DATABASE FUNDAMENTALS

Curriculum Content Frameworks

Please note: All assessment questions will be taken from the knowledge portion of these frameworks.

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DATABASE FUNDAMENTALS

Grade Levels: 10, 11, 12 Course Code: 492560	Prerequisite: Keyboarding CBA or Word Processing I Algebra I

Course Description: The Data Modeling course is a one semester course that is largely conceptual in that students are challenged to identify patterns or connections between information that is not obviously related and to identify key or underlying issues in complex situations. Student activities are designed to include using creative, conceptual, and inductive reasoning. Students learn how to transform business information needs into entity relationship diagrams and, later, into a relational database.

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Unit 1: Introduction to Database Fundamentals
Hours: 10

Terminology: Attribute, Business needs, Conceptual model, Data, Data model, Data type, Distribution, Entity, Entity relationship diagram, Finance, Graphical user interface, Grid computing, Hardware, Infrastructure, Instance, Mandatory, Null, Operating system, Optional, Physical model, Relationship, Unique identifier (UID), Venture capitalist, Volatile

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
1.1	Define terminology	1.1.1	Prepare a list of terms with definitions	Foundation	Reading Writing	Applies/Understands technical words that pertain to database fundamentals [1.3.6] Uses words appropriately [1.6.21]
1.2	Identify examples of jobs, salaries, and opportunities that could result from obtaining database certification	1.2.1	Create a report from the occupational outlook handbook with examples of jobs, salaries, and opportunities that could result from obtaining database certification	Foundation Personal Management	Reading Writing Career Awareness, Development, and Mobility	Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23] Summarizes written information [1.6.17] Develops skills to locate, evaluate, and interpret career information [3.1.4]
1.3	List at least three key facts about the importance of a postsecondary education	1.3.1	Discuss with the class three key facts about the importance of a postsecondary education	Foundation	Speaking Writing	Participates in conversation, discussion, and group presentations [1.5.8] Summarizes written information [1.6.17]
1.4	Discuss the history of computing	1.4.1	Using the Internet, research and illustrate the history of computing	Foundation	Listening Reading Speaking Writing	Listens for conversation [1.2.4] Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23] Communicates a thought, idea, or fact in spoken form [1.5.5] Takes notes from various sources [1.6.18]
1.5	Enumerate key points in the history of Oracle Corporation and its database technologies	1.5.1	Identify key points in the history of Oracle Corporation and its database technologies	Foundation	Reading Writing	Identifies relevant details, facts, and specifications [1.3.16] Takes notes from various sources [1.6.18]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
1.6	Identify modern database applications used in everyday life	1.6.1	Research and discuss modern database applications used in everyday life	Foundation	Reading Speaking Writing	Identifies relevant details, facts, and specifications [1.3.16] Communicates a thought, idea, or fact in spoken form [1.5.5] Takes notes from various sources [1.6.18]
1.7	Describe the evolution of the database	1.7.1	Create a timeline to show the evolution of a database	Foundation	Reading Writing	Identifies relevant details, facts and specifications [1.3.16] Summarizes written information [1.6.17]
1.8	Compare and contrast the concepts of data and information	1.8.1	Discuss examples of data and information	Foundation	Listening Reading Speaking	Listens for conversation [1.2.4] Identifies relevant details, facts, and specifications [1.3.16] Communicates a thought, idea, or fact in spoken form [1.5.5]
1.9	Describe the database development process	1.9.1	Identify the steps of the database development process	Foundation	Reading Writing	Identifies relevant details, facts, and specifications [1.3.16] Takes notes from various sources [1.6.18]
1.10	Identify specific areas of business that use database technology and explain how it is integral to their success	1.10.1 1.10.2	Identify business areas that use database technology Explain how database technology is integral to business success	Foundation	Reading Speaking Writing	Identifies relevant details, facts, and specifications [1.3.16] Communicates a thought, idea, or fact in spoken form [1.5.5] Takes notes from various sources [1.6.18]
1.11	List the reasons for tracking and storing data	1.11.1	Create a list of reasons for tracking and storing data	Foundation	Reading Writing	Identifies relevant details, facts, and specifications [1.3.16] Analyzes data, summarizes results, and makes conclusions [1.6.2]
1.12	List the reasons for building a conceptual model	1.12.1	Create a list of reasons for building a conceptual model	Foundation	Reading Writing	Identifies relevant details, facts, and specifications [1.3.16] Analyzes data, summarizes results, and makes conclusions [1.6.2]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
1.13	Compare and contrast logical and physical data models	1.13.1	Discuss examples of logical and physical data models	Foundation	Listening Speaking	Evaluates oral information/presentation [1.2.2] Communicates a thought, idea, or fact in spoken form [1.5.5]

Unit 2: Entities, Attributes, and Relationships
Hours: 18

Terminology: Barred relationship, Business rule, Cardinality, Convention, Degree, ERDish, Exhaustive, Intersection entity, Many-to-Many, Matrix diagram, Mutually exclusive, Non-transferability, One-to-Many, One-to-One, Optionality, Procedural business rule, Redundancy, Reserved words, Revenue, Softbox, Source document, Structural business rule, Subentity, Subtype, Supertype, Transferability

