

**67-271 Fundamentals of Systems Development
Carnegie Mellon University
Syllabus
Fall 2004**

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M,T,W,TR 7:00-9:00 PM, PH A20 and A21

Credits: Undergrad (9 hours)

Lecture: TR 10:30-11:50 AM
BH A53

Office hours: Cleotilde Gonzalez, WF 12:00-1:00 PM and by appointment

Overview

Fundamentals of Systems Development is an introductory course in software systems analysis and design and project management. It is a required course in the IS major and minor sequence. In this course you will learn the fundamental theory, methods and techniques needed to develop complex information systems projects.

This is not a programming course. Creating complex software products is a lot more than programming. It involves planning, gathering requirements, modeling business needs, creating blueprints for building the system, and managing and organizing resources. Software building is a challenging, difficult, complex and expensive activity. Because of its intangible and intellectual nature, many authors in this field claim that developing software systems is the most complex engineering activity ever attempted.

In this course you will learn processes, methods, and techniques to plan, analyze, and design complex software products. This course is organized according to a Software Development Process (SDP) including phases common to many development strategies. SDP

is used as a framework on which different pieces in the software development activities are glued together.

Software Analysis and Design are fields in constant evolution. Today, the most exciting ideas are in Object-Oriented (OO) techniques. The Unified Modeling Language (UML) provides a common set of diagramming techniques rich enough to understand different perspectives of an information system from the initiation to implementation. This course will present these OO ideas and techniques.

Objectives

Upon successful completion of the course, you should be able to:

1. Understand what are the tasks involved in the development of complex software systems.
2. Do a feasibility analysis for a software project including: technical, economical, and organizational factors.
3. Apply information-gathering techniques towards the documentation of requirements for an information system solution.
4. Understand how to use OO analysis and design methodologies and modeling techniques towards the documentation of a system solution with use cases and class models.
5. Plan, design and execute usability evaluations.
6. Develop project plans, and understand how to organize, direct, and control a software project.

Textbooks and readings

Textbooks:

- [DWT] Dennis, Alan; Wixom, Barbara H.; Tegarden, David (2005). *Systems Analysis and Design with UML Version 2.0*, Second Edition. John Wiley & Sons, Inc.
- [SW] Schneider, Geri; Winters, Jason P. (2001). *Applying Use Cases: a Practical Guide*, 2nd Edition. Addison-Wesley.

Additional readings are on the schedule. The references for additional readings are:

- [RC] Rosson, Mary Beth; Carroll, John M. (2002). *Usability Engineering: Scenario-Based Development of Human-Computer Interaction*. Morgan Kaufmann.
- [BJR] Booch, Grady; Rumbaugh, James; Jacobson Ivar (1999). *The Unified Modeling Language User Guide*. Addison-Wesley.
- [BH] Beyer, Hugh; Holtzblatt, Karen. (1998). *Contextual Design*. Morgan Kaufmann.
- [NM] Nielsen, Jacob; Mack, Robert L. (1994). *Usability Inspection Methods*. Wiley & Sons.

These extra readings are available in reserve in the Hunt library.

CASE (Computer Aided Software Engineering) tools

Throughout the course you will need the following tools to prepare your assignments. The tools you will need for each of the assignments appear in the schedule and can be found in the locations as indicated below:

IBM Rational Rose: available in reserve in the Hunt library

CAMTASIA: free trial download from :

<http://www.techsmith.com/products/studio/default.asp>)

MSProject: available in Cyert 100 cluster

Drawing software visio, html editors, director, VBasic

Word, Excel

Organization

The course consists of lectures, readings, project assignments and exams.

Lectures are the main source of information that will help you meet the course objectives.

Lectures cover general topics on Software Development as well as specific methodologies and tools such as feasibility analysis, information gathering techniques, OO analysis and design modeling, usability evaluations and project management. The class schedule shows the topics I intend to cover in each class.

Readings from the textbooks as well as extra readings are also presented in the schedule when they are due. The readings will help you expand and review information of the topics covered in the lectures. Please make sure to do your reading **before** coming to class.

Project Assignments will help you practice the concepts presented in the lectures and also help you prepare for the exams. The project assignments consist of several deliverables due on the days presented in the schedule.

Each project assignment refers to one *case study*, available in Blackboard. This is with the purpose of practicing the software development concepts with a unified case throughout the semester. This year you will use the case study of a payroll system. Other cases will be used in class to accomplish more exercises.

