

**ITT Technical Institute**  
**IT203**  
**Database Development**  
**Onsite Course**

**SYLLABUS**

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**Credit hours:** 4

**Contact/Instructional hours:** 50 (30 Theory Hours, 20 Lab Hours)

**Prerequisite(s) and/or Corequisite(s):**

Prerequisite: TB133 Strategies for the Technical Professional or equivalent

**Course Description:**

This course introduces relational database concepts and the role of databases in both Windows and Web applications. The course introduces basic data modeling and normalization concepts. Extensible Markup Language (XML) is also introduced.

## **Where Does This Course Belong?**

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This course is required in the associate degree programs in Computer Network Systems (CNS), Software Development Technology (SDT), Software Applications and Programming (SAP) and Web Development (WEB). Please refer to the catalog for detailed information about these programs.

## Course Summary

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### Major Instructional Areas

As defined by the goals of this course, approximately 60%+ of the instructional areas will be devoted to basic database concepts and competencies, i.e., define what database are, how to classify them, what relational databases are, what appropriate data types are, and how to build simple databases. The rest of the course will focus on intro-level DBA tasks in terms of installation and daily routines of maintaining the database server, for which this course is Microsoft SQL Server 2008 in the Microsoft Windows XP environment (as a virtual machine solution for each individual student). Specifically, this course will cover the following:

1. Database design and management
2. Data retrieval and manipulation
3. Database security and maintenance
4. RDBMS administration and management

### Course Objectives

1. Define a relational database.
2. Gather database requirements.
3. Define business rules for a database.
4. Create an entity design for a database using MS Visio.
5. Normalize a database.
6. Develop databases in MS SQL Server.
7. Run SQL queries in MS SQL Server.
8. Define the security context of a database and its users in MS SQL Server.

### SCANS Objectives

SCANS is an acronym for Secretary's Commission on Achieving Necessary Skills. Created by the National Secretary of Labor in the early 1990s, the committee created a list of skills and competencies that the committee feels are necessary for employees to function in a high-tech job market. For more information on SCANS objectives, visit the U.S. Department of Labor Employment and Training Administration: [www.doleta.gov](http://www.doleta.gov).

## Learning Materials and References

### Required Resources

Textbook Package	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Conger, S. (2012). <i>Hands-on Database</i> . Upper Saddle River, NJ: Pearson Education.	■		
Mistry, R., & Morimoto, R. (2009) <i>Microsoft SQL Server 2008 Management and Administration</i> (custom edition). Upper Saddle River, NJ: Pearson.	■		
Reese, R., & Lai, D. (2012). <i>Lab Manual for Database Development</i> (custom edition). Upper Saddle River, NJ: Pearson.	■		
Virtual Machine with SQL Server 2008 Express, 13E (2012)	■		

### Recommended Resources

#### Books, Professional Journals

- Computer Weekly: <http://www.computerweekly.com/Home/>
- InformationWeek: <http://www.informationweek.com/>
- Journal of Logic and Computation: <http://logcom.oxfordjournals.org/>
- SQL Server Magazine: <http://www.sqlmag.com/>
- Worldwide Databases: <http://www.marketresearch.com/Worldwide-Videotex-v2376/>

#### Professional Associations

- Association of Information Technology Professionals: <http://www.aitp.org/>
- Information Technology Association of America (ITAA): <http://www.techamerica.org/>
- Network and Systems Professionals Association: <http://www.naspa.com/>

ITT Tech Virtual Library (accessed via Student Portal)

#### Books

- Bagui, S., & Earp, R. (2003). *Database design using entity-relationship diagrams*. Boca Raton, FL: Auerbach Publications.
- Haley, A. M. (2006). *The concordance database manual*. Berkeley, CA: Apress.
- Nielson, P. (2009). *SQL server 2008 bible*. Indianapolis, IN: John Wiley & Sons.
- Powell, G. (2006). *Beginning database design and implementation*. Indianapolis, IN: Wiley Publishing.
- Petkovic, D. (2008). *Microsoft SQL server 2008: A beginner's guide*. New York, NY: McGraw-Hill/Osborne.
- Siau, K. (2007). *Contemporary issues in database design and information systems development*. Hershey, PA: IGI Publishing.
- Taylor, A. G. (2001). *Database development for dummies*. Foster City, CA: John Wiley & Sons.
- Schneider, R. (2008). *Microsoft SQL server 2008 All-in-one desk reference for dummies*. Hoboken, NJ: John Wiley & Sons.