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
2.1 Define terminology	2.1.1 Prepare a list of terms with definitions	Foundation	Reading	Applies/Understands technical words that pertain to entities, attributes, and relationships [1.3.6]
			Writing	Uses words appropriately [1.6.21]
2.2 Compare and contrast entities and instances of entities	2.2.1 Create sets of examples demonstrating differentiation of entities and instances of entities	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Problem Solving	Comprehends ideas and concepts related to entities and instances [4.4.1]
2.3 Identify those aspects of a business about which data must be known when given a brief description of the business	2.3.1 List the entities and attributes to be tracked about a business when given a written description of a business	Foundation	Reading	Identifies relevant details facts and specifications [1.3.16]
			Writing	Organizes information into an appropriate format [1.6.10]
		Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
2.4 Identify and describe attributes for a given entity	2.4.1 Create a list of attributes for a given entity	Thinking	Creative Thinking	Uses imagination to create something new [4.1.1]
2.5 Identify sample values for an attribute to support its inclusion in a data model	2.5.1 Identify possible values for a given attribute and support the attributes inclusion in a data model	Thinking	Problem Solving	Comprehends ideas and concepts related to attributes and values [4.4.1]
			Reasoning	Determines which conclusions are correct [4.5.3]
2.6 Compare the difference between an attribute and its value	2.6.1 Categorize an item as either attribute or a value	Thinking	Problem Solving	Comprehends ideas and concepts related to attributes and values [4.4.1]
			Reasoning	Determines which conclusions are correct [4.5.3]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
2.7	Identify how to apply the rule that an attribute can have only one value at a given point in time	2.7.1	Identify and explain violations of the rule that an attribute can have only one value at a given point in time	Foundation	Reading	Evaluates written information for accuracy, appropriateness, and style [1.3.14]
					Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
				Thinking	Problem Solving	Comprehends ideas and concepts related to attributes and values [4.4.1]
					Reasoning	Determines which conclusions are correct [4.5.3]
2.8	Identify unique identifiers for a given entity	2.8.1	Determine which of an entity's attributes can be selected as its unique identifier	Foundation	Reading	Locates pertinent information in documents, such as manuals, graphs, and schedules to perform tasks [1.3.18]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
2.9	Know the four goals of entity relationship modeling	2.9.1	Identify the four goals of entity relationship modeling	Foundation	Reading	Identifies relevant details facts and specifications [1.3.16]
2.10	Know the major types of databases	2.10.1	List and discuss the major types of databases	Foundation	Speaking	Participates in conversation, discussion, and group presentations [1.5.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.11	Discuss and interpret relationship optionally	2.11.1	Explain the meaning of a given ERD containing various optionality	Foundation	Reading	Uses graphs/charts/tables to obtain factual information [1.3.21]
					Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
2.12	Discuss and interpret relationship cardinality	2.12.1	Explain the meaning of a given ERD containing various cardinality	Foundation	Reading	Uses graphs/charts/tables to obtain factual information [1.3.21]
					Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
2.13	Describe ER diagramming conventions	2.13.1	Demonstrate ER diagramming conventions	Foundation	Listening	Comprehends ideas and concepts related to ER diagramming conventions [1.2.1]
					Writing	Uses words appropriately [1.6.21]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
2.14	List the ER diagramming conventions	2.14.1	Create an ER diagram that represents entities, attributes, and relationships according to diagramming conventions	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.15	Identify relationships between pieces of data	2.15.1	Articulate relationships between disparate pieces of data	Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
					Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.16	Explain how to interpret and name entity relationships	2.16.1	Construct sentences that explain the relationship between two entities in an ERD	Foundation	Reading	Uses graphs/charts/tables to obtain factual information [1.3.21]
					Writing	Uses words appropriately [1.6.21]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.17	Identify relationships using a matrix diagram	2.17.1	Create a matrix diagram indicating the relationships in a business description	Foundation	Reading	Identifies relevant details facts and specifications [1.3.16]
					Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.18	Identify key elements of source documents by identifying entities, attributes, and relationships	2.18.1	List the entities, attributes, and relationships found in a business document	Foundation	Reading	Identifies relevant details facts and specifications [1.3.16]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]

