Data Development Utilizing Database Design and SQL

Course Outline

**Class:** WA150 – Data Development Utilizing Database Design and SQL

60 hours

**Instructor:**

**Text:**  A Guide to SQL, 9th Edition  
 Philip J. Pratt; Mary Z. Last

CENGAGE Learning

**Prerequisite:** WA140 - Object Oriented Programming with Java

**Equipment:** Each student shall be equipped with a desktop computer with the technical characteristics configured to run the programs used throughout the program:

* 20 desktop computers (including 24” monitors and mice) minimum
* Quad Core processor with Microsoft Windows 7, 8.x, or 10,
* Minimum 16 GB Ram
* Minimum 500 GB HD
* Internet access.

**Grading System:**

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|  | | **Grading Scale** | | |
| Classwork, Homework, Participation, Attendance | 10% | 90–100 | A | I - Incomplete |
| Exams/Quizzes | 50% | 80–89 | B | T - Transfer Credit |
| Presentation/Projects | 10% | 70–79 | C | E - Exempt |
| Final Exam | 30 % | 65–69 | D | W - Withdrew |
|  | **100%** | Below 65 | F | I - Incomplete |

**Course Description:**

In this course the students are introduced to the database technology and Structured Query Language (SQL) programming using straightforward instruction, extensive hands-on exercises, and a strong foundation in real-world business applications. The course teaches basic SQL commands in the context of a running case, in which a business uses SQL to manage orders, items, customers, and sales reps. The course focuses on the fundamental data modeling principles and practices, and serves as a prerequisite for the subsequent programming courses.

**Overview:** This class meets for a total of 60 hours. Day classes are six hours per day, Monday through Friday.

**Objectives:** Upon successful completion of this course, the student will be able to:

1. Understand Database Design Fundamentals
2. Create Tables
3. Construct Single Table Queries
4. Construct Multiple Table Queries
5. Update Data
6. Create Functions and Stored Procedures

**Requirements:** 1. Meet attendance and academic criteria.

2. Completion of all assignments.

3. Completion of the final exam.

**Graded Work:** The test average and quiz average each comprise 50% of the final grade point average. Quiz grades are based upon completion of the assignment in the time allotted, ability to follow instructions, observance of safety rules and neatness of work area.

**Attendance:** Daily attendance is required. If you anticipate an absence, consult with your instructor.

Be aware that each absence will require an equal amount of make-up time. Each student is required to maintain a minimum attendance of 85% for each course:

* If you miss more than 15% of the total hours in any one course, you will be required to make-up enough missed hours to meet the minimum course attendance requirement of 85%.
* If at the end of the cycle your attendance is less than 85% you will receive an incomplete (I) for the course, and will have 5 business days immediately following the end of the cycle to make-up the hours missed, otherwise your grade will change from an incomplete to an F, and you will be required to retake the course.
* If you miss more than 30% of the total hours in any one course, you will receive a W (withdrawal) and will be required to retake the course.

**Make-up Work:** All missed work is required to be completed as soon as possible. If you need extra help, it is your responsibility to make an appointment with your instructor at a mutually agreeable time.

**Supplies:** Hunter Business School provides all the necessary supplies.

### **Lesson Plan**

##### Day 1 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 1: Introduction to TAL Distributors, Colonial Adventure Tours, and Solmaris Condominium Group |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Understand the case study of TAL Distributors, a company whose database is used as the basis for many of the examples throughout the text * Understand the case study of Colonial Adventure Tours, a company whose database is used as a case that runs throughout the text * Understand the case study of Solmaris Condominium Group, a company whose database is used as an additional case that runs throughout the text |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:45 AM   * Introduction to Databases, slides 2-4 * TAL Distributors case study, slides 5-25   10:45 AM – 11 AM   * Break   11 AM – 12:30 PM   * Lab, slide 26 * Colonial Adventure Tours case study, slides 27-36   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * Lab, slide 37 * Solomaris Condominium Group case study, slides 38-46 * Summary, slide 47 * Lab, slide 48 |
| **Review / Assessment:** | 3 Lab assignments are planned to assess students understanding of the material |

