

**ITT Technical Institute**  
**CS300**  
**Application Design**  
**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):**

Prerequisites: CS120 Programming in Visual Basic or equivalent, IT203 Database Development, IT218 Programming in Java I or equivalent

**Course Description:**

This course introduces key design techniques and basic modeling to solve specific application design problems. Coverage includes object modeling, use cases, and requirements analysis. The course takes students through the application design and implementation process from requirements definition through testing.

# Syllabus: Application Design

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Instructor:	_____
Office hours:	_____
Class hours:	_____

## Major Instructional Areas

1. Object-oriented systems analysis and design (OOSAD)
2. Unified Modeling Language (UML)
3. Use-case descriptions
4. Object-Relational Modeling
5. Analysis classes
6. Components and frameworks
7. User interface design
8. Coding, testing, implementation, and maintenance

## Course Objectives

1. Describe the benefits of object-oriented programming (OOP).
2. Describe the role of decomposition, modularity, coupling, and cohesion in software design.
3. Gather and analyze application requirements.
4. Use Unified Modeling Language (UML) and Object-Relational Modeling to design a program.
5. Identify relationships between classes.
6. Identify the benefits of building applications using frameworks.
7. Describe commonly used application architectures.
8. Design a user interface.
9. Use refactoring and design patterns to improve code.
10. Create a testing plan.
11. Create documentation, deployment, and maintenance plans.

## Course Outline

Note: All graded activities, except the Project and exams, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Lab 1.1 refers to the 1st lab activity in Unit 1.

Unit	Activities
1— Object-Oriented Design Concepts	Content Covered: <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 1, “The Object-Oriented Systems Development Environment”</li> <li>○ Chapter 2, “Introduction to Object Orientation”</li> </ul> Labs: 1.1 Assignments: 1.1
2— Gathering and Analyzing Requirements	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 5, “Determining Object-Oriented Systems Requirements”</li> <li>○ Chapter 6, “Structuring System Requirements: Use-Case Description and Diagrams”</li> </ul> Labs: 2.1 Assignments: 2.1 Course Project: Part 1
3— Conceptual Data Modeling	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 7, “Conceptual Data Modeling”</li> </ul> Labs: 3.1 Assignments: 3.1 Course Project: Part 2
4— Object-Relational Modeling	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 8, “Object-Relational Modeling”</li> </ul> Labs: 4.1 Assignments: 4.1 Course Project: Part 3 Quizzes: 4.1
5— Analysis Classes	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 9, “Analysis Classes”</li> </ul> Labs: 5.1 Assignments: 5.1 Course Project: Part 4
6— Data Storage Design	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 11, “Physical Database Design”</li> </ul> Labs: 6.1 Assignments: 6.1 Course Project: Part 5 Exam I
7— Patterns and Frameworks	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 12, “Design Elements”</li> </ul> Read <i>Pattern-Oriented Software Architecture: A System of Patterns, Volume 1:</i> <ul style="list-style-type: none"> <li>○ Chapter 1, “Patterns,” Sections 1.1-1.3</li> </ul> Labs: 7.1 Assignments: 7.1 Course Project: Part 6
8— Design Strategies and Refactoring	Read <i>Object-Oriented Systems Analysis and Design:</i> <ul style="list-style-type: none"> <li>○ Chapter 10, “Selecting the Best Alternative Design Strategy”</li> </ul> Read <i>Professional Refactoring in Visual Basic:</i> <ul style="list-style-type: none"> <li>○ Chapter 1, “Refactoring—What’s All the Fuss”</li> </ul>

