objects, run queries, and program in SQL.

COURSE LEARNING OUTCOMES:

1. Examine the relational database model and components.
2. Explain the role of primary and foreign keys in the relationships in a database.
3. Design a simple relational database from a set of user requirements in an entity/relationship diagram (ERD).

4. Utilize Structured Query Language (SQL) to create database tables, load data, create queries, and create reports.
5. Apply normalization rules to reduce redundant data.
6. Compare popular relational database management systems (RDBMS).

PARTICIPATION & ATTENDANCE

Prompt and consistent attendance in your online courses is essential for your success at CSU-Global Campus. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes do. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

COURSE MATERIALS

Required:

Juba, S. & Volkov, A. (2017). *Learning postgresQL 10* (2nd Ed.). Birmingham B3 2PB, UK: PackT Publishing. ISBN 13: 9781788392013 (Print), 9781788470667 (eBook).

Mannino, M. V. (2019). *Database design, application development, and administration* (7th Ed.). Chicago, IL: Chicago Business Press. ISBN 13: 9781948426008 (Print), 9781948426060 (eBook).

Additional Required Course Materials or Web-based Tools/Applications:

This course requires some additional software that can be acquired for free online. Contact your instructor if you need assistance or have issues with the downloads. Be sure to read the terms of service on each website for full details.

- Diagramming software: You may use Microsoft Visio or a free Open Source option called Lucidchart, available at <https://www.lucidchart.com/>. A free-single user option is available if you sign up on the website. Be sure to read the terms of service for full details.
- PostgreSQL : We will be utilizing PostgreSQL for this class. Everything you need for this installation and setup is straightforward and free. One advantage of this system is that it is compatible with all platforms. Installation and configuration of PostgreSQL are activities students will perform in Module 1. Installation and setup instructions are included in the Critical Thinking Assignment for Module 1.

NOTE: All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.

COURSE SCHEDULE

Due Dates

The academic week at CSU-Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday 11:59 p.m. MT. Late posts may not be awarded points.
- **Opening Exercises:** Take the Opening Exercise before reading each week's content to see which areas you will need to focus on. You may take these exercises as many times as you need. The Opening Exercises will not affect your final grade.
- **Mastery Exercises:** Students may access and retake Mastery Exercises through the last day of class until they achieve the scores they desire.
- **Critical Thinking Assignments:** Critical Thinking Assignments are due Sunday at 11:59 p.m. MT.

WEEKLY READING AND ASSIGNMENT DETAILS

MODULE 1

Readings

- Chapters 1 & 2 in *Database Design*
- Chapters 1 & 2 in *Learning PostgreSQL 10*
- PR, N. (2017, October 5). Breakthrough PostgreSQL 10 delivers more database flexibility and performance. PR Newswire U.S. Retrieved from <https://www.prnewswire.com/news-releases/breakthrough-postgresql-10-delivers-more-database-flexibility-and-performance-300531849.html>
- Yahalom, D. (2018). Is serverless computing a game-changer for the relational database market? *InfoWorld.Com*.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking Assignment (70 points)

Option #1: Database Software Installation, Database and Table Creation and Population

In this Critical Thinking Assignment, you will install the PostgreSQL software product and create and populate the JigSaw Operational database. Follow the instructions in the assignment module folder to: 1) install PostgreSQL; 2) create the JigSaw database; 3) create the tables within the database; and 4) populate the tables with data.

Part I: Create a new database in PostgreSQL

1. Expand the **PostgreSQL** item on the tree listing.
2. Right-click to select the **Databases** item and then select **Create -> Database**.
3. The **Create Database** dialog window appears:
 - Enter **js** in the Database name.
 - Enter any comments you feel are appropriate.
 - Click **Save**. The database **js** now appears in the tree listing on the left side of the screen.
4. Right-click **js** and select **Query tool**.
5. Open the **js.sql** file using a text editor, then:

- Select all of the SQL statements.
 - Copy and paste the SQL into the **Query tool** window.
 - Run the SQL.
 - Click the lightning bolt to execute the SQL script. You should receive a **Query Returned Successful** message.
 - Clear the **Query tool** window.
6. Open the **js_data.sql** file using a text editor, then:
- Select all of the SQL statements.
 - Copy and paste the SQL into the **Query tool** window.
 - Run the SQL.
 - Click the lightning bolt to execute the SQL script. You should receive a **Query Returned Successful** message.
 - Clear the **Query tool** window.

At this point, the **js** database and tables are created and populated. Use these procedures and SQL scripts as an example when creating the database and tables, and when populating the databases.

Assignment Deliverables:

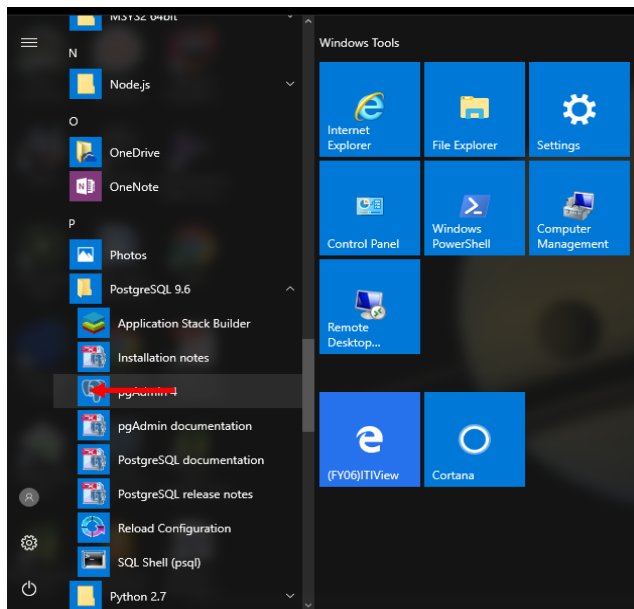
1. Screenshot of the PostgreSQL screen signifying a successful installation. Make sure when you set up the database, you name it "Your last name_studentID)
2. Screenshot of the Jigsaw database and populated tables signifying successful completion of the database operations. For all submissions, every week you should submit the snapshot of the code and outcome it generated from your system and your database name should show up. Submitting code in MS Word will not be accepted.
3. A brief report describing your key learnings from this assignment.