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### **Lesson Plan**

##### Day 2 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 2: *Database Design Fundamentals* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Understand the terms *entity*, *attribute*, and *relationship* * Understand the terms *relation* and *relational database* * Understand functional dependence and be able to identify when one column is functionally dependent on another * Understand the term *primary key* and identify primary keys in tables * Design a database to satisfy a set of requirements * Convert an un-normalized relation to first normal form * Convert tables from first normal form to second normal form * Convert tables from second normal form to third normal form * Create an entity-relationship diagram to represent the design of a database |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:30 AM   * Entities, Attributes and Relationships, slides 2-8 * Functional Dependence, Primary Keys, slides 9-10 * Database Design Method, slides 11-12   10:30 AM – 10:45 AM   * Break   10:45 AM – 12:00 PM   * Lab, slide 13   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * Database Normalization, slides 14-25 * Diagrams for Database Design, slides 26-30 * Summary, slides 31-32 * Lab, slides 33-34 |
| **Review / Assessment:** | 2 Lab assignments are planned to assess students understanding of the material |

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### **Lesson Plan**

##### Day 3 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 3: *Creating Tables* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Create and run SQL commands * Create tables * Identify and use data types to define columns in tables * Understand and use nulls * Add rows to tables * View table data * Correct errors in a table * Save SQL commands to a file * Describe a table’s layout using SQL |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:30 AM   * Oracle Express Edition and creating tables, slides 2-24 * Lab, slide 25   10:30 AM – 10:45 AM   * Break   10:45 AM – 12:00 PM   * Data Types and Nulls, slides 26-29 * SQL Insert, slides 30-34 * Lab, slide 35   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * SQL Select, Delete and Update, slides 36-42 * Lab, slide 43 * Saving SQL scripts and describing a table, slides 44-48 * Summary, slides 49-51 * Lab, slide 52 |
| **Review / Assessment:** | 4 Lab assignments are planned to assess students understanding of the material. Optional homework assignment can be given to those students who did not complete the labs in class. |

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### **Lesson Plan**

##### Day 4 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 4: *Single-Table Queries* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Retrieve data from a database using SQL commands * Use simple and compound conditions in queries * Use the BETWEEN, LIKE, and IN operators in queries * Use computed columns in queries * Sort data using the ORDER BY clause * Sort data using multiple keys and in ascending and descending order * Use aggregate functions in a query * Use subqueries * Group data using the GROUP BY clause * Select individual groups of data using the HAVING clause * Retrieve columns with null values |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:45 AM   * Simple queries, slides 2-27   10:45 AM – 11:00 AM   * Break   11:00 AM – 12:00 PM   * Lab, slide 28   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * SQL Functions, Nested Queries, Grouping, slides 29-45 * Summary, slides 46-47 * Lab, slide 48 |
| **Review / Assessment:** | 2 Lab assignments are planned to assess students understanding of the material. Optional homework assignment can be given to those students who did not complete the labs in class. |

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### **Lesson Plan**

##### Day 5 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 5: *Multiple-Table Queries* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Use joins to retrieve data from more than one table * Use the IN and EXISTS operators to query multiple tables * Use a subquery with a subquery * Use an alias * Join a table to itself * Perform set operations (union, intersection, and difference) * Use the ALL and ANY operators in a query * Perform special operations (inner join, outer join, and product) |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:45 AM   * Joining two tables, slides 2-17 * Joining a table to itself, slides 18-21 * Joining several tables, slides 22-24   10:45 AM – 11:00 AM   * Break   11:00 AM – 12:00 PM   * Lab, slide 25   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * Set operations, slides 26-31 * All and Any, slides 32-34 * Inner and Outer joins, slides 35-37 * Summary, slides 38 * Lab, slide 39 |
| **Review / Assessment:** | 2 Lab assignments are planned to assess students understanding of the material. Optional homework assignment can be given to those students who did not complete the labs in class. |

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### **Lesson Plan**

##### Day 6 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 6: *Updating Data* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Create a new table from an existing table * Change data using the UPDATE command * Add new data using the INSERT command * Delete data using the DELETE command * Use nulls in UPDATE commands * Change the structure of an existing table * Use the COMMIT and ROLLBACK commands to make permanent data updates or to reverse updates * Understand transactions and the role of COMMIT and ROLLBACK in supporting transactions * Drop a table |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:45 AM   * Creating a new table from existing one, slides 2-4 * Changing existing data, slides 5-9 * Transactions, slides 10-20   10:45 AM – 11:00 AM   * Break   11:00 AM – 12:00 PM   * Lab, slide 21   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * Changing a table’s structure, slides 22-31 * Dropping a table, slides 32-33 * Summary, slides 34-36 * Lab, slide 37 * Homework, slide 38 |
| **Review / Assessment:** | 2 Lab assignments and homework are planned to assess students understanding of the material. |