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Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
2.19 Describe a business represented by an entity relationship diagram	2.19.1 Create a written description of a business represented by an entity relationship diagram	Foundation	Reading	Uses graphs/charts/tables to obtain factual information [1.3.21]
			Writing	Uses words appropriately [1.6.21]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.20 Explain an ERD based on an understanding of business needs	2.20.1 Present and defend an entity relationship model based on an understanding of the described business needs	Foundation	Reading	Identifies relevant details facts and specifications [1.3.16]
			Speaking	Organizes ideas and communicates oral messages to listeners [1.5.7]
				Speaks effectively using appropriate eye contact, gestures, and posture [1.5.11]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.21 Identify examples of supertypes and subtypes	2.21.1 Demonstrate examples of supertypes and subtypes	Foundation	Reading	Locates pertinent information in documents, such as manuals, graphs, and schedules to perform tasks [1.3.18]
		Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
2.22 Discuss the rules relating to entities and subtypes	2.22.1 List the rules relating to entities and subtypes	Foundation	Writing	Uses words appropriately [1.6.21]
2.23 Identify inaccuracies in an ERD including supertypes and subtypes	2.23.1 Appraise the accuracy of an ERD including supertypes and subtypes	Foundation	Reading	Evaluates written information for accuracy, appropriateness, and style [1.3.14]
			Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
		Thinking	Problem Solving	Uses imagination to create something new [4.1.1]
			Reasoning	Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
2.24	Recall the rules of supertype and subtype and include them in a diagram	2.24.1	Create a diagram including supertype/ subtype modeling based on a written description of a business	Foundation	Reading	Locates pertinent information in documents, such as manuals, graphs, and schedules to perform tasks [1.3.18]
					Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
2.25	Compare and contrast structural and procedural business rules	2.25.1	Create sets of examples demonstrating differentiation of structural and procedural business rules	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Creative Thinking	Uses imagination to create something new [4.1.1]
2.26	Discuss business rules that must be implemented through programming	2.26.1	Create business rules that must be implemented through programming	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.27	Identify business rules that can be represented in an ER model	2.27.1	Create a diagram of business rules that can be represented in an ER model	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.28	Describe and give an example of relationship nontransferability	2.28.1	Identify unique attributes for a record that cannot be transferred	Foundation	Speaking	Participates in conversation, discussion, and group presentations [1.5.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.29	Illustrate the use of a One-to-One relationship	2.29.1	Design an ERD including a One-to-One relationship	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
2.30 Illustrate the use of a One-to-Many relationship	2.30.1 Design an ERD including a One-to-Many relationship	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.31 Illustrate the use of a Many-to-Many relationship	2.31.1 Design an ERD including a Many-to-Many relationship	Foundation	Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.32 Identify a redundant relationship	2.32.1 Identify a redundant relationship in an entity relationship diagram	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
			Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.33 Describe the steps to resolve a Many-to-Many relationship using an intersection entity	2.33.1 Demonstrate the steps to resolve a Many-to-Many relationship using an intersection entity	Foundation	Reading	Locates pertinent information in documents, such as manuals, graphs, and schedules to perform tasks [1.3.18]
			Writing	Composes and creates document – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
2.34 Explain the UID of an intersection entity and how to locate it in an ERD	2.34.1 Identify the UID of an intersection entity and locate it in an ERD	Foundation	Reading	Locates pertinent information in documents, such as manuals, graphs, and schedules to perform tasks [1.3.18]
		Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]

Unit 3: First, Second, and Third Normal Forms
Hours: 10

Terminology: Artificial attributes, Artificial unique identifier, Composite unique identifier, Context, First normal form (1NF), Normalization, Obsolete, Primary unique identifier, Second normal form (2NF), Secondary unique identifier, Simple unique identifier, Third normal form (3NF), Transitive dependency

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
3.1 Define terminology	3.1.1 Prepare a list of terms with definitions	Foundation	Reading	Applies/Understands technical words that pertain to normal forms [1.3.6]
			Writing	Uses words appropriately [1.6.21]
3.2 Discuss the purpose of normalization in database models	3.2.1 Illustrate the purpose of normalization in database models	Foundation	Listening	Comprehends ideas and concepts related to normalization in database models [1.2.1]
			Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
3.3 Explain the rule of first normal form	3.3.1 Apply the rule of first normal form	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
3.4 Identify violations of the rule of first normal form	3.4.1 Analyze a non-normal entity and identify violations of the rule of first normal form	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
		Thinking	Problem Solving	Draws conclusions from what is read and gives possible solutions [4.4.4]
3.5 Identify entities and relationships that fit the structure of an ERD based on context clues	3.5.1 Analyze a partially completed ERD and identify entities and relationships that fit the structure	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
		Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]
3.6 Identify entities, attributes, and relationships in source documents	3.6.1 Analyze a source document from a business and identify entities, attributes, and relationships	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
		Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
3.7	Determine how to use meaning in source documents to create an ERD	3.7.1	Create a conceptual model from a source document.	Foundation	Reading	Identifies relevant details, facts and specifications [1.3.16]
					Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]
3.8	Explain the rule of second normal form	3.8.1	Demonstrate the rule of second normal form	Foundation	Writing	Uses words appropriately [1.6.21]
3.9	Describe violations of the rule of second normal form in a nonnormalized ERD	3.9.1	Identify violations of the rule of second normal form in a nonnormalized ERD	Foundation	Reading	Identifies inaccurate information/entries on written documents [1.3.15]
3.10	Discuss how to resolve violations of the rule of second normal form	3.10.1	Apply the rule of second normal form to solve a violation in a data model	Foundation	Reading	Identifies inaccurate information/entries on written documents [1.3.15]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
3.11	Discuss the selection of an artificial UID, a composite UID, or a secondary UID based on business needs	3.11.1	Analyze business rules and justify the creation of an artificial UID, a composite UID, or a secondary UID	Foundation	Reading	Identifies inaccurate information/entries on written documents [1.3.15]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
3.12	Discuss transitive dependencies in a data model	3.12.1	Identify transititve dependencies in a data model	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
				Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]
3.13	Explain the rules of third normal form	3.13.1	Demonstrate the rule of third normal form	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
3.14	Identify violations of the rule of third normal form in a nonnormalized ERD	3.14.1	Identify violations of the rule of third normal form in a nonnormalized ERD	Foundation	Reading	Identifies inaccurate information/entries on written documents [1.3.15]
3.15	Discuss how to resolve violations from the rule of third normal form	3.15.1	Apply the rule of third normal form to solve a violation in the model	Foundation	Reading	Identifies inaccurate information/entries on written documents [1.3.15]