Option #2: Database Software Installation, Database and Table Creation and Population

In this Critical Thinking Assignment, you will install the PostgreSQL software product and create and populate the Northwind database. Follow the instructions in the assignment module folder to: 1) install PostgreSQL; 2) create the Northwind database; 3) create the tables within the database; and 4) populate the tables with data.

Once you have installed PostgreSQL, you will need to create a database and seed your database with data. For this assignment, you will use the Northwind database from Microsoft. To create the database, you will use the pgAdmin4 utility, which was installed in your PostgreSQL installation. If you are familiar with Microsoft SQL Server, then pgAdmin4 is similar to Microsoft SQL Server Studio Express.

- Click on or tab to the **pgAdmin4** icon and press Enter to launch the application.
(Note the screen shot below shows how to start pgAdmin4 in Windows 10. You may have an icon on your desktop in other versions of Windows.)

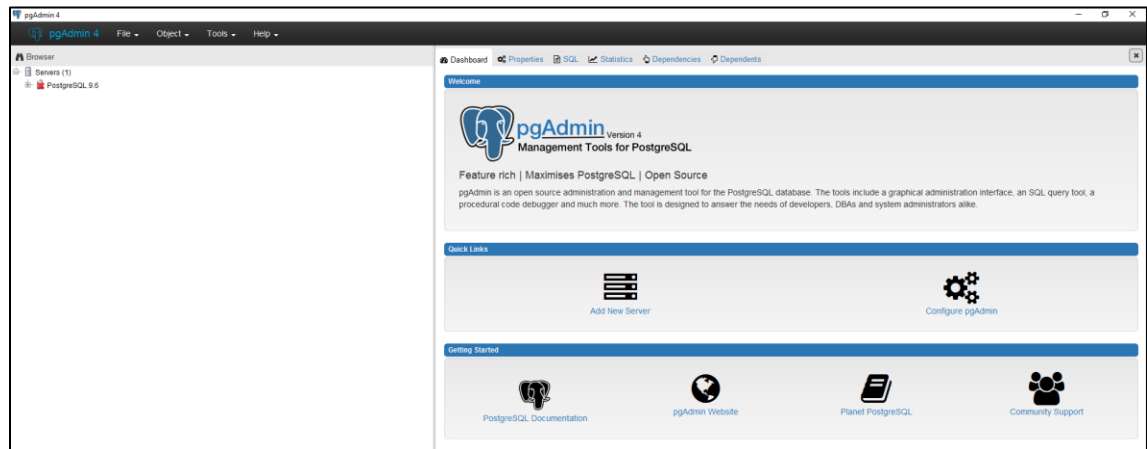


The interactive development environment should appear after a few moments.

Seeding the Database with Data

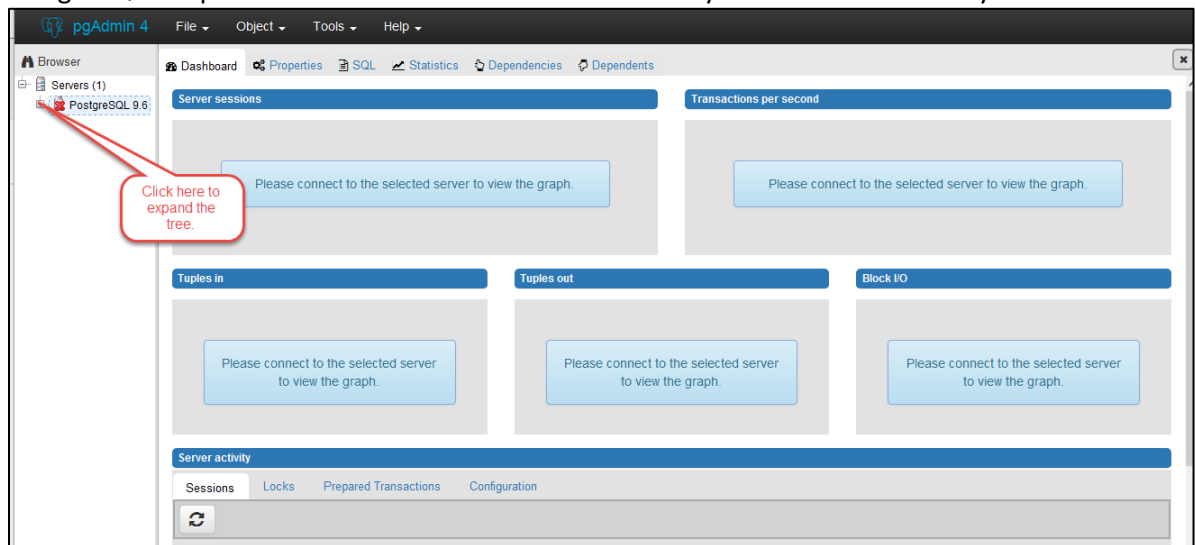
You will need to seed your database with data. You might use Microsoft's Northwind database for the exercises in this class. PostgreSQL database administrative tool is named **PgAdmin**, and if you are familiar with Microsoft's SQL Server Studio Express, PgAdmin works similarly. PgAdmin is found in the PostgreSQL bin folder.

1. In Windows, the folder is C:\Program Files\PostgreSQL***version of PostgreSQL***\pgAdmin 4\bin. The executable name is pgAdmin4.exe and has the "elephant" icon. You may want to create a desktop shortcut for this program. This screen's contents will vary based on the version you downloaded.

