

ITT Technical Institute
PT2520
Database Concepts
Onsite Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 56 (34 Theory Hours, 22 Lab Hours)

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

Prerequisites: PT1420 Introduction to Programming or equivalent

Course Description:

This course introduces the basic concepts in databases and their applications. Topics include database history, structure, objects, relational database management systems (RDBMS) and introductory Structured Query Language (SQL).

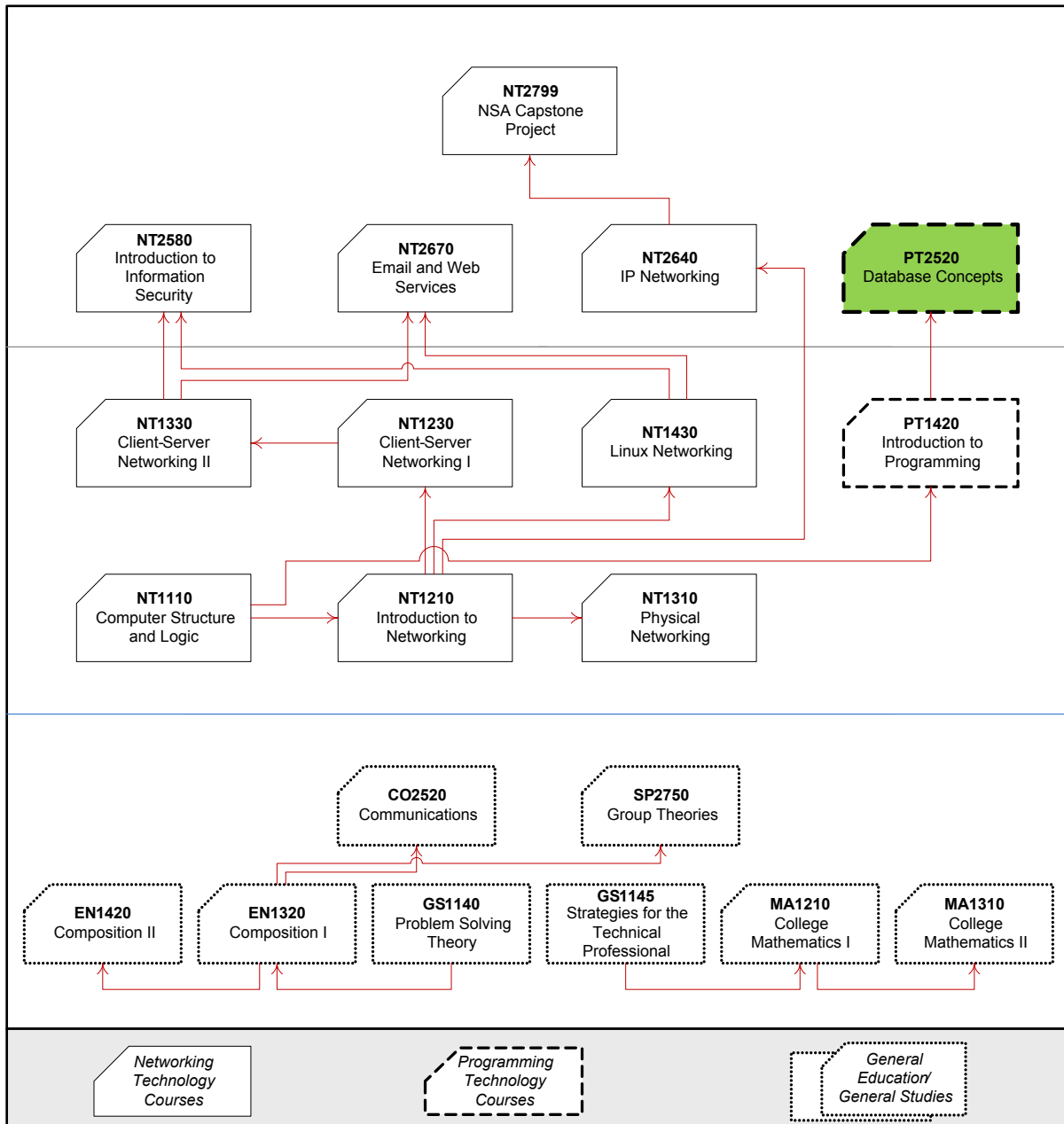
Where Does This Course Belong?

