IT306
Software Application Programming
[Onsite]

Course Description:

Students will apply math skills, GUI principles and programming techniques to develop complex application software. Teamwork, project planning and implementation are the underlying criteria for this course.

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

Prerequisites: IT203 Database Development, IT217 Programming in C++ II, IT219 Programming in JAVA II

Credit hours: 4

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

SYLLABUS

Instructor: _____

Office hours: _____

Class hours: _____

MAJOR INSTRUCTIONAL AREAS

Unit 1

Chapter 1: Introduction

- FAQs about Software Engineering
- Professional and Ethical Responsibility

Chapter 2: Socio-Technical Systems

- Emergent System Properties
- Systems Engineering
- Organizations, People, and Computer Systems
- Legacy Systems

Unit 2

Chapter 3: Critical Systems

- System Dependability
- Availability and Reliability
- Safety and Security

Unit 3

Chapter 4: Software Processes

- Software Process Models
- Process Iteration
- Process Activities
- Computer-Aided Software Engineering

Unit 4

Chapter 5: Project Management

- Management Activities
- Project Planning
- Project Scheduling
- Risk Management

Unit 5

Chapter 6: Software Requirements

- Functional Requirements
- User Requirements
- System Requirements
- Interface Specification
- The Software Requirements Document

Unit 6

Chapter 7: Requirements Engineering Process

- Feasibility Studies
- Requirements Validation
- Requirements Management

Unit 7

Chapter 8: System Models

- Context Models
- Behavior Models
- Data Models
- Object Models
- Structured Models

Unit 8

Chapter 11: Architectural Design

- Architectural Design Decisions
- System Organization
- Modular Decomposition Styles
- Control Styles

Unit 9

Chapter 17: Rapid Software Development

- Agile Methods
- Extreme Programming
- Rapid Application Development
- Software Prototyping

Unit 10

Chapter 23: Software Testing

- System Testing
- Component Testing

- Test Case Design
- Test Automation

Unit 11

Final Exam

COURSE OBJECTIVES

After successful completion of this course, the student will have the opportunity to:

1. Define software engineering.
2. Identify the commercial issues related to software.
3. Define the software development process framework.
4. Identify the phases in the software development life cycle.
5. Explain the different types of development models.
6. Identify basic metrics used to evaluate software.
7. Create a tasks list using MS Project.
8. Describe the role of quality assurance in the software development lifecycle.
9. Describe the role of configuration management in the software development lifecycle.
10. Identify the objectives of system modeling.
11. Explain business process modeling and how it applies to software development.
12. Explain the object-oriented analysis model used in software design.
13. Describe the role of system architecture in the software design process.
14. Identify considerations involved in user interface design.
15. Explain common design models used in software development.
16. Identify testing strategies used in the software development lifecycle.
17. Identify the project rollout steps used to deploy technology systems.

18. Define software requirements and the role of the software requirements document.

19. Describe the purpose and general procedures of a requirements engineering process.

20. Define the purpose and practices of rapid software development.

Related SCANS Objectives

1. Explain how technological systems work and operate effectively.
2. Identify the need for data and evaluate its relevance and accuracy.
3. Explain trends in technological change in systems and deduce how the change has impacted the system operations.
4. Identify the related problems in computers and other technologies.
5. Create written or computerized records and other forms of information in a systematic fashion.
6. Analyze information using oral, written, graphic, pictorial, or multi-media methods.
7. Process information using computers.

TEACHING STRATEGIES

The 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 in the classroom.

COURSE RESOURCES

Student Textbook Package

- Sommerville, Ian. *Software Engineering, Eighth Edition. USA: Addison Wesley, 2007*

References and Resources

ITT Tech Virtual Library

Login to the ITT Tech Virtual Library (http://www.library.itt-tech.edu/) to access online books, journals, and other reference resources selected to support ITT Tech curricula.

- General References

  - >Reference Resources>Computers>

    1. The Ultimate Computer Acronyms Archive
       A searchable database of common acronyms and abbreviations.

    2. Software History Center
       The Software History Center is dedicated to preserving the history of the software industry.

    3. Introduction to the Core of Information Technology
       A project from George Mason University that provides information and timelines related to "the great ideas that make the computer work."

  - >Program Links> Software Applications Programming (ITSAP)>Link Library

  - >Program Links> Software Applications Programming (ITSAP)> Professional Organizations
    - Association for Computing Machinery
    - Association for Logic Programming
    - Association for Women in Computing
    - Association of C and C++ Users
    - Association of Information Technology Professionals
    - Association of Shareware Professionals
    - Black Data Processing Associates
    - Business Software Alliance
    - Computer Professionals for Social Responsibility

- IEEE Computer Society
- Information Technology Association of America (ITAA)
- Project Management Institute
- SkillsUSA-VICA
- Software & Information Industry Association
- Women in Technology International (WITI)

- **>Program Links>Textbook Support**
  - Sommerville, Ian. *Software Engineering, Eighth Edition. USA: Addison Wesley, 2007*
  - Author's Companion Web Site for Software Engineering, Seventh Edition: http://www.software-engin.com
- **>Program Links>Recommended Links**

  - C Programming: C++ Resources
  - This site offers information, tutorials, bibliographies, source code, FAQs, discussion, and more

  - Center for Women & Information Technology
  - CWIT is provided by the University of Maryland, Baltimore County, to encourage, enable, and inform women about IT.