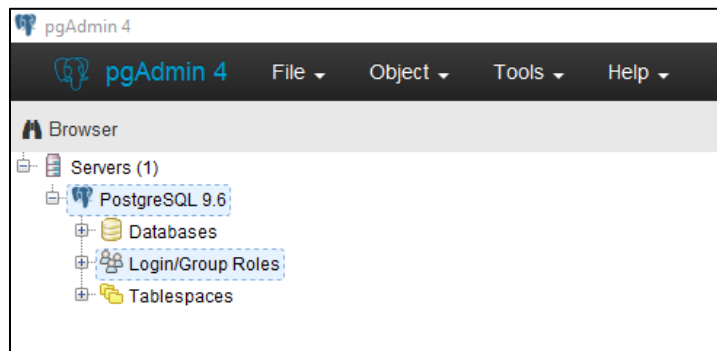


2. Next, you will create the database you will be using for this class. Click on or tab to the "+" next to *Servers (1)* and press Enter to expand the database tree. Then click on or tab to the "X" beside

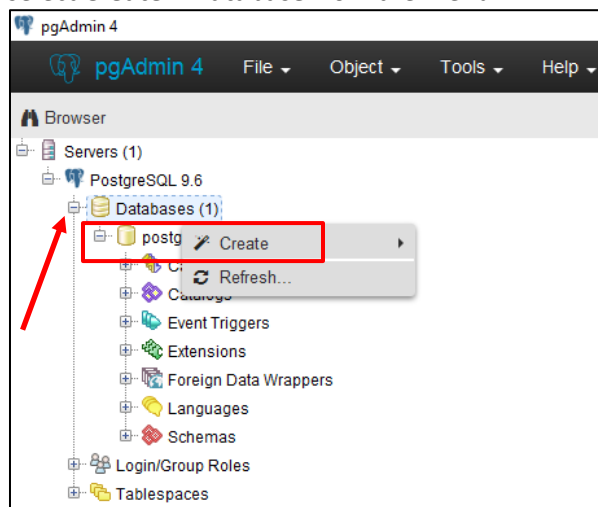
PostgreSQL and press Enter. This screen's contents will vary based on the version you downloaded.



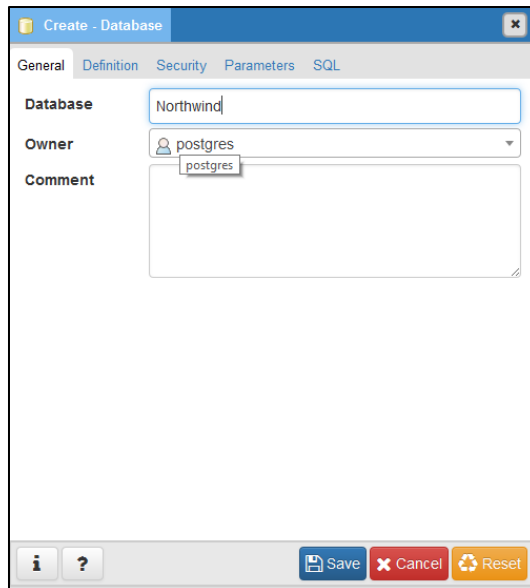
- The Postgres database tree is expanded. The version may vary after the PostgreSQL depending on the version downloaded.



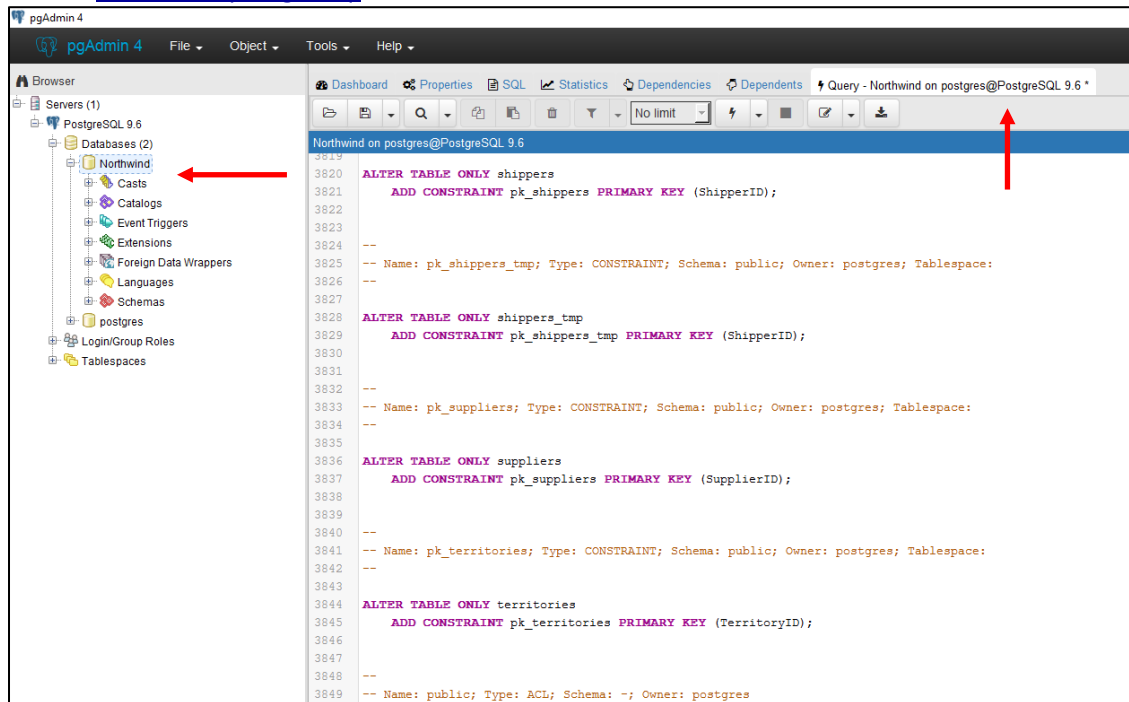
3. Expand the database tree in order to create your database. Right-click on *Databases (1)* and select **Create > Database** from the menu.