Unit	Activities
	<p>About?"</p> <ul style="list-style-type: none"> <li>○ Chapter 2, "A First Taste of Refactoring"</li> </ul> <p>Labs: 8.1  Assignments: 8.1  Course Project: Part 7  Quizzes: 8.1</p>
9— User Interface Design	<p>Read <i>Object-Oriented Systems Analysis and Design</i>:</p> <ul style="list-style-type: none"> <li>○ Chapter 13, "Designing the Human Interface"</li> </ul> <p>Labs: 9.1  Assignments: 9.1  Course Project: Part 8</p>
10—Implementation and Operation	<p>Read <i>Object-Oriented Systems Analysis and Design</i>:</p> <ul style="list-style-type: none"> <li>○ Chapter 14, "OOSAD Implementation and Operation"</li> </ul> <p>Labs: 10.1  Assignments: 10.1  Course Project: Part 9</p>
11— Course Review and Exam II	<p>Review  Exam II  Course Project: Part 10</p>

## Instructional Methods

This curriculum is designed to promote a variety of teaching strategies that support the outcomes described in the course objectives and that foster higher cognitive skills. Delivery makes use of various media and delivery tools.

This course is very concept-oriented. Therefore, it is especially important to provide students with concrete, real-world examples. When possible, illustrate a concept using an example and then ask students to provide another example. Discuss how well the student's example describes the concept. Make sure to explain why.

Many of the labs are design labs. Students use Visio to create a design. However, wherever possible, students are given the opportunity to implement all or part of the design using Visual Basic.

Some activities are structured to allow students to create a design and critique the designs of other students. These critiques are important to help students learn how to give and receive constructive criticism, a critical skill when working in a team environment.

Writing assignments give students a chance to explain concepts while improving their writing skills. When discussing writing assignments, emphasize the importance of clearly presenting an idea. Students will also have the opportunity to prepare and present PowerPoint presentations about various application design issues.

The course project allows students to work in teams. Students are given a set of requirements based on a business case and must create design documents.

## Instructional Materials and References

### Student Textbook Package

- George, Joey F., D. Batra, J. S. Valacich, and J. A. Hoffer. (2010). *Object-oriented systems analysis and design*. (Custom 2nd ed.) Boston, MA: Pearson Custom,.

## Other Required Resources

In addition to the student textbook package, the following is also required in this course:

ITT Tech Virtual Library> Main Menu> Books> Books 24x7

- Arsenovski, Danijel. *Professional Refactoring in Visual Basic*. Indianapolis, IN: Wiley Publishing, Inc., 2008.
- Buschmann, Frank, K. Henney, and D. C. Schmidt. *Pattern-Oriented Software Architecture: A System of Patterns, Volume 1*. West Sussex, England: John Wiley & Sons, 1996.

## Equipment and Tools

- Windows XP Professional Service Pack 3 (on virtual machine)
- Microsoft Visio (on host machine of lab computer)
- Microsoft Office (on host machine of lab computer)
- VMware Player 4.01 (or later) (on host machine of lab computer)
- ITT-Lab virtual machine
- Java Platform, Standard Edition 6.0 or Java Platform, Enterprise Edition 6.0 (on virtual machine)

## References

### ITT Tech Virtual Library

Log on to the ITT Tech Virtual Library at <http://www.library.itt-tech.edu/> to access online books, journals, and other reference resources selected to support ITT Tech curricula.

#### Books

You may click “Books” from the Main Menu or use the “Library Catalog” function on the home page to find the following books.