I expect quality reports. Points will be subtracted for unprofessional project assignments. An “A” project is complete, correct, and convincing in every respect. It demonstrates the author's initiative as well as thoughtfulness, insight, and depth of analysis into the methodologies and techniques. It meets or exceeds my expectations in every dimension. An “A” project could be used, without modification, to demonstrate the concepts learned in the class to new students.

Project assignments should be **done individually and independently**. You are not allowed to share any information concerning the solution of the project assignments with other students in this course. Cheating will not be excused and will lead to failure in the course. Project assignments must be delivered in your digital drop box in Blackboard. No paper should be handed in. Project assignments are **due at midnight**, the day appearing on the schedule. That is, no assignments will be graded if not found in my Blackboard electronic mailbox by 12:00 o'clock. Therefore do not try to submit the project assignments at 11:59 PM. Make the

necessary arrangements to make sure we will get your assignments by midnight not 12:01, not 12:30, not next morning!. An assignment is classified as late if received after 12:00 AM on its due day. **Late project assignments will automatically reduce your grade by 20% of the points of the assignment.** An assignment is classified as missing if not received within 24 hours of its due day. **Missing project assignments will automatically reduce your grade by 100% of the points of the assignment**

Exams. There will be 2 in-class exams and a final (see schedule; however, the date of the final is fixed by the Registrar). Exams will include multiple choice, short answer, short essay, modeling and diagramming questions. Exams will be based upon the readings, lectures, and assignments. I will hold in-class review sessions the class before the exams. Exams are to be taken individually. Mid-term exams are NOT cumulative, final exam IS cumulative.

Communication

We will be using the university-supported system for course delivery called Blackboard. You will be able to access class slides and project assignments, read announcements, and hold discussions about the course, etc. through Blackboard. To get started, go to http://www.blackboard.com/docs/r6/6_1/student/bbbs_r6_1_student/ and follow the instructions about logging in and accessing class information. Our class is found under F04-67271 Fundamentals of System Development.

Please make a regular habit of checking the Blackboard for this class because all course announcements will appear there!!! It is your responsibility to be informed of whatever is posted there.

Course Policies

General policies for the IS program courses are in:

<http://www.andrew.cmu.edu/course/67-272/Behavior.html>

This site includes policies for:

- Study Skills and Time Management
- Personal Software Process Documentation
- Regrades
- Missed Examinations and In-Class Projects
- Use of Email
- Office Hours
- Respectful Behavior
- Academic Honesty and Integrity

Please make sure you read carefully and understand these policies. These policies will be explained to you in the first class session of the course 67-272. Additional policy items, particular to this course are stated next. The following one overwrite the ones explained in the above URL.

Regrading. I will accept regrade requests only if submitted **in writing** within **one week** after the project assignments/exam has been handed back.

Schedule

<i>AUGUST</i>	<i>Lecture Topic</i>	<i>Reading Due</i>	<i>HW Assigned</i>	<i>HW Due at midnight</i>	<i>CASE Tool</i>
Tues, 8-31	Introduction to class, policies and project assignments.				
<i>SEPTEMBER</i>					
Thurs, 9-2	Introduction to Software Development: Software Development Life Cycle and Methodologies	DWT. Chapter 1 & www article: "Introduction to Extreme programming": http://www.advisor.com/doc/13571			
Tues, 9-7	Project Initiation: System Request and Feasibility and Risk analysis	DWT. Chapter 3 SW. Chapter 1	Feasibility Analysis		Word and templates
Thurs, 9-9	Requirements Gathering Techniques I: Contextual Inquiry	Reading Packet: BH. Chapters 3 and 4			
Mon, 9-13				Feasibility Analysis	
Tues, 9-14	Requirements Gathering Techniques II: Interviews	DWT. Chapter 5 Pages 120-147	Requirements Gathering		Word and templates
Thurs, 9-16	Requirements Gathering Techniques III: Questionnaires, Observation, Focus groups Visit from the Career Center 11:20 AM				
Tues, 9-21	TOC - NO CLASS				
Wed, 9-22				Requirements Gathering	
Thurs, 9-23	Visual Modeling and introduction to UML	Reading Packet: BJR. Chapters 1 and 2 DWT. Chapter 2			
Tues, 9-28	Review for Midterm EXAM 1				
Thurs, 9-30	EXAM 1 – Covers up to 9-28 class				