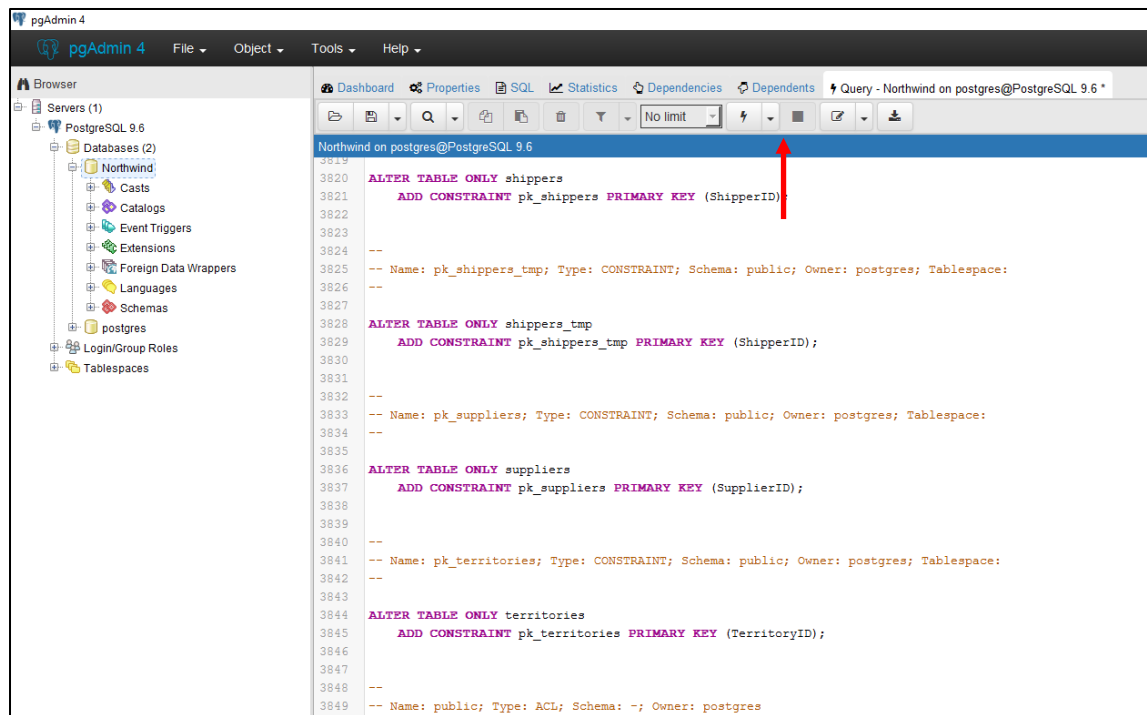
4. Enter **Northwind** as the name of your database in the *Database* field. Select the Save Button.



5. Select **Northwind** under **Databases**. Under Tools in the main menu, select the **Query Tool** and press Enter. The query editor tool displays. In the query editor, copy and paste the contents of the file [northwind.postgre.sql](#).



6. Execute the SQL statements by clicking on or tabbing to the **lightning bolt** in the menu bar and pressing Enter. This will create and seed your tables with data.



7. Expand the *Tables* tree under the *Schemas* tree. You should see the tables of the Northwind dataset. Take a screenshot of the table structure and submit it as part of your Critical Thinking Assignment (CTA) for Module 1. Our 24/7 technical support site has a set of instructions for best practices when taking a screenshot, accessed by clicking the technical support link.

Assignment Deliverables:

1. Screenshot of the PostgreSQL screen signifying a successful installation. Make sure when you set up the database, you name it "Your last name_studentID).
2. Screenshot of the Northwind database and populated tables signifying successful completion of the database operations. For all submissions, every week, you should submit the snapshot of the code and outcome it generated from your system and your database name should show up. Submitting code in MS Word will not be accepted.
3. A brief report describing your key learnings from this assignment.

MODULE 2

Readings

- Chapter 3 in *Database Design*
- Chapters 3 & 4 in *Learning PostgreSQL 10*
- McMinn, P.S., Kapfhammer, G. and Wright, C.J. (2016) *Virtual mutation analysis of relational database schemas*. In: AST '16 Proceedings of the 11th International Workshop on Automation of Software Test. 11th International Workshop on Automated Software Test (AST 2016), 14-22 May 2016 Association for Computing Machinery (pp. 36-42).
<https://dx.doi.org/10.1145/2896921.2896933> Retrieved from
<http://eprints.whiterose.ac.uk/96265/1/c42-notyetlive.pdf>
- Long, C. (2017). Access. *Strategic Finance*, 98(9), 68-69.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking Assignment (70 points)

Option #1: Relational Data Model – Order Entry

For this option, you will use the Customer, Order, and Employee tables in your *Database Design* text, pp. 73-74. Complete tasks 1 – 4 on page 74. Create a database called <studentfirst_studentlast_ID>. Create the tables in the database. Screenshots should show the database name. Typed code in the Word document will not be accepted. Submit your deliverable in a Word document. You can use Visio, Lucid-chart, or Word to create the Relationship Diagram.

Your deliverables for this assignment are:

1. CREATE table statements for the Customer table in the database and create a screenshot of the SQL code and the table side-by-side.
2. CREATE table statements for the Employee table in the database and create a screenshot of the SQL code and the table side-by-side.
3. CREATE table statements for the Order table in the database and create a screenshot of the SQL code and the table side-by-side.
4. Create an Entity Relationship Diagram with primary and foreign keys and parent and child tables.
5. A brief discussion on the primary challenges, if any, you experienced in completing this assignment.

Your paper must meet the following requirements:

- Submit your deliverables in a Microsoft Word document and make sure to include a title page.
- Follow the CSU-Global Guide to Writing and APA Requirements.

Option #2: Data Sets – Sales and Purchased Items Transactions

For this option, you will use the Sales and Purchased Items tables below. Create a database called <studentfirst_studentlast_ID>. Create the tables in the database. Screenshots should show the database name. Finally, you should explain why these two tables are not candidates for a relational model.

