

Table 2

Learning and Measurable Objectives by Construct Set for the Course Objective *Construct Conceptual Data Models (Conceptual Modeling)*

Learning Objectives	Set	Example Measures (Quadrants for ECS)
Entities		
- Strong and weak	MCS	- Appropriate use of entity types
- Aggregate and composite	ECS	- Appropriate use of advanced entity types (TN/TT)
Attributes		
- Basic types and key notation/construction	MCS	- Correct attribute and key notation - Correct primary key and foreign key construction
- Composite, multivalued, and derived	MCS	- Correct use and labeling of advanced data types
Relationships		
- Cardinalities	MCS	- Identify, assign, and justify minimum and maximum cardinalities (e.g., one-to-one/many, mandatory/optional)
- Degrees	MCS	- Identify relationship degree (e.g., unary, binary, ternary) - Construct relationship of appropriate degree
Supertypes and subtypes		
- Inheritance	ECS	- Identify inherited supertype attributes (TN/TT)
- Constraints (completeness and disjointness)	ECS	- Assign appropriate constraints (TN/TT)
- Discriminators	ECS	- Integrate subtype discriminators (TN/TT)
- Relationships	ECS	- Appropriate use of supertype/subtype relationships with external entities (TN/TT)

Abbreviations: ECS, extended construct set; MCS, minimum construct set; N, nontechnical; T, technical.

Notes: Quadrants listed for each ECS measure are defined in Table 1 and would be measured by a combination of the student survey and students' progress. The ECS and MCS for the objective in this example are available in Tables 3 and 4 of the following source (the previous article in this series).

Source: Hylock, Ray, and Susie T. Harris. "Healthcare Database Management for Health Informatics and Information Management Students: Challenges and Instruction Strategies—Part 1." *Educational Perspectives in Health Informatics and Information Management* (Winter 2016): 1–24.