Unit 4: Refining ERDs: Modeling Change Over Time
Hours: 14

Terminology: Appreciation, Arc, Audit trail, Chief Executive Officer (CEO), Conditional nontransferability, Constraint, Consultant, Data structure, Depreciation, Exclusive OR relationship, Feedback, Formulate, Generic, Hierarchical relationships, High-volume entity, Historical data, Journaling, Logging, Property, Recursive relationship, Time-related constraint, White space

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
4.1 Define terminology	4.1.1 Prepare a list of terms with definitions	Foundation	Reading	Applies/Understands technical words that pertain to refining ERDs [1.3.6]
			Writing	Uses words appropriately [1.6.21]
4.2 Identify an exclusive OR relationship in a business scenario	4.2.1 Analyze a given set of relationships and identify those which are mutually exclusive	Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]
4.3 Illustrate the relationship between arcs and an exclusive OR relationship	4.3.1 Create a diagram of an arc constraint to represent an exclusive OR relationship	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]
4.4 Distinguish between the use of an arc and a subtype in a data model	4.4.1 Create an ERD using subtypes from an ERD written in arc form	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
			Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]
4.5 Identify an example of a hierarchical relationship	4.5.1 Categorize a given relationship as hierarchical	Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]
4.6 Explain how to diagram the UID relationships in a hierarchal model	4.6.1 Create a diagram of the UID relationships in a hierarchical model	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
		Thinking	Reasoning	See relationship between two or more ideas, objects, or situations [4.5.5]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
4.7	Identify business examples of recursive relationships	4.7.1	Create an ERD from a given business scenario involving recursive relationships	Foundation Thinking	Writing Reasoning	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8] See relationship between two or more ideas, objects, or situations [4.5.5]
4.8	Compare and contrast hierarchical modeling and recursive modeling	4.8.1	Create a model using both recursion and hierarchies to express the same conceptual meaning	Foundation Thinking	Writing Reasoning	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8] See relationship between two or more ideas, objects, or situations [4.5.5]
4.9	Identify the need to track data changes over time	4.9.1	Justify the need to track changes over time	Foundation	Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]
4.10	Discuss how to model change over time	4.10.1	Create ERD models that incorporate elements of "data over time"	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
4.11	Explain the UID of an entity that stores historical data	4.11.1 4.11.2	Identify the UID of an entity that stores historical data Explain and justify the choice of UID	Foundation	Writing	Presents answers/conclusions in a clear and understandable form [1.6.13]
4.12	Explain a data model to an audience	4.12.1	Interpret and present a data model to an audience	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
4.13	Identify required elements in written documentation that accompanies an ERD	4.13.1	Create written documentation to accompany the oral presentation of an ERD	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
4.14	Discuss the role of a consultant	4.14.1	Summarize the role of a consultant	Personal Management	Career Awareness, Development, and	Develops skills to locate, evaluate, and interpret career information [3.1.4]

Unit 5: Transforming from the Conceptual to the Physical
Hours: 18

Terminology: Cascade barred relationship, CHAR, Discriminator column, Map, NUMBER, Transform, VARCHAR2

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
5.1	Define terminology	5.1.1	Prepare a list of terms with definitions	Foundation	Reading Writing	Applies/Understands technical words that pertain to conceptual/physical [1.3.6] Uses words appropriately [1.6.21]
5.2	Identify entity relationship models and database models	5.2.1	Contrast entity relationship models and database models	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
5.3	Compare and contrast the conceptual and physical data models	5.3.1	Describe the terminology mapping between a conceptual model and a relational database model	Foundation Thinking	Speaking Problem Solving	Communicates a thought, idea, or fact in spoken form [1.5.5] Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.4	Discuss the rule of basic mapping to transform an entity into a table	5.4.1	Apply the rule of basic mapping to transform an entity into a table	Foundation Thinking	Writing Problem Solving	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8] Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.5	Recall the rule of Oracle naming conventions for tables and columns used in relational models	5.5.1	Apply the rule of Oracle naming conventions for tables and columns used in relational models	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]
5.6	Recall the rule of relationship mapping to correctly transform One-to-Many and barred relationships	5.6.1	Apply the rule of relationship mapping to correctly transform One-to-Many and barred relationship	Foundation	Science Writing	Applies knowledge to complete a practical task [1.4.3] Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
5.7	Recall the rule of relationship mapping to correctly transform Many-to-Many relationships	5.7.1	Apply the rule of relationship mapping to correctly transform Many-to-Many relationships	Foundation	Science Writing	Applies knowledge to complete a practical task [1.4.3] Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
5.8	Recall the rule of relationship mapping to correctly transform One-to-One relationships	5.8.1	Apply the rule of relationship mapping to correctly transform One-to-One relationships	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]
					Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
5.9	Recall the rule of relationship mapping to correctly transform relationships in an arc	5.9.1	Apply the rule of relationship mapping to correctly transform relationships in an arc	Foundation	Science	Applies knowledge to complete a practical task [1.4.3]
					Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.10	Recall the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype implementations	5.10.1	Apply and state the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype implementations	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.11	Recall the table, column, identifiers, relationship, and integrity constraint rules for mapping subtype implementations	5.11.1	Apply and state the table, column, identifiers, relationship, and integrity constraint rules for mapping subtype implementations	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.12	Recall the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype and subtype arc implementations	5.12.1	Apply and state the table, column, identifiers, relationship, and integrity constraint rules for mapping super and subtype arc implementations	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.13	Discuss how to create a table in HTMLDB using a provided SQL script	5.13.1	Demonstrate the process of entering a provided SQL script	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
5.14	Describe how to enter sample data into an existing table using a provided SQL script	5.14.1	Modify a given script to insert requested data into an existing table	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
				Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]
5.15	Explain how to query a table to view data using a provided SQL script	5.15.1	Create a query to recall previously-entered information from a table using a provided SQL script	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]