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### **Lesson Plan**

##### Day 7 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 7: *Database Administration* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Understand, create, and drop views * Recognize the benefits of using views * Use a view to update data * Grant and revoke users’ database privileges * Understand the purpose, advantages, and disadvantages of using an index * Create, use, and drop an index * Understand and obtain information from the system catalog * Use integrity constraints to control data entry |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:30 AM   * Views, slides 2-21 * Lab, slide 22   10:30 AM – 10:45 AM   * Break   10:45 AM – 12:00 PM   * Security, slides 23-25 * Indices, slides 26-33 * Lab, slide 34   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * System Catalog, slides 35-37 * Integrity Constraints, slides 38-44 * Summary, slide 45 * Lab, slide 46 |
| **Review / Assessment:** | 3 Lab assignments are planned to assess students understanding of the material. |

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### **Lesson Plan**

##### Day 8 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 8: *SQL Functions and Procedures* |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Understand how to use functions in queries * Use the UPPER and LOWER functions with character data * Use the ROUND and FLOOR functions with numeric data * Add a specific number of months or days to a date * Calculate the number of days between two dates * Use concatenation in a query * Embed SQL commands in PL/SQL and  T-SQL procedures * Retrieve single rows using embedded SQL * Update a table using embedded INSERT, UPDATE, and DELETE commands * Use cursors to retrieve multiple rows in embedded SQL * Manage errors in procedures containing embedded SQL commands * Use SQL in a language that does not support embedded SQL commands * Use triggers |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:30 AM   * SQL Functions, slides 2-14   10:30 AM – 10:45 AM   * Break   10:45 AM – 12:00 PM   * Lab, slide 15   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * Stored procedures, slides 16-24 * Cursors, slides 25-39 * Triggers, slides 40-41 * Summary, slides 42-43 * Lab, slide 44 |
| **Review / Assessment:** | 2 Lab assignments are planned to assess students understanding of the material. |

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### **Lesson Plan**

##### Day 9 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Chapter 7: Working with Databases and MySQL  Book: PHP Programming with MySQL, 2nd Edition |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | After completion of the lesson, students will be able to:   * Study the basics of MySQL * Work with MySQL databases * Define database tables * Modify user privileges * Work with database records * Work with phpMyAdmin |
| **Technology:** | * Overhead projector |
| **Materials:** | * PowerPoint presentation |
| **Teacher/Student Input:** | * Question and Answer interactions * Class exercises |
| **Lesson Plan** | 9 AM – 10:30 AM   * Getting started with MySQL, slides 2-20   10:30 AM – 10:45 AM   * Break   10:45 AM – 12:00 PM   * Lab, slide 21   12:30 PM – 1:00 PM   * Lunch break   1:00 PM – 3 PM   * User privileges, slides 22-25 * Adding, modifying and deleting records, slides 26-34 * Summary, slide 35 * Lab, slide 36 |
| **Review / Assessment:** | 2 Lab assignments and optional homework are planned to assess students understanding of the material. |

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### **Lesson Plan**

##### Day 10 of 10

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| **Name:** |  |
| **Date:** |  | **Department:** |  |

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| **Subject:** | Introduction to Databases |
| **Subject Topics:** | Final Test |
| **# of Students in the Class:** |  |
| **Previous Requirements:** | WA140 – Object Oriented Programming with Java |
| **Aim / Objective:** | Comprehensive evaluation of the student’s understanding of concepts covered in the WA150 course. |
| **Technology:** | * N/A |
| **Materials:** | * Test print-outs |
| **Teacher/Student Input:** | * N/A |
| **Lesson Plan** | 9 AM – 9:45 AM   * Review of the concepts covered in the WA150 course * Q&A   09:45 AM – 10:00 AM   * Break   10 AM – 2:00 PM   * Final WA150 Test |
| **Review / Assessment:** | N/A |

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