  - CPAN: Comprehensive Perl Archive Network
  - "All things Perl."

  - CPlusPlus
  - A portal site for C++ resources

  - Database Development
  - Articles, links, FAQs, suggested reading, and a discussion forum on the topic from Dr. Dobb's Journal

- DevX
- Categories of information include .NET, C++, Database Development, Java, Visual Basic, Open Source, and UML

- Free Programming Resources
- A directory of links to programming tutorials, books, compilers, interpreters, tools, and source code

- GNU Project and the Free Software Foundation
- The GNU Project was launched in 1984 to develop a complete Unix-like operating system; FSF is the principal organizational sponsor of the GNU Project

- Hotscripts
- A directory of Web programming-related resources

- Java Boutique
- Java tutorials, articles, reviews, and a discussion forum

- Java Shareware
- This site offers Java applications, applets, servlets, beans, development tools, and other projects

- Java.Sun.com: The Source for Java Technology
- Comprehensive information downloads, documentation, and news related to Java technologies

- Loads of Linux Links

- A subject directory of links related to Linux

- Microsoft Support Webcasts
- "Tune in to on-demand recordings and watch technical presentations delivered by Microsoft technology experts Additionally, the PowerPoint slides are available for download, and full session transcripts are posted later"

- The Perl Archive
- A resource center for Perl cgi programs

- SearchDatabase.com
- Database-related news, tips, discussions, white papers, Webcasts, and Ask the Experts

- Standard Template Library Programmer's Guide
- Site maintained by Silicon Graphics, Inc.

- Tech Fest
- A collection of links to information about networking, computer hardware, and software

- VBnet: Visual Basic Developers Resource Centre
- Information and code for Visual Basic developers using “VBClassic”

- Visual Basic Explorer
- The site features tutorials, source code, and tips and tricks for the novice VB programmer

- Whatis.com: The IT-specific Encyclopedia
- Look up definitions of current IT-related words

- **Books**

The following books are related to this course and are available through the ITT Tech Virtual Library:

- Hightower, Richard. *Professional Java Tools for Extreme Programming. Hoboken: Wrox Press, 2004.*
- Pandian, C. Ravindranath. *Software Metrics: A Guide to Planning, Analysis, and Application. New York: Auerbach Publications 2000.*

- **Periodicals**

- **Periodicals>EbscoHost**

  Dependable Software by Design. By: Jackson, Daniel. *Scientific American, Jun 2006, Vol. 294 Issue 6, p68-75, 7p, 1 chart, 5c; (AN 20748425)*

  Design Principles Are Where You Find Them. By: Simonelis, Alex. *Communications of the ACM, Nov 2004, Vol. 47 Issue 11, p11-11, 2/3p; (AN 14957776)*

  A Student-Enacted Simulation Approach to Software Engineering Education. By: Blake, M. Brian. *IEEE Transactions on Education, Feb 2003, Vol. 46 Issue 1, p124, 9p, 3 charts, 6 diagrams; (AN 9345880)*

- **Other Resources**

- Textbook Companion: http://www.software-engin.com
- Software QA and Testing Resource Center: http://www.softwareqatest.com/
- Bringing Design to Software: http://hci.stanford.edu/bds/
- Writing Software Requirements Specifications: http://www.techwr-l.com/techwhirl/magazine/writing/softwarerequirementspecs.html

All links to Web references outside of the virtual library are always subject to change without notice.

EVALUATION & GRADING

COURSE REQUIREMENTS

1. **Attendance and Participation**

   Regular attendance and participation are essential for satisfactory progress in this course.

2. **Completed Assignments**

   Each student is responsible for completing all assignments on time.

3. **Team Participation (if applicable)**

   Each student is responsible for participating in team assignments and for completing the delegated task. Each team member must honestly evaluate the contributions by all members of their respective teams.

Evaluation Criteria Table

The final grade will be based on the following weighted categories:

CATEGORY	WEIGHT
Homework	15%
Quiz	15%
Lab Assignments	25%
Project	25%
Final Exam	20%
Total	**100%**

Grade Conversion Table

Final grades will be calculated from the percentages earned in class 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

COURSE OUTLINE

Wk	Lesson Title	Reading	Activity Type			
			Home work	Quiz	Project	Lab s
1	Introduction	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-1	x			x
	Socio-technical Systems	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-2				
2	Critical Systems	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-3	x			x
3	Software Processes	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-4	x	*	**	x
4	Project Management	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-5	x			x
5	Software Requirement s	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-6	x			x
6	Requirement s Engineering Process	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-7	x	*	**	x
7	System Models	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-8	x			x
8	Architectural Design	Sommerville, Ian. *Software Engineering, Eighth Edition. USA: Addison Wesley, Chapter-11*	x			x
9	Rapid Software Development	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-l7	x	*	**	x

Wk	Lesson Title	Reading	Activity Type			
10	Software Testing	Sommerville, Ian. Software Engineering, Eighth Edition. USA: Addison Wesley, 2007, Chapter-23				x
11	Review and Final Examination					