ITT Tech Virtual Library> Main Menu> Books> Books 24x7

- Ambler, Scott. *The Object Primer, 3E*. Cambridge, UK: Cambridge University Press, 2004.
- Biafore, Bonnie. *Visio 2007 Bible*. Indianapolis, IN: Wiley Publishing, Inc., 2007.
- Brown, William H., R. C. Malveau, H. W. McCormick III, and T. J. Mowbray. *AntiPatterns: Refactoring Software, Architectures, and Projects in Crisis*. New York: John Wiley & Sons, 1998.
- Buschmann, Frank, K. Henney, and D. C. Schmidt. *Pattern-Oriented Software Architecture: On Patterns and Pattern Languages, Volume 5*. West Sussex, England: John Wiley & Sons, 2007.
- Clark, Daniel R. *Beginning Object-Oriented Programming with VB 2005: From Novice to Professional*. Berkeley, CA: Apress, 2006.
- Dewson, Robin. *Beginning SQL Server 2005 for Developers: From Novice to Professional*. Berkeley, CA: Apress, 2006.
- Garzás, Javier, and M. Piattini. *Object-Oriented Design Knowledge: Principles, Heuristics and Best Practices*. Hershey, PA: Idea Group Publishing, 2007.
- Greenfield, Jack, and K. Short. *Software Factories—Assembling Applications with Patterns, Models, Frameworks, and Tools*. Indianapolis, IN: Wiley Publishing, Inc., 2004.
- Gross, Christian. *Foundations of Object-Oriented Programming Using .NET 2.0 Patterns*. Berkeley, CA: Apress, Inc. 2006.
- Keogh, Jim, and M. Giannini. *OOP Demystified: A Self-Teaching Guide*. Emeryville, CA: McGraw-Hill/Osborne, 2004.

- Kuchana, Partha. *Software Architecture Design Patterns in Java*. Boca Raton, FL: Auerbach Publications, 2004.
- Link, Johannes, and P. Frohlich. *Unit Testing in Java: How Tests Drive the Code*. San Francisco: Morgan Kaufmann Publishers, 2003.
- Lowe, Doug. *Java All-In-One Desk Reference for Dummies*. 3rd ed. Hoboken, NJ: Wiley Publishing, Inc. 2011.
- Muller, Robert J. *Database Design for Smarties: Using UML for Data Modeling*. San Francisco: Morgan Kaufmann Publishers, 1999.
- Nielson, Paul. *SQL Server 2005 Bible*. Indianapolis, IN: John Wiley & Sons, 2007.
- Powell, Gavin. *Beginning Database Design and Implementation*. Indianapolis, IN: Wiley Publishing, 2006.
- Reingruber, Michael, and W. W. Gregory. *The Data Modeling Handbook: A Best-Practice Approach to Building Quality Data Models*. New York: John Wiley & Sons, 1994.
- Siau, Keng. *Contemporary Issues in Database Design and Information Systems Development*. Hershey, PA: IGI Publishing, 2007.
- Silverston, Len. *The Data Model Resource Book: A Library of Universal Data Models for All Enterprises, Revised Edition, Volume 1*. New York: John Wiley & Sons, 2001.
- Walker, Mark H. *Microsoft Office Visio 2007 Inside Out*. Redmond, WA: Microsoft Press, 2007.

#### Periodicals

You may click “Periodicals” from the Main Menu or use the “E-Journal Look-up” function on the home page to find the following periodicals.

- InfoWorld
- Software Quality Professional
- M2 Presswire
- Software Development

#### Reference Resources

ITT Tech Virtual Library>School of Study> School of Information Technology> Recommended Links

- Webopedia
- TechEncyclopedia
- DevX

#### **Other References**

The following resources may be found **outside** of the ITT Tech Virtual Library, whether online or in hard copy.

#### Websites

- Microsoft Developer Network (MSDN)

<http://msdn2.microsoft.com/en-us/default.aspx>

This vendor page contains links to information about Microsoft developer tools and languages.

- Sun Developers Network

<http://developers.sun.com>

This vendor page is the portal to Sun’s developer community, including resources, training, support, and blogs.

All links to Web references outside of the ITT Tech Virtual Library are always subject to change without prior notice.

## Course Evaluation and Grading

### Evaluation Criteria Table

The final grades will be based on the following categories:

<b>CATEGORY</b>	<b>WEIGHT</b>
Assignments	10%
Labs	25%
Course Project	15%
Quizzes	10%
Exam I	20%
Exam II	20%
<b>Total</b>	<b>100%</b>

Note: Students are responsible for abiding by the Plagiarism Policy.

### Grade Conversion Table

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

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