CoLAB IT Pathways
Data Management KSAs for Curriculum Alignment

2. Data Modeling and Design

	KSA Description	Knowledge, Skill, or Ability?	Bloom's Taxonomy Level?	Cross-cutting KSAs
a	Describe the System Development Life Cycle (SDLC) and differentiate the waterfall vs agile approaches.	Knowledge	3	
b	Explain data modeling and identify the various types of data models (including relational, object-oriented and NoSQL).	Knowledge	2	
c	Understand the significance of business requirements and be able to elicit and document those requirements.	Skill	3	
d	Describe business rules and demonstrate ability to translate them into the components of a data model.	Ability	3	
e	Explain basic data modeling components including entities, attributes, attribute domains, identifiers, relationships and cardinality.	Knowledge	3	
f	Describe and differentiate conceptual, logical and physical data models.	Knowledge	3	
g	Awareness of the various ER diagramming techniques (such as Chen, Crow's Foot, UML class, Object-role, etc.).	Knowledge	2	
h	Identify appropriate techniques and create an ER diagram (ERD) to graphically represent a data model.	Ability	3	
i	Evaluate and apply appropriate data structures and data types.	Ability	4	
j	Ability to normalize a database through 3rd normal form.	Ability	3	Software Development
k	Describe normalization and denormalization and its associated benefits and risks.	Knowledge	2	
l	Demonstrate ability to implement primary and foreign keys and indexes.	Ability	3	

m	Recognize the capabilities of data modeling (software) tools.	Knowledge	2	
n	Demonstrate ability to use basic SQL data definition language such as Create Table/Index, Alter Table/Index, Drop Table/Index.	Ability	4	
o	Understand performance requirements for the database.	Knowledge	2	