

COMP310 Competencies

1. **(Work with Existing Relational DB)** Given a schema for an existing database, work alone or with a team to develop SQL queries to meet a customer's needs. Be able to present the results of the queries to the customer and/or interface those results with the customer's software application requirements.

<u>Knowledge Area</u>	<u>Skill Level</u>
1 - Database Environments	Understanding
3 - SQL	Applying
9a - Analytical and Critical Thinking	Applying
9b - Collaboration and Teamwork	Applying
9d - Mathematics and Statistics	Understanding
9k - Research and Self-Starter/Learner	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Collaborative	Adaptable

2. **(Evaluate DB against Requirements)** Given a schema for an existing database, evaluate that database's design against user requirements and present your findings to a technical audience.

<u>Knowledge Area</u>	<u>Skill Level</u>
1 - Database Environments	Applying
2 - Relational Data Model	Evaluating
4 - Database Design	Evaluating
9a - Analytical and Critical Thinking	Applying
9b - Collaboration and Teamwork	Applying
9d - Mathematics and Statistics	Understanding
9k - Research and Self-Starter/Learner	Applying
9f/9m - Oral & Written Communication	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Purpose-Driven	Adaptable
Professional	Responsible		

3. **(Design a DB given Requirements)** Given the requirements for a customer or organization, work with a team to design and implement a relational database that meets their needs.

<u>Knowledge Area</u>	<u>Skill Level</u>
1 - Database Environments	Applying
2 - Relational Data Model	Creating
3 - SQL	Applying
4 - Database Design	Creating
9a - Analytical and Critical Thinking	Applying
9b - Collaboration and Teamwork	Applying
9d - Mathematics and Statistics	Understanding
9k - Research and Self-Starter/Learner	Applying
9e - Multi-Task Prioritization and Management	Applying
9l - Time Management	Applying
9j - Relationship Management	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Purpose-Driven	Adaptable
Professional	Responsible	Responsive	Inventive

4. **(Sharing a DB)** Work as part of a team to support a non-technical customer/user in their efforts to determine if a database approach to their problem suits their needs and layout the benefits, drawbacks, and requirements of such an approach.

<u>Knowledge Area</u>	<u>Skill Level</u>
1 - Database Environments	Applying
2 - Relational Data Model	Understanding
4 - Database Design	Analyzing
9a - Analytical and Critical Thinking	Applying
9b - Collaboration and Teamwork	Applying
9d - Mathematics and Statistics	Understanding
9k - Research and Self-Starter/Learner	Applying
9f/9m - Oral & Written Communication	Applying
9c - Ethical and Intercultural Perspectives	Applying
9j - Relationship Management	Applying

<u>Dispositions</u>			
Meticulous	Self-Directed	Purpose-Driven	Adaptable
Professional	Responsible	Responsive	

COMP310 Knowledge Areas

1. Database Environments and DBMSs
 - a. External - Conceptual - Internal ANSI-SPARC Arch.
2. Relational Data Model
 - a. Data Structures
 - b. Integrity Constraints
 - c. Relational Algebra
 - d. Relational Calculus
3. Standard Query Language (SQL)
 - a. Data Manipulation
 - i. Selecting
 - ii. Ordering
 - iii. Grouping
 - iv. Aggregates
 - v. Subqueries
 - vi. Any,all,exists,not exists
 - vii. Joins (Inner,Outer, left, right)
 - viii. Set Operations
 - b. Data Definition
 - i. Data Types and Integrity Constraints
 - ii. Creating and altering tables and indices
 - iii. Creating Views
4. Database Design
 - a. Entity-Relationship Modeling (ER Modeling)
 - b. Relational Database Normalization
 - c. Database Design & Development Methods
5. *Professional Knowledge (Table 4.2 from CC2020 (pg 50))*
 - a. Analytical and Critical Thinking
 - b. Collaboration and Teamwork
 - c. Ethical and Intercultural Perspectives
 - d. Mathematics and Statistics
 - e. Multi-Task Prioritization and Management
 - f. Oral Communication and Presentation
 - g. Problem Solving and Troubleshooting
 - h. Project and Task Organization and Planning
 - i. Quality Assurance / Control
 - j. Relationship Management
 - k. Research and Self-Starter/Learner
 - l. Time Management
 - m. Written Communication

COMP310 Skills Hierarchy (Bloom's Taxonomy, CC2020 pg 50)

1. *Remembering* - Recall facts, terms, concepts, answers, etc.
2. *Understanding* - Be able to organize, compare, translate, interpret, and give descriptions of facts and ideas
3. *Applying* - Use knowledge, ideas, facts in different ways to solve problems in new situations.
4. *Analyzing* - Make inferences and find evidence to support solutions
5. *Evaluating* - Make judgements about information, validity of ideas, or quality of material
6. *Creating* - Combine elements of information in a new pattern or propose alternative solutions.

COMP310 Dispositions (From CC2020, pg 51.)

1. Adaptable
2. Collaborative
3. Inventive
4. Meticulous
5. Passionate
6. Proactive
7. Professional
8. Purpose-Driven
9. Responsible
10. Responsive
11. Self-directed

COMP310 Task Environments

1. Given a pre-designed database, understand its structure and be able to develop SQL queries to that database.
2. Evaluate a relational database design using ER Modeling and Normalization
3. Normalize a Database
4. Design & develop a relational database from high-level requirements using ER modeling and normalization techniques