Unit 6: Introduction to Database Programming
Hours: 20

Terminology: Application software, Arguments, Arithmetic expression, Arithmetic operator, Ascending, Case sensitive, Column, Column alias, Comparison condition, Concatenation, Data integrity, Default, Descending, Describe, Distinct, Field, Foreign key, Function, Grid computing, Join, Logical condition, Modification, Operator precedence, Order by, Parallel operations, Primary key, Projection, Resume, Row, Selection, Sort, String, Subset, Syntax, System development lifecycle, Table, User acceptance testing, Venn diagram, WHERE

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		**ACADEMIC and WORKPLACE SKILLS** What the Instruction Should Reinforce		
Knowledge	**Application**	**Skill Group**	**Skill**	**Description**
6.1 Define terminology	6.1.1 Prepare a list of terms with definitions	Foundation	Reading	Applies/Understands technical words that pertain to database programming [1.3.6]
			Writing	Uses words appropriately [1.6.21]
6.2 Illustrate the Integrity rule as it relates to database tables	6.2.1 Hypothesize why a given query that violates the integrity rule fails when run	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
		Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
6.3 Discuss table, row, column, primary key, unique key, and foreign key	6.3.1 Identify table, row, column, primary key, unique key, and foreign key given a diagram containing them	Foundation	Reading	Locates pertinent information in documents such as manuals, graphs, and schedules to perform tasks [1.3.18]
6.4 Identify violations of data-integrity rules	6.4.1 Correct violations of data-integrity rules	Thinking	Problem Solving	Identifies possible reasons for problem [4.4.6]
6.5 Recall the rules of SQL to display all columns of a table	6.5.1 Apply the rules of SQL to display all columns of a table	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
6.6 Recall the rules of SQL to display a subset of the columns of a table specified by criteria	6.6.1 Apply the rules of SQL to display a subset of the columns of a table specified by criteria	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
		Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
6.7 Discuss how to add new data to a table containing four columns	6.7.1 Apply the rules of SQL to add new data to a table containing four columns	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
		Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]
6.8 Discuss how to add a new column to an existing table	6.8.1 Apply the rules of SQL to add a new column to an existing table	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications - information processing, problem solving [1.1.38]
		Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
6.9	Discuss the applications of DELETE and ALTER TABLE	6.9.1	Apply the DELETE and ALTER TABLE commands to revise a table	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Uses computer in mathematical applications - information processing, problem solving [1.1.38] Applies rules and principles to a new situation [4.5.1]
6.10	Identify a data-modeling project to solve a business information need	6.10.1	Develop a business scenario to solve business information needs based on research	Foundation Thinking	Writing Creative Thinking	Organizes information into an appropriate format [1.6.8] Uses imagination to create something new [4.1.1]
6.11	Identify solutions to business problems using database technology	6.11.1	Within groups, develop solutions to business problems using database	Interpersonal Thinking	Teamwork Problem Solving	Contributes to group with ideas, suggestions, and effort [2.6.2] Draws conclusions from observations, evaluates conditions, and gives possible solutions [4.4.5]
6.12	Present a database solution to a business problem	6.12.1	Create and present a database solution to a business problem	Foundation	Speaking	Adapts presentation to audience [1.5.1] Organizes ideas and communicates oral messages to listeners [1.5.7]
6.13	Explain the different stages of the system development lifecycle	6.13.1	List and describe the different stages of the system development lifecycle	Foundation	Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]
6.14	Recall how to implement tables from an ERD	6.14.1	Demonstrate the use of HTMLDB to implement tables from an ERD	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Uses computer in mathematical applications - information processing, problem solving [1.1.38] Applies rules and principles to a new situation [4.5.1]
6.15	Recall how to issue SQL queries in HTMLDB	6.15.1	Create a query output using HTMLDB	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Uses computer in mathematical applications - information processing, problem solving [1.1.38] Applies rules and principles to a new situation [4.5.1]
6.16	Explain the features and benefits that Oracle Database Environment provides for businesses	6.16.1	Discuss the features and benefits that Oracle Database Environment provides for businesses	Foundation	Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]
6.17	Compare and contrast application software and system software	6.17.1	Identify key differences between application software and system software	Thinking	Creative Thinking	Makes connections between seemingly unrelated ideas [4.1.6]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
6.18	Identify the appropriate SOL functions to perform projection, selection and join	6.18.1	Describe which sections of a SQL statement are responsible for projection, selection and join	Foundation Thinking	Writing Problem Solving	Analyzes data, summarizes results, and makes conclusions [1.6.2] Comprehends ideas and concepts related to projection, selection and join [4.4.1]
6.19	Discuss the correct syntax to perform arithmetic expressions on the columns of a query	6.19.1	Demonstrate the correct syntax to perform arithmetic expressions on the columns of a query	Foundation Thinking	Arithmetic/ Mathematics Creative Thinking	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.20	Recall correct operator precedence to display desired results	6.20.1	Create queries using correct operator precedence to display desired results	Thinking	Problem Solving	Devises and implements a plan of action to resolve problem [4.4.3]
6.21	Compare and contrast the concepts of null, zero, and an empty string	6.21.1	Categorize the concepts of null, zero, and an empty string	Thinking	Reasoning	Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]
