Information Management Practice – 6%

Domain Scope

1. Tools and techniques for efficient data modeling, collection, organization, retrieval, and management.
2. How to extract information from data to make data meaningful to the organization.
3. How to develop, deploy, manage and integrate data and information systems to support the organization.
4. Safety and security issues associated with data and information.
5. Tools and techniques for producing useful knowledge from information.

Domain Competencies

A. Express how the growth of the internet and demands for information have changed data handling and transactional and analytical processing, and led to the creation of special purpose databases. *(Requirements)*
B. Design and implement a physical model based on appropriate organization rules for a given scenario including the impact of normalization and indexes. *(Requirements and development)*
C. Create working SQL statements for simple and intermediate queries to create and modify data and database objects to store, manipulate and analyze enterprise data. *(Testing and performance)*
D. Analyze ways data fragmentation, replication, and allocation affect database performance in an enterprise environment. *(Integration and evaluation)*
E. Perform major database administration tasks such as create and manage database users, roles and privileges, backup, and restore database objects to ensure organizational efficiency, continuity, and information security. *(Testing and performance)*

Information Management Practice Subdomains

01 Perspectives and impact
(Level 1 minimal degree of engagement)
Competencies:

a. Describe how data storage and retrieval has changed over time.
b. Justify the advantages of a database approach compared to traditional file processing.
c. Describe how the growth of the internet and demands for information for users outside the organization (customers and suppliers) impact data handling and processing.
d. Tell a brief history of database models and their evolution.

02 Data-information concepts
(Level 2 medium degree of engagement)
Competencies:

a. Describe the role of data, information, and databases in organizations.
b. Compare and use key terms such as: information, data, database, database management system, metadata, and data mining.
c. Illustrate data quality, accuracy, and timeliness, and explain how their absence will impact organizations.
d. Describe mechanisms for data collection and their implications (automated data collection, input forms, sources).
e. Describe basic issues of data retention, including the need for retention, physical storage, backup, and security.

03 Data modeling
(Level 3 large degree of engagement)
Competencies:

a. Design Entity Relationship diagrams based on appropriate organizational rules for a given scenario.
b. Describe the relationship between a logical model and a physical model.
c. Evaluate importance of database constraints.
d. Design a physical model for the best performance including impact of normalization and indexes.
e. Compare and contrast the differences and similarities between the relational and the dimensional data modeling (OLTP vs. OLAP).

04 Database query languages
(Level 3 large degree of engagement)
Competencies:

a. Create, modify, and query database objects using the Structured Query Language (SQL).
b. Perform filtering and sorting data using various clauses including where, order by, between, like, group by, and having.
c. Use joins to select data across multiple tables.
d. Use embedded SQL queries.
e. Perform calculations in a query using calculated fields and aggregate functions.
f. Create updatable and non-updatable views.

05 Data organization architecture
(Level 3 large degree of engagement)
Competencies:

a. Demonstrate select, project, union, intersection, set difference, and natural join relational operations using simple example relations provided.
b. Contrast and compare relational databases concepts and non-relational databases including object-oriented, XML, NewSQL and NoSQL databases.
c. Express the relationship between functional dependencies and keys, and give examples.
d. Evaluate data integrity and provide examples of entity and referential integrity.
e. Analyze how data fragmentation, replication and allocation affect database performance.

06 Special-purpose databases
(Level 1 minimal degree of engagement)
Competencies:

a. Describe major concepts of object oriented, XML, NewSQL, and NoSQL databases.
b. Demonstrate an understanding of online analytical processing and data warehouse systems.
c. Describe methods of data mining and what insights may be gained by these methods.

07 Managing the database environment
(Level 2 medium degree of engagement)
Competencies:

a. Contrast and compare data administration and database administration.
b. Describe tasks commonly performed by database administrators.
c. Create and manage database users, roles, and privileges.
d. Consider the concept of database security and backup and recovery.
e. Evaluate the importance of metadata in database environment.

Note: Level L1 (L1) used within a subdomain indicates a minimal degree of engagement associated with the learning proficiency of the fundamentals of the subdomain.

Levels 2 (L2) and 3 (L3) used within a subdomain indicate medium and large degrees of learning engagement associated with the application and transferring of learning to complex problems and situations.