LastName	FirstName	Phone	InvoiceDate	InvoiceItem	Price	Tax	Total
Shire	Robert	206-524-2433	14-Dec-17	Antique Desk	3,000.00	249.00	3,249.00
Shire	Robert	206-524-2433	14-Dec-17	Antique Desk Chair	500.00	41.50	541.50
Goodyear	Katherine	206-524-3544	15-Dec-17	Dining Table Linens	1,000.00	83.00	1,083.00
Bancroft	Chris	425-635-9788	15-Dec-17	Candles	50.00	4.15	54.15
Griffith	John	206-524-4655	23-Dec-17	Candles	45.00	3.74	48.74
Shire	Robert	206-524-2433	5-Jan-18	Desk Lamp	250.00	20.75	270.75
Tierney	Doris	425-635-9677	10-Jan-18	Dining Table Linens	750.00	62.25	812.25
Anderson	Donna	360-538-7566	12-Jan-18	Book Shelf	250.00	20.75	270.75
Goodyear	Katherine	206-524-3544	15-Jan-18	Antique Chair	1,250.00	103.75	1,353.75
Goodyear	Katherine	206-524-3544	15-Jan-18	Antique Chair	1,750.00	145.25	1,895.25
Tierney	Doris	425-635-9677	25-Jan-18	Antique Candle Holders	350.00	29.05	379.05

Sales Table

PurchaseItem	PurchasePrice	PurchaseDate	Vendor	Phone
Antique Desk	1,800.00	7-Nov-17	European Specialties	206-325-7866
Antique Desk	1,750.00	7-Nov-17	European Specialties	206-325-7866
Antique Candle Holders	210.00	7-Nov-17	European Specialties	206-325-7866
Antique Candle Holders	200.00	7-Nov-17	European Specialties	206-325-7866
Dining Table Linens	600.00	14-Nov-17	Linens and Things	206-325-6755
Candles	30.00	14-Nov-17	Linens and Things	206-325-6755
Desk Lamp	150.00	14-Nov-17	Lamps and Lighting	206-325-8977
Floor Lamp	300.00	14-Nov-17	Lamps and Lighting	206-325-8977
Dining Table Linens	450.00	21-Nov-17	Linens and Things	206-325-6755
Candles	27.00	21-Nov-17	Linens and Things	206-325-6755
Book Shelf	150.00	21-Nov-17	Harrison, Denise	425-746-4322
Antique Desk	1,000.00	28-Nov-17	Lee, Andrew	425-746-5433
Antique Desk Chair	300.00	28-Nov-17	Lee, Andrew	425-746-5433
Antique Chair	750.00	28-Nov-17	New York Brokerage	206-325-9088
Antique Chair	1,050.00	28-Nov-17	New York Brokerage	206-325-9088

Purchased Items Table

Your deliverables for this assignment are:

1. CREATE TABLE statements for the Sales table and create a screenshot of the SQL code and the generated table side-by-side.
2. CREATE TABLE statements for the Purchased Items table and create a screenshot of the SQL code and the generated table side-by-side.
3. Identify the redundancies in each table
4. Explanation of why these two data sets are not candidates for a relation data model
5. A brief discussion on the primary challenges, if any, you experienced in completing this assignment

Your paper must meet the following requirements:

- Submit your deliverables in a Microsoft Word document and make sure to include a title page.
- Follow the CSU-Global Guide to Writing and APA Requirements.

MODULE 3

Readings

- Chapter 5 in *Database Design*
- Ordonez, Maabout, Matusевич, & Cabrera. (2014). Extending ER models to capture database transformations to build data sets for data mining. *Data & Knowledge Engineering*, 89(C), 38-54.
- Storey, Trujillo, & Liddle. (2015). Research on conceptual modeling: Themes, topics, and introduction to the special issue. *Data & Knowledge Engineering*, 98, 1-7.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking Assignment (70 points)

Option #1: Washington State Patrol Case Questions

Consider the traffic citation shown in the figure below. The rounded corners on this form provide graphical hints about the boundaries of the entities represented.

WASHINGTON STATE PATROL CORRECTION NOTICE

NAME		Kroenke		David M	
LAST		FIRST			
ADDRESS 5053 88 Ave SE					
CITY Mecer Island		STATE Wa		ZIP CODE 98040	
DRIVERS LICENSE 00000		STATE WA		BIRTH DATE 2/27/46	
		HGT 6		WGT 165	
VEHICLES LICENSE AAA000		STATE Wa		YEAR 90	
		COLOR		MAKE Saab	
				TYPE 900	
VIN					
REGISTERED					
OWNER					
ADDRESS					
VIOLATION DATE		MO 11 DAY 7 YEAR 2013		TIME 935	
		DIST 2		DETACH 17	
LOCATION 17 MILES E OF Enumckum ON SR410					
VIOLATIONS					
Writing text while driving					
OFFICERS SIGNATURE S Scott		PERSONNEL NUMBER 850			
<input checked="" type="checkbox"/> This is a warning, no further action is required.					
<input type="checkbox"/> You are released to take this vehicle to a place of repair. Continued operation on the roadway is not authorized.					
<input type="checkbox"/> CORRECT VIOLATION(S) IMMEDIATELY. Return this signed card for proof of compliance within 15/30 days. (if this box checked)					
DRIVERS SIGNATURE <i>[Signature]</i>					

- Create the entities for an ERD model based on the traffic citation form. Use five entities and use the data items on the form to specify identifiers and attributes for those entities. In which of these entities should you place the unique Notice Number that is the unique identifier for this notice?
- Complete the ERD model by specifying relationships among the entities. Name the relationships and specify the relationship types and cardinalities (i.e. one-to-one, one-to-many, or many-to-many). Justify the decisions you make regarding minimum and maximum cardinalities, indicating which cardinalities can be inferred from data on the form and which need to be checked out with systems users. Specify relationships among the entities. Name the relationship and give its type and cardinalities. Indicate which cardinalities can be inferred from data on the form and which need to be checked out with systems users.
- Submit your deliverable in a Word document. You can use Visio or Lucid-chart to create the Entity-Relationship Diagram.