6.22	Recall the effect null values have in arithmetic expressions	6.22.1	Demonstrate the effect null values have in arithmetic expressions	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.23	Identify when and how to use a column alias	6.23.1	Construct a query using a column alias	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.24	Recall how to use the concatenation operator	6.24.1	Apply the concatenation operator to link column values and expressions to create a character expression	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.25	Discuss the use of literal values of type character, number, and date	6.25.1	Apply literal values of type character, number, and date in a SQL SELECT statement	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
6.26	Define and use DISTINCT to eliminate duplicates in query results	6.26.1	Apply DISTINCT to eliminate duplicates in query results	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.27	Display the structure of a table using DESCRIBE	6.27.1	Create a query to display the structure of a table using DESCRIBE	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.28	Illustrate the use of HTMLDB to run, edit, and save SQL statements	6.28.1	Create a query to edit, execute, and save SQL statements in HTMLDB	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.29	Know how to use WHERE clause to restrict rows returned in a SQL query	6.29.1	Apply the WHERE clause to restrict rows returned in a SQL query	Foundation Thinking	Arithmetic/ Mathematics R	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.30	Explain why it is important to be able to easily limit data retrieved from a table	6.30.1	Justify the use of a WHERE clause used to limit data retrieved from a table	Thinking	Decision Making	Identifies pros and cons to assist in decision-making process [4.2.7]
6.31	Explain the use of logical comparisons to restrict the rows returned based on two or more conditions	6.31.1	Evaluate logical comparisons to restrict the rows returned based on two or more conditions	Thinking	Reasoning	Comprehends ideas and concepts related to SQL [4.5.2]
6.32	Explain the rules of precedence by which expressions are evaluated and calculated	6.32.1	Apply the rules of precedence to determine the order in which expressions are evaluated and calculated	Thinking	Reasoning	Comprehends ideas and concepts related to SQL [4.5.2]
6.33	Identify a query to sort a result set in ascending or descending order	3.33.1	Construct a query to sort a result set in ascending or descending order	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.34	Identify a query to order a result set using a column alias	3.34.1	Construct a query to order a result set using a column alias	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do				ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge		**Application**		**Skill Group**	**Skill**	**Description**
6.35	Identify a query to order a result set for single or multiple columns	6.35.1	Construct a query to order a result set for single or multiple columns	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.36	Identify appropriate applications of single-row functions in query statements	6.36.1	Create queries using single-row functions when given an appropriate business scenario	Foundation Thinking	Arithmetic/ Mathematics Reasoning	Applies computation skills to construct a SQL query [1.1.5] Applies rules and principles to a new situation [4.5.1]
6.37	Identify a function as a single row or multiple row function	6.37.1	Categorize a function as a single row or multiple row function	Thinking	Reasoning	Comprehends ideas and concepts related to SQL [4.5.2]
6.38	Compare and contrast the results returned by single row and multiple row functions	6.38.1	Categorize the results returned by a function as single row or multiple row	Thinking	Reasoning	Comprehends ideas and concepts related to SQL [4.5.2]

Glossary
Unit 1: Introduction to Database Fundamentals

1. Attribute – a characteristic that describes, quantifies, or specifies an entity
2. Business needs – the requirements of a business that are fulfilled with an information system
3. Conceptual model – a data model usually represented by an entity-relationship diagram
4. Data – a collection of facts from which conclusions may be drawn
5. Data model – the product of the database design process which aims to identify and organize the required data
6. Data type – a classification identifying one of various types of data, stating the possible values for that type, the operations that can be done on that type, and the way the values of that type are stored
7. Distribution – the commercial activity of transporting and selling goods from a producer to a consumer
8. Entity – a named thing or category of things that is significant to the business and about which data must be known
9. Entity relationship diagram – a drawing that is used to represent a data model; also known as entity relationship model
10. Finance – the management of money, banking, investments, and credit
11. Graphical user interface – an interface for issuing commands to a computer utilizing a pointing device, such as a mouse, that manipulates and activates graphical images on a monitor
12. Grid computing – an ambitious and exciting global effort to develop an environment in which individual users can access computers, databases, and experimental facilities simply and transparently, without having to consider where those facilities are located
13. Hardware – a computer and the associated physical equipment directly involved in the performance of data-processing or communications functions; machines and other physical equipment directly involved in performing an industrial, technological, or military function
14. Infrastructure – the basic framework or features of a system; facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons
15. Instance – an occurrence or example
16. Mandatory – required, necessary, imperative
17. Null – a value that is unavailable, unassigned, unknown, or inapplicable; it is not a zero or space
18. Operating system – software designed to control the hardware of a specific data-processing system in order to allow users and application programs to make use of it

19. Optional – not required; left to choice

20. Physical model – a design for an object (a car, a house, a database, etc.) which includes implementation details such as size, volume, weight, etc.