This course is required for the Associate Degree in Network Systems Administration program. This program covers the following core areas:

Program Outline:

1st QTR	
GS1140	Problem Solving Theory
NT1110	Computer Structure and Logic
GS1145	Strategies for the Technical Professional
2nd QTR	
NT1210	Introduction to Networking
NT1230	Client-Server Networking I
MA1210	College Mathematics I
3rd QTR	
NT1310	Physical Networking
NT1330	Client-Server Networking II
MA1310	College Mathematics II
4th QTR	
PT1420	Introduction to Programming
NT1430	Linux Networking
EN1320	Composition I
5th QTR	
PT2520	Database Concepts
NT2580	Introduction to Information Security
EN1420	Composition II
6th QTR	
NT2640	IP Networking
NT2670	Email and Web Services
CO2520	Communications
7th QTR	
NT2799	Network Systems Administration Capstone Project
SP2750	Group Theory

The following diagram demonstrates how this course fits in the program:



Course Summary

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 Express 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. The committee, created by the National Secretary of Labor in the early 1990s, 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.

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. (2010). <i>Hands-on database, An introduction to database design and development</i> . Upper Saddle River, NJ: Pearson Education.	■		
Database Development: Select Readings from Microsoft SQL Server 2008 Management and Administration	■		
Reese, R., & Lai, D. (2012). <i>Lab manual for database development</i> (custom edition). Upper Saddle River, NJ: Pearson.	■		
DVD with preinstalled master virtual machine with the SQL Server 2008 Express and sample database	■		

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

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

own experiences.

components every day.

Course Outline

<p>Unit 1: DATABASE CONCEPT</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> • Define relational databases. • Describe the position of relational databases in the history of databases. • Identify major relational database management systems (RDBMS). • Identify main characteristics of relational databases. • Describe the SQL's role in relational database. • Identify some indications of where a database could be useful. • Define a statement of work for a given scenario. 			<p>Out-of-class work: 6 hours</p>
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> • Conger, Chapter 1 • Conger, Appendix B 	Lab	Unit 1 Lab 1.1	3%
		Unit 1 Lab 1.2	
		Unit 1 Lab 1.3	
		Unit 1 Lab 1.4	
	Assignment	Unit 1 Assignment 1: Homework	2%
	Research Assignment	Research Assignment 1	1%

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

Unit 3: DATABASE DESIGN			
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> • 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"> • Conger, Chapter 4 • Conger, Appendix C • Conger, Appendix D 	Lab	Unit 3 Lab 3.1 (Group A)	3%
		Unit 3 Lab 3.2 (Group B)	
	Assignment	Unit 3 Assignment 1	2%
	Research Assignment	Unit 3 Research Assignment 1	1%
	Quiz	Unit 3 Quiz 2	1%

Unit 4: NORMALIZATION			
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> • 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"> • Conger, Chapter 5 • Conger, Appendix D 	Lab	Unit 4 Lab 4.1 (Group A)	3%
		Unit 4 Lab 4.2 (Group B) †	
	Assignment	Unit 4 Assignment 1	2%
	Research Assignment	Unit 4 Research Assignment 1	1%
	Quiz	Unit 4 Quiz 3	1%

<p>Unit 5: PHYSICAL DESIGN</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> • 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. <p style="text-align: right;">Out-of-class work: 6 hours</p>			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> • Conger, Chapter 6 	Lab	Unit 5 Lab 5.1 (Group A)	3%
		Unit 5 Lab 5.2 (Group B)	
	Assignment	Unit 5 Assignment 1	2%
	Research Assignment	Unit 5 Research Assignment 1	1%
	Quiz	Unit 5 Quiz 4	1%