Option #2: Curiosity Shop Data Model

A Curiosity Shop wants to expand its database applications beyond the current recording of sales. The company still wants to maintain data on customers, employees, vendors, sales, and items, but it wants to simplify the storage of inventory and customer and employee data.

Sales Table

LastName	FirstName	Phone	InvoiceDate	InvoiceItem	Price	Tax	Total
Shire	Robert	206-524-2422	12/14/2017	Antique Desk	3000.00	249.00	3249.00
Shire	Robert	206-524-2422	12/14/2017	Antique Desk Chair	500.00	41.50	541.50
Goodyear	Katherine	206-524-3544	12/15/2017	Dining Table Linens	1000.00	83.00	1083.00
Bancroft	Chris	426-635-9788	12/15/2017	Candles	50.00	4.16	54.16
Griffith	John	206-524-4656	12/23/2017	Candles	45.00	3.74	48.74
Shire	Robert	206-524-2422	1/5/2018	Desk Lamp	250.00	20.75	270.75
Tierney	Doris	425-635-8677	1/10/2018	Dining Table Linens	750.00	62.25	812.25
Anderson	Donna	360-538-3544	1/12/2018	Book Shelf	250.00	20.75	270.75
Goodyear	Katherine	206-524-3544	1/15/2018	Antique Chair	1250.00	103.75	1353.75
Goodyear	Katherine	206-524-3544	1/15/2018	Antique Chair	1750.00	145.25	1895.25
Tierney	Doris	425-635-8677	1/25/2018	Antique Candle Holders	350.00	29.05	379.05

Purchased Items Table

PurchaseItem	PurchasePrice	Purchase Date	Vendor	Phone
Antique Desk	1800.00	11/7/2017	European Specialties	206-325-7868
Antique Desk	1750.00	11/7/2017	European Specialties	206-325-7868
Antique Candle Holders	210.00	11/7/2017	European Specialties	206-325-7868
Antique Candle Holders	200.00	11/7/2017	European Specialties	206-325-7868
Dining Table Linens	600.00	11/14/2017	Linen and Things	206-325-6755
Candles	30.00	11/14/2017	Linen and Things	206-325-6755
Desk Lamp	150.00	11/14/2017	Lamps and Lighting	206-325-8977
Floor Lamp	300.00	11/14/2017	Lamps and Lighting	206-325-8977

Dining Table Linens	450.00	11/21/2017	Linen and Things	206-325-6755
Candles	27.00	11/21/2017	Linen and Things	206-325-6755
Book Shelf	150.00	11/21/2017	Harrison, Denise	425-746-4332
Antique Desk	1000.00	11/28/2017	Lee, Andrew	425-746-5433
Antique Desk Chair	300.00	11/28/2017	Lee, Andrew	425-746-5433
Antique Chair	750.00	11/28/2017	New York Brokerage	206-325-9088
Antique Chair	1050.00	11/28/2017	New York Brokerage	206-325-9088

Currently, each item is considered unique, which means that the item must be sold as a whole, and that multiple units of the item in stock must be treated as separate items in the ITEM table. The Curiosity Shop management wants the database modified to include an inventory system that will allow multiple units of an item to be stored under one ItemID. The system should allow for a quantity on hand, a quantity on order, and an order due date. If the identical item is stocked by multiple vendors, the item should be orderable from any of these vendors. The SALE_ITEM table should then include Quantity and ExtendedPrice columns to allow for sales of multiple units of an item.

The Curiosity Shop management has noticed that some of the fields in CUSTOMER and EMPLOYEE store similar data. Under the current system, when an employee buys something at the store, his or her data has to be reentered into the CUSTOMER table. The managers would like to have the CUSTOMER and EMPLOYEE tables redesigned using subtypes.

- Create the entities for an ERD model based on the Sales and Purchased Items tables, extending the entities to include the Inventory and Sales and Employee data requirement. Specify identifiers and attributes for all entities. Remove unnecessary attributes from the original entities as the three new entities are added.
- Draw an ERD model for the Curiosity Shop's entities, relationships, attributes and identifiers. Use the IE Crow's Foot ERD model for your diagrams. Justify the decisions you make regarding minimum and maximum cardinalities. Deciding on cardinalities is an important skill for data modelers

Submit your deliverable in a Word document. You can use Visio or Lucid-chart to create the Entity-Relationship Diagram.

MODULE 4

Readings

- Chapters 7 & 8 in *Database Design*
- Stiglich, P. (2014). Data modeling in the age of big data. *Business Intelligence Journal*, 19, 17-22.
- Schäfer, A., Kyle, P., & Pietzcker, R. (2016). Exploring the use of dynamic linear panel data models for evaluating energy/economy/environment models—an application for the transportation sector. *Climatic change*, 136(1), 141-154. Retrieved from <https://link.springer.com/article/10.1007%2Fs10584-014-1293-y>

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Milestone (70 points)

Option #1: Johnson Video Store

Review the business situation documented in the Portfolio Project Option 1. Your understanding of the business situation will determine your responses to the assignment requirements for the Portfolio Milestone.

1. This assignment should be of sufficient length to clearly identify and describe all entities, including their attributes by listing them. For instance, Entity –Movie. Attributes: Movie ID, Director, Format, Genre, etc.
2. Business rules should be clearly defined. Example: One customer can rent no more than three movies at a time. A customer cannot have more than one account.
3. Ensure you develop relationship sentence pairs.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*.

Option #2: Hardware Store

Review the business situation documented in the Portfolio Project Option 2. Your understanding of the business situation will determine your responses to the assignment requirements for the Portfolio Milestone.