21. Relationship – a connection or association between objects

22. Unique identifier (UID) – any combination of attributes and/or relationships that serves, in all cases, to uniquely identify an occurrence of an entity

23. Venture capitalist – a speculator who makes money available for innovative projects (especially in high technology)

24. Volatile – tending to vary often or widely, highly changeable

Unit 2: Entities, Attributes, and Relationships

1. Barred relationship – a relationship that participates in an entity's unique identifier

2. Business rule – a formalized statement of the usual, customary, or generalized course of action or behavior for a business; a generalized statement that describes what is true in most or all cases

3. Cardinality – a property of an end of a relationship between X and Y, that describes how many of X is related to Y; both ends of a relationship must have a defined cardinality; same as degree

4. Convention – an accepted way of constructing diagrams to ensure legibility

5. Degree – a property of an end of a relationship between X and Y, that describes how many of X is related to Y; both ends of a relationship must have a defined degree; same as cardinality

6. ERDish – the language or statements used to describe relationships between entities in an entity-relationship diagram

7. Exhaustive – treating all parts or aspects without omission

8. Intersection entity – the product of the resolution of a Many-to-Many relationship

9. Many-to-Many – a type of relationship that has "one or more" cardinality at both ends

10. Matrix diagram – a grid-like drawing that can be used to discover and record relationships between entities in an entity-relationship model

11. Mutually exclusive – a relationship that presents choices which are unable to be true at the same time; a choice between mutually exclusive possibilities means selecting "either this or that"

12. Non-transferability – property of a relationship where an instance of A is related to an instance of B, and the association cannot be moved to another instance of B

13. One-to-Many – a relationship where a single record in Table A can be related to one or more records in Table B, but a single record in Table B can only be related to one record in Table A

14. One-to-One – a relationship where each record in Table A can be related to one, and only one, record in Table B, and vice versa

15. Optionality – a property of an end of a relationship between X and Y, that describes whether X must be or may be related to Y; both ends of a relationship must have a defined optionality

16. Procedural business rule – a business rule that is workflow or business process related (example: A has to happen before B, and then C has to happen at the same time as D); also called a process business rule

17. Redundancy – the state of being unnecessarily repetitive

18. Reserved words – words that have a special meaning and function within a computer system or language

19. Revenue – income which returns or comes back from an investment

20. Softbox – a four-sided visual element with rounded corners; used to represent an entity in an entity-relationship diagram

21. Source document – written or printed material that is used and/or produced by the business and which analysts can use to determine information requirements

22. Structural business rule – a structural business rule indicates the types of information to be stored and how the information elements interrelate

23. Subentity – synonymous with subtype; an entity may be split into two or more subentities, each of which has common attributes and/or relationships; subentities may have attributes and/or relationships of their own and may be further subtyped to lower levels

24. Subtype – synonymous with subentity; an entity may be split into two or more subtypes, each of which has common attributes and/or relationships; subtypes may have attributes and/or relationships of their own and may be further subtyped to lower levels

25. Supertype – a means of classifying an entity that has subtypes

26. Transferability – property of a relationship between A and B, where an instance of A is related to an instance of B, and the association can be moved to another instance of B

Unit 3: First, Second, and Third Normal Forms

1. Artificial attributes – a created attribute that does not occur in nature (example: a student id)
2. Artificial unique identifier – a unique identifier that does not occur in nature, usually an artificial attribute
3. Composite unique identifier – a unique identifier that is a combination of attributes and/or relationships
4. Context – the circumstances in which an event occurs; a setting
5. First normal form (1NF) – the output of the first step of database normalization; eliminates repeating groups by putting each into a separate table and connecting them with a One-to-Many relationship
6. Normalization – a series of steps followed to obtain a database design that allows for efficient access and storage of data in a relational database
7. Obsolete – no longer in use, outdated
8. Primary unique identifier – the designated unique identifier for an entity, when there is more than one UID available
9. Second normal form (2NF) – the output of the second step of database normalization; eliminates functional dependencies on a partial key by putting the fields in a separate table from those that are dependent on the whole key
10. Secondary unique identifier – an alternate unique identifier for an entity, when there is more than one unique identifier available
11. Simple unique identifier – a unique identifier that is composed of one attribute
12. Third normal form (3NF) – the output of the third step of database normalization; eliminates functional dependencies on non-key fields by putting them in a separate table
13. Transitive dependency – a condition that exists when any attribute in an entity is dependent upon any other non-UID attribute in that entity