- Hotek, M. (2009). *MCTS self-paced training kit (Exam 70-432): Microsoft SQL server 2008: Implementation and maintenance*. Sebastopol, CA: Microsoft Press.
- Leiter, C. (2009). *Beginning Microsoft SQL server 2008 administration*. Hoboken, NJ: Wrox Press.
- Hotek, M. (2009). *Microsoft SQL server 2008 step by step*. Sebastopol, CA: Microsoft Press.

#### Other References

#### **Website**

- Microsoft MSDN Community about SQL Server  
<http://msdn.microsoft.com/en-us/sqlserver> (accessed 9/25/11)

Informational resources about using and learning SQL Server from Microsoft's Developers Network site.

**NOTE:** All links are subject to change without prior notice.

## **Information Search**

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- Relational databases
- Relational Database Management Systems (RDBMS)
- Entity relation diagrams (ERD)
- Normalization
- Primary and foreign keys
- Structured Query Language (SQL)
- Entities and attributes
- Constraints
- SQL Server 2008 Express
- Roles and users

## **Course Plan**

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### **Suggested Learning Approach**

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
<ul style="list-style-type: none"> <li>▪ Do take a proactive learning approach.</li> <li>▪ Do share your thoughts on critical issues and potential problem solutions.</li> <li>▪ Do plan your course work in advance.</li> <li>▪ Do explore a variety of learning resources in addition to the textbook.</li> <li>▪ Do offer relevant examples from your experience.</li> <li>▪ Do make an effort to understand different</li> </ul>	<ul style="list-style-type: none"> <li>▪ Don't assume there is only one correct answer to a question.</li> <li>▪ Don't be afraid to share your perspective on the issues analyzed in the course.</li> <li>▪ Don't be negative about the points of view that are different from yours.</li> <li>▪ Don't underestimate the impact of collaboration on your learning.</li> <li>▪ Don't limit your course experience to reading</li> </ul>

points of view.

- Do connect concepts explored in this course to real-life professional situations and your own experiences.

the textbook.

- Don't postpone your work on the course deliverables – work on small assignment components every day.

## Course Outline

<b>Unit 1: DATABASE CONCEPT</b>			
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>Define relational databases.</li> <li>Describe the position of relational databases in the history of databases.</li> <li>Identify major relational database management systems (RDBMS).</li> <li>Identify main characteristics of relational databases.</li> <li>Describe the SQL's role in relational database.</li> <li>Identify some indications of where a database could be useful.</li> <li>Define a statement of work for a given scenario.</li> </ul>			<b>Out-of-class work:</b> 6 hours
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> <li>Conger, Chapter 1</li> <li>Conger, Appendix B</li> </ul>	Lab	Unit 1 Lab 1.1: Explore the AdventureWorks Database Using the SQL Server Management Studio (Group A)	1%
		Unit 1 Lab 2.1: Define Major Topics for a Database (Group A)	1%
		Unit 1 Lab 3.1: Create a Statement of Work (Group B)	1%
		Unit 1 Lab 4.1: Challenge Activity (Group B)	1%
	Assignment	Unit 1 Assignment 1: Homework	2%

<b>Unit 2: GATHER INFORMATION AND DEFINE REQUIREMENTS</b>			
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>Review documents to discover relevant entities and attributes for database.</li> <li>Prepare interview questions and follow up.</li> <li>Prepare questionnaires.</li> <li>Observe work flow for process and exceptions.</li> <li>Identify the issues with the current database.</li> <li>Define and list requirements of a database.</li> <li>Define business rules of a database.</li> <li>Define entities and attributes of a database.</li> <li>Identify candidate keys for entities of a database.</li> </ul>			<b>Out-of-class work:</b> 6 hours
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> <li>Conger, Chapters 2 and 3</li> </ul>	Lab	Unit 2 Lab 2.1: Identify Business Rules, Attributes, and Candidate Keys (Group A)	2%
		Unit 2 Lab 2.2: Identify Entities, Attributes, and Business Rules (Group B)	2%
	Assignment	Unit 2 Assignment 1: Homework	2%

Quiz	Quiz 1	1%
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**Unit 3: DATABASE DESIGN**

Upon completion of this unit, students are expected to:

- Use the database-modeling template in MS Visio.
- Create entities and add attributes of a database.
- Define relationship between entities of a database.
- Create many-to-many relationships with a linking table.