1. This assignment should be of sufficient length to clearly identify and describe all entities, including their attributes by listing them. For instance, Entity –Tools. Attributes: Tool Id, Manufacturer, Serial Number, Suppliers, etc.
2. Peer Sentences and business rules should be clearly defined. Example: One customer can rent no more than three tools at a time.
3. Ensure you develop relationship sentence pairs.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*.

MODULE 5

Readings

- Chapters 4 & 9 in *Database Design* Reading 1
- Chapters 5 & 6 in *Learning PostgreSQL 10*
- Mullins, C. S. (2016). Designing for batch database processing. *Database Trends and Applications*, 30(5), 29.
- Mullins, C. S. (2016). Improving IT security with database auditing techniques. *Database Trends and Applications*, 30(4), 33.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking Assignment (70 points)

Option #1: Order Entry

Refer to Critical Thinking Assignment – Option 1 in Module 2. Your tasks begin by generating and executing the SQL statements to create the Customer, Employee, and Order tables. Next, you will develop and execute the SQL statements to populate the 3 database tables from the data in the 3 tables on pages 73-74 in the *Database Design*. Finally, you will write and execute queries to display the data from all attributes (columns) and tuples (rows) in the 3 database tables.

Important reminder, refer to the instructions from Module 1 for creating database. This step must be completed before you can create and populate tables within the database.

The deliverables for this assignment are:

1. Screenprint after the database is created.
2. Screenprint after the 3 database tables are created.
3. Screenprint of the query results of the contents for each table.
4. A brief description of your key learnings from this assignment.

Option #2: Sales Transactions

Refer to Critical Thinking Assignment – Option 2 in Module 2. Your tasks begin by generating and executing the SQL statements to create the Sales and Purchased Items tables. Next, you will develop and execute the SQL statements to populate the 2 database tables from the data in their respective tables in the Critical Thinking Assignment. Finally, you will write and execute queries to display all attributes (columns) and tuples (rows) in the 2 database tables.

Important reminder, refer to the instructions from Module 1 for creating database. This step must be completed before you can create and populate tables within the database.

The deliverables for this assignment are:

1. Screenprint after the database is created.
2. Screenprint after the 2 database tables are created.
3. Screenprint of the query results for each table.
4. A brief description of your key learnings from this assignment.

MODULE 6

Readings

- Chapters 12 and 13 in *Database Design*
- Chapter 8 in *Learning PostgreSQL*
- Gonzales, R., Wareham, J., & Serida, J. (2015). Measuring the impact of data warehouse and business intelligence on enterprise performance in Peru: A developing country. *Journal of Global Information Technology Management*, 18(3), 162-187.
- Schraml, T. (2017). Updating facts is not a good practice. *Database Trends and Applications*, 31(3), 60.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking Assignment (80 points)

Option #1: Star Schema – JigSaw database

Utilize the JigSaw SQL file in the assignment folder to create a Star Schema diagram. Remember, to create a Star Schema from a normalized data model, you will need to denormalize the data model into fact and dimension tables.

The diagram should contain all of the facts and dimension tables necessary to integrate the JigSaw operational database into a data warehouse. Write a brief paper describing the challenges you experienced in completing this assignment.

Option #2: Star Schema – Northwind database

Utilize the normalized Entity-Relationship Diagram in the assignment folder to create a Star Schema Diagram. Remember, to create a Star Schema from a normalized data model, you will need to denormalize the data model into fact and dimension tables.

The diagram should contain all of the fact and dimension tables necessary to integrate the Northwind operational database into a data warehouse. Write a brief paper describing the challenges you experienced in completing this assignment.

MODULE 7

Readings

- Chapters 14 & 15 in *Database Design*
- Bellatreche, L., Cuzzocrea, A., & Song, I. (2015). Advances in data warehousing and OLAP in the big data era. *Information Systems*, 53, 39.
- Labouseur, A., & Matheus, C. (2017). An introduction to dynamic data quality challenges. *Journal of Data and Information Quality (JDIQ)*, 8(2), 1-3.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

MODULE 8

Readings

- Chapter 16 in *Database Design*
- Chapter 11 in *Learning PostgreSQL 10*
- Creating Metadata and a Data Dictionary (n.d.) <https://data.ca.gov/pages/creating-metadata-and-data-dictionary>

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Project (280 points)

Option #1: Johnson Video Store

You are a database consultant with Ace Software, Inc., and have been assigned to develop a database for the Johnson Video Store in town. The owners have been keeping their records of videos and DVDs purchased from distributors and rented to customers in stacks of invoices and piles of rental forms for years. They have finally decided to automate their record keeping with a relational database.

You sit down with the owners to discuss their business and watch their operation for about a week. You discover quickly that a video and a DVD are both copies of a movie kept in a separate plastic case that is

rented out. They have several copies of each movie they rent; therefore, there are several videos and DVDs for each movie title. You learn that in their inventory they have several thousand videos and DVDs, which they get wholesale from about a half dozen distributors. The video and DVD prices for them are based on the quantity of their shipment and the past business they have done with each company.

The price of a DVD for a movie might be different from the price of a video for the same movie, even from the same distributor. Each distributor provides different types of movies (e.g., suspense, horror, mystery, comedy, etc.). A single distributor may provide several different types of movies in both video and DVD format. It is possible to obtain the same movie from multiple distributors and at different wholesale prices.

Each video and DVD has a unique identification number that The owners assign in their inventory, in addition to the distributor's serial number for the item. Each movie also has a unique identification number. The owners assign in addition to the title and any movie IDs the distributors use in their electronic catalogs. Distributors provide electronic catalogs to the owners, and the information from these catalogs must be included in the database.