Unit 4: Refining ERDs: Modeling Change Over Time

1. Appreciation – a rise in value or price, especially over time
2. Arc – a curved line used to represent an exclusive relationship in an entity-relationship diagram
3. Audit trail – a step-by-step record of data changes
4. Chief Executive Officer (CEO) – the highest-ranking executive in a company or organization, responsible for carrying out the policies of the board of directors on a day-to-day basis
5. Conditional nontransferability – refers to a relationship that may or may not be transferable, depending on time
6. Constraint – restricts, limits, or regulates; a check
7. Consultant – one who gives expert or professional advice; in the information technology industry, one who provides expert services, such as data modeling, database troubleshooting, installation support, etc.
8. Data structure – a physical method of organizing a collection of data in a database to allow it to be manipulated effectively; i.e. table, index, view
9. Depreciation – a decrease or loss in value, because of age, wear, or market conditions
10. Exclusive OR relationship – a logical operator that returns a true value if one, but not both, of its operands is true; also called XOR
11. Feedback – the return of information about the result of a process or activity; an evaluative response
12. Formulate – to state as or reduce to a formula; to express in systematic terms or concepts; to devise or invent, i.e. formulate strategy
13. Generic – relating to or descriptive of an entire group or class; general
14. Hierarchical relationships – a series of relationships that reflect entities organized into successive levels
15. High-volume entity – an entity that will have a large number of instances
16. Historical data – data that records changes over time
17. Journaling – keeping an on-going record of transactions
18. Logging – keeping an on-going record of transactions
19. Property – a characteristic
20. Recursive relationship – a relationship between an entity and itself

21. Time-related constraint – a constraint or data restriction that results from the time dimension

22. White space – space on a page or poster not covered by print or graphic matter

Unit 5: Transforming from the Conceptual to the Physical

1. Cascade barred relationship – a series of barred relationships between successively connected entities; cascade barred relationships imply that the unique identifier of each entity in the chain is carried down to the entity on the next level

2. CHAR – stores fixed-length character strings

3. Discriminator column – a column that is created in the single table implementation of the supertype, to hold values that distinguish between the subtypes

4. Map – a representation

5. NUMBER – data type Number value; only contains a number, plus or minus sign, and a decimal point

6. Transform – to change

7. VARCHAR2 – stores variable-length strings

Unit 6: Introduction to Database Programming

1. Application software – program that gives a computer instructions that provide the user with tools to accomplish a task
2. Arguments – a value used to evaluate a function
3. Arithmetic expression – a mathematical equation
4. Arithmetic operator – a symbol used to perform an operation on some values
5. Ascending – orders the rows in ascending order (this is the default order); A - Z
6. Case sensitive – there is a noted difference between big (capitalized) and small letters
7. Column – a means of implementing an item of data within a table, an implementation of an attribute or relationship
8. Column alias – renames a column heading
9. Comparison condition – compares one expression to another value or expression
10. Concatenation – links two columns together to form one character data column
11. Data integrity – the state or quality of the data in the database as being entire or complete, honest, and correct
12. Default – a particular setting or value for a variable that is assigned automatically by an operating system and remains in effect unless canceled or overridden by the operator, or specifies a preset value if a value is omitted in the INSERT statement
13. Descending – orders the rows in descending order; Z - A
14. Describe – an iSQL*Plus command to display the structure of a table
15. Distinct – a command that suppresses duplicates, or makes the function consider only non-duplicate values within a column
16. Field – intersection of a row and column
17. Foreign key – a column or set of columns that defines how tables relate to each other
18. Function – used to perform calculations on data, modify individual data items, manipulate output for groups of rows, format dates and numbers for display, convert column data types
19. Grid computing – uses the resources of a many separate computers connected by a network (usually the internet) to solve large-scale computation problems
20. Join – display data from two or more related tables

21. Logical condition – combine the results of two component conditions to produce a single result based on them or inverts the result of a single condition

22. Modification – change, revision

23. Operator precedence – an order of rank relating to SQL commands and operations, or rules that determine the order expressions are evaluated and calculated

24. Order by – clause used to sort rows

25. Parallel operations – the simultaneous execution of 2 different operations

26. Primary key – a constraint which ensures that the column contains no null values and uniquely identifies each row of the table, or unique identifier of each row of data in a table; it must contain a value and it must be unique

27. Projection – the capability in SQL to choose the columns in a table that you want returned from a query

28. Résumé – a brief account of one's work experience and qualifications, often submitted with an employment application

29. Row – represents all data required for an instance

30. Selection – the capability in SQL to choose the rows in a table returned from a query

31. Sort – to arrange according to class, kind, or size

32. String – a group of character data

33. Subset – a set whose members are members of another set; a set contained within another set

34. Syntax – the rules governing the formation of statements in a programming language

35. System development lifecycle – the overall process of developing information systems through a multi-step process from investigation of initial requirements through analysis, design, implementation and maintenance

36. Table – an orderly arrangement of data, especially one in which the data are arranged in columns and rows in an essentially rectangular form, or stores data, basic unit of storage, composed of rows and columns

37. User acceptance testing – the type of testing where monitored users determine whether a system meets all their requirements, and will support the business for which it was designed

38. Venn diagram – a diagram using circles to represent sets, with the position and overlap of the circles indicating the relationships between the sets

39. WHERE – restricts the rows returned by a select statement