**Out-of-class  
work:**  
6 hours

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> <li>• Conger, Chapter 4</li> <li>• Conger, Appendix C</li> <li>• Conger, Appendix D</li> </ul>	Lab	Unit 3 Lab 3.1: Complete an Entity Relation Diagram (ERD) (Group A)	2%
		Unit 3 Lab 3.2: Design a Database Using Visio (Group B)	2%
	Assignment	Unit 3 Assignment 1: Homework	2%
	Quiz	Quiz 2	1%

**Unit 4: NORMALIZATION**

Upon completion of this unit, students are expected to:

- Evaluate an entity against the first three normal forms.
- Normalize a database in first normal form (1NF).
- Normalize a database in second normal form (2NF).
- Normalize a database in third normal form (3NF).
- Describe the importance of design review.

**Out-of-class  
work:**  
6 hours

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> <li>• Conger, Chapter 5</li> <li>• Conger, Appendix D</li> </ul>	Lab	Unit 4 Lab 4.1: Normalize a Database Design Step-by-Step (Group A)	2%
		Unit 4 Lab 4.2: Normalize a Database (Group B) (ePORTFOLIO)	2%
	Assignment	Unit 4 Assignment 1: Homework	2%
	Quiz	Quiz 3	1%

**Unit 5: PHYSICAL DESIGN**

Upon completion of this unit, students are expected to:

- Compare different RDBMS and determine which best suits current needs.
- Implement a physical design of a database based on the logical ERDs.
- Choose appropriate data types for table columns.
- Enter sample data into database tables.

**Out-of-class  
work:**  
6 hours

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)



			work)
• Conger, Chapter 6	Lab	Unit 5 Lab 5.1: Create a Database Step-by-Step (Group A)	3%
		Unit 5 Lab 5.2: Create a Database (Group B)	1%
	Assignment	Unit 5 Assignment 1: Homework	2%
	Quiz	Quiz 4	1%

**Unit 6: SQL QUERIES I**

Upon completion of this unit, students are expected to:

- Name the main events in the development of SQL statements.
- Run SELECT queries with wild cards, DISTINCT keyword, calculations, sorting, and aliasing..
- Run queries with the WHERE clause to filter the result sets.
- Use the Aggregate functions COUNT, AVG, SUM, MIN, and MAX.

**Out-of-class  
work:**  
6 hours

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
• Conger, Chapter 7, pages 123-139	Lab	Unit 6 Lab 6.1: Writing SELECT Statements (Group A)	3%
		Unit 6 Lab 6.2: Write Queries to Meet Business Requirements (Group B)	1%
	Assignment	Unit 6 Assignment 1: Homework	2%
	Quiz	Quiz 5	1%

**Unit 7: SQL QUERIES II**

Upon completion of this unit, students are expected to:

- Use GROUP BY and HAVING SQL statements to create advanced queries.
- Join two or more tables in a SQL query.
- Use INSERT, UPDATE, and DELETE SQL statements to maintain database records.
- Create indexes to optimize query performance.
- Use SQL statements to test business rules.