The owners need to record when a video or DVD is rented, when a video or DVD is returned, and all customer charges such as late and damaged fees, failure to rewind fees, and taxes. They need a report of which videos are returned late because there are standard and late charges. On occasion, there are discount prices for specific movies or types of movies. Customers want to rent movies based on actors or actresses, running length, type of movie, rating, year released, the director, and the Academy Awards won (by the movie, the actors, the actresses and/or the directors). Customers also want to know how many videos they have rented in the last month, year, and so forth. The owners need to keep only basic information on customers in their database, such as name, address, telephone numbers, etc.

There must be no limit to the number of video and/or DVD copies of a movie that the owners can have in their inventory. Video/DVD ID numbers, movie ID numbers, and distributor ID numbers for videos, DVDs, and movies are all different. Also, each movie must be able to have an unlimited number of actors, actresses, directors, and Academy Awards (i.e., Oscars). Other types of awards (e.g., Golden Globe, People's Choice, etc.) are not of interest for this application. The rental of equipment, sale of videos, DVDs, popcorn, etc., is not to be kept in the database.

1. Draw an ERD utilizing a software of your choice.
2. Develop metadata from the ERD and document in an Excel spreadsheet.
3. Using PostgreSQL, develop and execute an SQL script file of DDL SQL to create the database tables in the metadata document.
4. Using PostgreSQL, develop and execute an SQL script file of DML SQL INSERT statements to populate the tables using SQL INSERT statements for at least 5 rows of data per table.
5. Using PostgreSQL develop and execute an SQL script file to:
 1. Show the contents of all tables
 2. Retrieve all of the customers' names, account numbers, and addresses (street and zip code only), sorted by account number
 3. Retrieve all of the DVDs rented in the last 30 days and sort in chronological rental date order
 4. Update a customer name to change their maiden names to married names. You can choose which row to update. Make sure that you use the primary key column in your WHERE clause to affect only a specific row.

5. Delete a specific customer from the database. You can choose which row to delete. Make sure that you use the primary key column in your WHERE clause to affect only a specific row.

The metadata should be submitted in an Excel spreadsheet. All other outputs for the database design, SQL code, and SQL results should be submitted in a single Word file in order, by step, and clearly labeled. The Word file should also have a preface describing the database lifecycle steps and methodologies and a conclusion section containing lessons learned from this project.

Your paper should be 6-10 pages in length, not including the cover page and references page, and conform to *CSU-Global Guide to Writing and APA*. Include at least five credible references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option #2: Hardware Store

You are a database consultant and have been hired by a small business owner to develop a database for his hardware store.

The business is a local hardware store that rents out tools.

For last year or so, the owners have been using a spreadsheet to keep track of everything, but now that business has picked up, that seems impossible.

The first order of business for you is to sit down with the owners and try to understand the business model. You ask for some existing documentations like spreadsheets, order forms, etc. During the interviews, you learn that the store has a significant number of tools from simple indoor repairs, to yard and lawn maintenance. They get tools from the following manufacturers: Bosch, Craftsman, DeWalt, Dremel, Kobalt, Makita, Milwaukee, PorterCable, Rigid, Ryobi, Stanley, Hilt, Hitachi, Husky and Bostitch.

Each tool has an identification number which is unique for the store, but it has a serial number from the manufacturer as well. They get their tools through three different suppliers (Supplier A, Supplier B and Supplier 3).

They want to make sure that they still can have an unlimited number of tools in inventory, but the customer cannot rent more than three tools at a time. Customers cannot have more than three tools in possession at any time. For instance, if a customer has already rented three tools but needs another one, he/she must return at least one to get another one.

They want to make sure that system can have the tools recorded in multiple ways like by manufacturer, supplier, area of use, power system (battery, AC or fuel), price, rental fee, insurance, etc. They want to list existing customers and add new ones as they project growth.

1. Draw an ERD utilizing a software of your choice.
2. Develop metadata from the ERD and document in an Excel spreadsheet.
3. Using PostgreSQL, develop and execute an SQL script file of DDL SQL to create the database tables in the metadata document.
4. Using your PostgreSQL, develop and execute an SQL script file of DML SQL INSERT statements to populate the tables using SQL INSERT statements for at least 5 rows of data per table.
5. Using PostgreSQL develop and execute an SQL script file to:

1. Show the contents of all tables

2. Retrieve all of the customers' names, account numbers, and addresses (street and zip code only), sorted by account number
3. Retrieve all of the tools rented in the last 30 days and sort in chronological rental date order
4. Update a customer name to change their maiden names to married names. You can choose which row to update. Make sure that you use the primary key column in your WHERE clause to affect only a specific row.
5. Delete a specific customer from the database. You can choose which row to delete. Make sure that you use the primary key column in your WHERE clause to affect only a specific row.

The metadata should be submitted in an Excel spreadsheet. All other outputs for the database design, SQL code, and SQL results should be submitted in a single Word file in order, by step, and clearly labeled.

The Word file should also have a preface describing the database lifecycle steps and methodologies and a conclusion section containing lessons learned from this project.

Your paper should be 6-10 pages in length, not including the cover page and references page, and conform to *CSU-Global Guide to Writing and APA*. Include at least five credible references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

COURSE POLICIES

Course Grading

20% Discussion Participation
0% Opening Exercises
0% Live Classroom
8% Mastery Exercises
37% Critical Thinking Assignments
35% Final Portfolio Project

Grading Scale	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

IN-CLASSROOM POLICIES

For information on late work and incomplete grade policies, please refer to our [In-Classroom Student Policies and Guidelines](#) or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

Academic Integrity

Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /repurposing your own work (see *CSU-Global Guide to Writing and APA Requirements* for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and Internet resources.

Citing Sources with APA Style

All students are expected to follow the *CSU-Global Guide to Writing and APA Requirements* when citing in APA (based on the APA Style Manual, 6th edition) for all assignments. For details on CSU-Global APA style, please review the APA resources within the CSU-Global Library under the “APA Guide & Resources” link. A link to this document should also be provided within most assignment descriptions in your course.

Disability Services Statement

CSU-Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

Netiquette

Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults, or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.