<i>OCTOBER</i>	<i>Lecture Topic</i>	<i>Reading Due</i>	<i>HW Assigned</i>	<i>HW Due at midnight</i>	<i>CASE Tool</i>
Tues, 10-5	Use-Case Modeling I: Introduction and elements of Use Case Diagrams	SW. Chapter 2 DWT. Chapter 6	Use-Case Modeling I		Rational Rose, Drawing Software, Word
Thurs, 10-7	Use-Case Modeling II: Documenting Use Cases. Activity Diagrams	SW. Chapters 3, 4, and 7 DWT. Chapter 6			
Tues, 10-12	Use-Case Modeling III: Practice Use Cases		Use-Case Modeling II		Rational Rose, Word, Drawing Software
Wed, 10-13				Use-Case Modeling I	
Thurs, 10-14	Use-Case Modeling IV: Reviewing Use Cases/Moving to Design	SW. Chapter 8			
Tues, 10-19	Class Modeling I: Find Classes from Use- Case Behavior. Class Diagrams	DWT. Chapter 7			
Wed, 10-20				Use-Case Modeling II	
Thurs, 10-21	Class Modeling III: Multiplicity. Practice Class diagrams	DWT. Chapter 7	Class Modeling		Rational Rose, Drawing Software
Tues, 10-26	Class Modeling II: Interaction Diagrams.	DWT. Chapter 8			
Thurs, 10-28	Class Modeling IV: Practice Interaction diagrams. From Use Cases to Class Diagrams: Practice cases				
Fri, 10-29				Class Modeling	
<i>NOVEMBER</i>					
Tues, 11-2	Review for Midterm EXAM 2				
Thurs, 11-4	EXAM 2 – Covers from 10-5 to 11-2 class				

OCTOBER	Lecture Topic	Reading Due	HW Assigned	HW Due at midnight	CASE Tool
Tues, 11-9	Dividing large systems	DWT. Chapter 9 SW. Chapter 9			
Thurs, 11-11	Scenario-Based User Interface Design and Prototyping	DWT. Chapter 12 Reading Packet: RC. Chapter 1 and 6. SW pp. 75-78			
Tues, 11-16	Usability Evaluation I: Think Aloud		Think Aloud		CAMTASIA
Thurs, 11-18	Usability Evaluation II: Introduction to other usability evaluation methods	Reading Packet: NM. Chapter 1			
Tues, 11-23	Usability Evaluation III: Heuristic Evaluation	Reading Packet: NM Chapter 2			
Wed, 11-24				Think Aloud	
Thurs, 11-25	THANKSGIVING BREAK- NO CLASS				
Tues, 11-30	Project Management I: Identify the project size, Create a workplan	DWT. Chapter 4	Project Management		MS Project or Excel
DECEMBER					
Thurs, 12-2	Project Management II: Create a workplan (cont), staff the project	DWT. Chapter 4			
Mon, 12-6				Project Management	
Tues, 12-7	Project Management III: Directing and Controlling				
Thurs, 12-9	Review for FINAL		Retrospective Due the day of the FINAL EXAM		

Grading

The total number of points you can get in this course is 100. Below you find the distribution of points for assignments and exams. **Late project assignments will automatically reduce your grade by 20% of the points of the assignment.** For example, you will loose 2 points if you are late in an assignment that is worth 10 points. The only circumstances in which there may not be a penalty for late or missing project assignments or missed examinations is a documented medical emergency or death in the family. Job interviews or other kind of trips are not valid excuses for any reason.

	Points
Project assignments	
1. Feasibility Analysis (Due Monday 9-13)	4
2. Requirements Gathering (Due Monday 9-22)	8
3. Use-Case Modeling I (Due Wednesday 10-13)	10
4. Use-Case Modeling II (Due Wednesday 10-20)	10
5. Class Modeling (Due Friday 10-29)	10
6. Think Aloud (Due Wednesday 11-24)	8
7. Project Management (Due Monday 12-6)	10
Total Project assignments	60
Exams (individual)	
Exam 1 (on Thursday 9-30)	10
Exam 2 (on Thursday 11-4)	10
Final examination (day by registrar)	15
Total Exams	35
Other	
Attendance and participation in class	3
Retrospective	2
Total Other	5
Grand total	100