**Out-of-class  
work:**  
6 hours

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
• Conger, Chapter 7, pages 134-150 • Mistry & Morimoto, Chapter 4, pp. 161-201	Lab	Unit 7 Lab 7.1: Writing Queries to Modify and Join Data (Group A)	3%
		Unit 7 Lab 7.2: Write Queries to Meet Business Requirements (Group B) (ePORTFOLIO)	1%
	Assignment	Unit 7 Assignment 1: Homework	2%
	Quiz	Quiz 6	1%

**Unit 8: DATABASE SECURITY I**

Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>Analyze security needs and restrictions for users of the database.</li> <li>Describe the concepts of authentication and authorization.</li> <li>Create logins and users.</li> <li>Create roles.</li> <li>Grant rights and permissions.</li> </ul>			<b>Out-of-class work:</b> 6 hours
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> <li>Conger, Chapter 8, pages 151-159</li> <li>Mistry &amp; Morimoto, Chapters 7, Chapter 8, pp. 318-321, Chapter 9, pp. 351-377</li> </ul>	Lab	Unit 8 Lab 8.1: Implement Authentication, Authorization, Views, Stored Procedures, and Backup (Group A)	3%
		Unit 8 Lab 8.2: Implement, Authentication, Authorization, Views, Stored Procedures, and Backup (Group B)	1%
	Assignment	Unit 8 Assignment 1: Homework	2%
	Quiz	Quiz 7	1%

<b>Unit 9: DATABASE SECURITY II</b> Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>Implement a preliminary threats assessment.</li> <li>Describe a disaster recovery plan.</li> <li>Create stored procedures.</li> </ul>			<b>Out-of-class work:</b> 6 hours
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> <li>Conger, Chapter 8, pages 160-170</li> <li>Mistry &amp; Morimoto, Chapters 8 &amp; 9</li> </ul>	Lab	Unit 9 Lab 9.1: Harden SQL Server and a Database (Group A)	3%
		Unit 9 Lab 9.2: Manage Logins and Roles (Group B)	1%
	Assignment	Unit 9 Assignment 1: Homework	2%
	Quiz	Quiz 8	1%

<b>Unit 10: COURSE PROJECT</b> Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>Use the database modeling template in MS Visio.</li> <li>Create entities and add attributes of a database.</li> <li>Define relationship between entities of a database.</li> <li>Create many-to-many relationships with a linking table.</li> <li>Evaluate an entity against the first three normal forms.</li> <li>Normalize a database in First Normal Form (1NF).</li> <li>Normalize a database in Second Normal Form (2NF).</li> <li>Normalize a database in Third Normal Form (3NF).</li> </ul>			<b>Out-of-class work:</b> 9 hours
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- Describe the importance of design review.
- Compare different RDBMS and determine which best suits current needs.
- Implement a physical design of a database based on the logical ERDs.
- Choose appropriate data types for table columns.
- Enter sample data into database tables.
- Name the main events in the development of SQL statements.
- Run SELECT queries with wild cards, DISTINCT keyword, calculations, sorting, and aliasing.
- Run queries with the WHERE clause to filter the result sets.
- Use the Aggregate functions COUNT, AVG, SUM, MIN, and MAX.
- Use GROUP BY and HAVING SQL statements to create advanced queries.
- Join two or more tables in a SQL query.
- Use INSERT, UPDATE, and DELETE SQL statements to maintain database records.
- Create indexes to optimize query performance.
- Use SQL statements to test business rules.
- Analyze security needs and restrictions for users of the database.
- Describe the concepts of authentication and authorization.
- Create logins and users.
- Create roles.
- Grant right and permissions.
- Implement a preliminary threats assessment.
- Describe a disaster recovery plan.
- Create stored procedures.

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
• None	Course Project	Course Project	17%
	Quiz	Quiz 9	1%

**Unit 11: REVIEW AND FINAL EXAM**

**Out-of-class work:**  
5 hours

Upon completion of this unit, students are expected to:

- Summarize their learning for the entire course from Unit 1 to 10.

READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
• None	Final Exam	Final Exam	20%

Note: Your instructor may add a few learning activities that will change the grade allocation for each assignment in a category. The overall category percentages will not change.

## Evaluation and Grading

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### Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	Weight
Lab	36%
Assignment	18%
Quiz	9%
Course Project	17%
Final Exam	20%
<b>TOTAL</b>	<b>100%</b>

### Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade	Percentage	Credit
A	90–100%	4.0
B+	85–89%	3.5
B	80–84%	3.0
C+	75–79%	2.5
C	70–74%	2.0
D+	65–69%	1.5
D	60–64%	1.0
F	<60%	0.0

## Academic Integrity

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All students must comply with the policies that regulate all forms of academic dishonesty, or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

*(End of Syllabus)*