<p>Unit 6: SQL QUERIES I</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> • Name the main events in the development of SQL statements. • Run SELECT queries with a variety of criteria. • Run queries with the WHERE clause to filter the result sets. • Use the Aggregate functions COUNT, AVG, SUM, MIN, and MAX. <p style="text-align: right;">Out-of-class work: 6 hours</p>			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> • Conger, Chapter 7, pp. 123-137 	Lab	Unit 6 Lab 6.1 (Group A)	3%
		Unit 6 Lab 6.2 (Group B)	
	Assignment	Unit 6 Assignment 1	2%
	Research Assignment	Unit 6 Research Assignment 1	1%
	Quiz	Unit 6 Quiz 5	1%

<p>Unit 7: SQL QUERIES II</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> • 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. <p style="text-align: right;">Out-of-class work: 6 hours</p>			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)

<ul style="list-style-type: none"> • Conger, Chapter 7, pp. 139-150 • Database Development: Select Readings from Microsoft SQL Server 2008 Management and Administration (CD), Chapter 4, pp. 161-201 	Lab	Unit 7 Lab 7.1 (Group A)	3%
		Unit 7 Lab 7.2 (Group B) †	
	Assignment	Unit 7 Assignment 1	2%
	Research Assignment	Unit 7 Research Assignment 1	1%
	Quiz	Unit 7 Quiz 6	1%

<p>Unit 8: DATABASE SECURITY I</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> • Analyze security needs and restrictions for users of the database. • Describe the concepts of authentication and authorization. • Create logins and users. • Create roles. • Grant rights and permissions. <p style="text-align: right;">Out-of-class work: 6 hours</p>			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> • Conger, Chapter 8, pp. 151-159 • Database Development: Select Readings from Microsoft SQL Server 2008 Management and Administration (CD), Chapter 7 	Lab	Unit 8 Lab 8.1 (Group A)	3%
		Unit 8 Lab 8.2 (Group B)	
	Assignment	Unit 8 Assignment 1	2%
	Research Assignment	Unit 8 Research Assignment 1	1%
	Quiz	Unit 8 Quiz 7	1%

<p>Unit 9: DATABASE SECURITY II</p> <p>Upon completion of this unit, students are expected to:</p> <ul style="list-style-type: none"> • Implement a preliminary threats assessment. • Describe disaster recovery plan. • Create stored procedures. <p style="text-align: right;">Out-of-class work: 6 hours</p>			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)

<ul style="list-style-type: none"> • Conger, Chapter 8, pp. 160-170 • Database Development: Select Readings from Microsoft SQL Server 2008 Management and Administration (CD), Chapters 8 and 9 	Lab	Unit 9 Lab 9.1 (Group A)	3%
		Unit 9 Lab 9.2 (Group B)	
	Assignment	Unit 9 Assignment 1	2%
	Research Assignment	Unit 9 Research Assignment 1	1%
	Quiz	Unit 9 Quiz 8	1%

Unit 10: COURSE PROJECT

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.
- 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.
- 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 key word, 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.

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

<ul style="list-style-type: none"> Describe disaster recovery plan. Create stored procedures. 			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> None 	Project	Course Project†	17%
	Quiz	Unit 10 Quiz 9	1%

Unit 11: REVIEW AND FINAL EXAM			Out-of-class work: 5 hours
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> Summarize their learning for the entire course from Units 1 to 10. 			
READING ASSIGNMENT	GRADED ACTIVITIES / DELIVERABLES		
	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
<ul style="list-style-type: none"> None 	Final Exam	Final Exam	20%

† Candidate for ePortfolio

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

Evaluation Criteria

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

Category	Weight
Lab	27%
Assignment	18%
Research Assignment	9%
Quiz	9%
Project	17%
Final Exam	20%
TOTAL	100%

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

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)