67-271 Fundamentals of Systems Development
Carnegie Mellon University
Syllabus
Fall 2005

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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, design methodologies and project management. It is a required course in the IS major and minor sequence. In this course you will learn the fundamental methods and techniques needed to develop complex information systems projects.

This is not a programming course. Creating complex software products encompasses 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, 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.

Additional readings can be accessed electronically via the Cameo system at CMU's library (http://www.library.cmu.edu). Select the "course reserves" option within Cameo and then type in the course name or number.

CASE TOOLS (Computer Aided Software Engineering tools)

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

Poseidon for UML. An evaluation version can be downloaded from:
http://www.gentleware.com/index.php?id=eval
CAMTASIA: a 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

It is your responsibility to become acquainted with the tools you will need for each assignment. **We will not provide technical support and will not be able to answer questions about the tools.** Please make sure you become familiar with each of the tools early, before you need the tool to do your assignments.

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/bbls_r6_1_student/ and follow the instructions about logging in and accessing class information. Our class is found under F05-67271 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 the announcements posted in Blackboard.

COURSE COMPONENTS AND POLICIES

The course consists of lectures, readings, project assignments and exams. To obtain the best grade in this class you must attend all lectures, participate in class regularly, read the corresponding readings before each lecture, deliver quality assignments on time, and excel in your 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.

Class attendance is important. It is the easiest way to learn the material fundamental to this class. Attendance will be taken in several randomly pre-selected days, either at the beginning or the end of the class. No advance notice of the attendance day will be given. No excuses will be accepted after attendance is taken.

Class participation is important. It is important that you express your opinion and ask questions during class.

To encourage class attendance and participation I have assigned 5 total points of your final grade to these items. The total 5 points will be given to the student who **never** missed a lecture and regularly participated in the class discussions.

Readings from the textbooks as well as extra readings are also shown 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*. The description of this case study is available in Blackboard. Please make sure you read this description. This case study will help you practice all the concepts presented in class using a unified case throughout the semester. This year you will use the case study of a home realty system. Other examples will be provided in class to accomplish more exercises.

I expect your assignments to be of high quality. 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**.

You must deliver project assignments on time in your digital drop box in Blackboard and **send** it to my mailbox. No paper should be handed in. Project assignments are **due at 11:59 PM**, the day appearing on the schedule. That is, no assignments will be graded if not found in my Blackboard electronic mailbox by 11:59PM. Therefore do not try to submit the project assignments at 11:58 PM. Make the necessary arrangements to make sure we will get your assignments by 11:59PM, not 12:30, not next morning!. An assignment is classified as late if received after 11:59PM on its due day. **Late project assignments will automatically reduce your grade by 20% of the points of the assignment**. For example, if you are late you will lose 2 points in an assignment that is worth 10 points. 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.

OTHER COURSE POLICIES

Missing lectures, late or missing assignments and missed examinations. The only circumstances in which there may not be a penalty for missing lectures, 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 or motives are **not** valid excuses for any reason. There will be no make up opportunities for unexcused absences from any examination. If you arrive late for any examination, you will not be given extra time to complete it.

Regrades. I will accept requests for regrades of assignments or exams if they are accompanied by a **written statement** carefully highlighting and explaining the items you feel were misgraded within **one week** of the day the project assignments/exam has been handed back. You must explain how the contested items meet both the spirit and the letter of the assignment or effectively answer an examination question, and propose a revised score. When we receive your request for regrading, I will review the **entire** assignment or examination. Your ultimate score on the project may therefore increase, decrease, or remain unchanged when I review it. Lengthy or complex statements and explanations of how we should have interpreted your work are generally prima facie evidence that the work was appropriately graded in the first place.

Use of E-mail. Please be advised that sending email to your Professor or TAs does not create a responsibility or obligation to respond to it. Sending us email does not shift any responsibility from you to us; you are still responsible for the on-time, high quality completion of assignments and projects. Do not send complicated questions or requests to us via email. Replies will not be given for email questions or problems requiring lengthy (more than a couple of sentences) or complicated responses. These types of communications should be done in person.

Religious observance. If you cannot attend a particular class because of religious reasons, please arrange with me at **least one week ahead of time** so we can make alternate plans for covering the material. I have planned the course in a way that exams or assignments do not conflict with religious observance, but if you find a conflict please tell me within the first two weeks of the semester.

GRADING

The total number of points you can get in this course is 100. Below you find the distribution of points for assignments, exams, attendance and participation.

The points assigned to each activity reflect the effort needed to do the task. For example, an assignment that is worth 4 points will take you less time and effort than an assignment that is worth 10 points. Please use this guideline to plan your work.

	Points
Project assignments	
1. Requirements Gathering	8
2. Use-Case Modeling I	12
3. Use-Case Modeling II	8
4. Class Modeling	10
5. Think Aloud	10
6. Project Management	12
Total Project assignments	**60**
Exams (individual)	
Exam 1	10
Exam 2	10
Final examination (day by registrar)	15
Total Exams	**35**
Attendance and participation in class	**5**
Total POINTS	**100**
Retrospective evaluation of the course: 1 EXTRA POINT	1

SCHEDULE

AUGUST	*Lecture Topic*	*Reading Due*	*HW Assigned*	*HW Due at 11:59PM*	*CASE Tool*
Tues, 8-30	0- Introduction to the course, explanation of objectives, policies and grading schema.				
SEPTEMBER					
Thurs, 9-1	1 - Introduction to the Software Development Process: Software Development Life Cycle and Methodologies	DWT. Chapter 1			
Tues, 9-6	2 - Requirements Gathering Techniques I: Interviews	DWT. Chapter 5 Pages 137-143	Requirements Gathering		Word
Thurs, 9-8	3 - Requirements Gathering Techniques II: Contextual Inquiry, Questionnaires, Observation, Focus groups	Reading Packet: BH. Chapters 3 and 4 DWT chapter 5 pages 144-159			
Tues, 9-13	4 - Visual Modeling and introduction to UML	Reading Packet: BJR. Chapters 1 and 2 DWT. Chapter 2			
Wed, 9-14				**Requirements Gathering**	
Thurs, 9-15	5 - Use-Case Modeling I: Introduction and elements of Use Case Diagrams	SW. Chapter 2 DWT. Chapter 6, pages 178-207	Use-Case Modeling I		Poseidon Drawing Software Word
Tues, 9-20	6 - Use-Case Modeling II: Use case specification	SW. Chapters 3 and 4 DWT. Chapter 6			
Thurs, 9-22	7 - Use-Case Modeling III: Practice drawing use case diagrams				
Mon, 9-26				**Use-Case Modeling I**	

SEPTEMBER	***Lecture Topic***	***Reading Due***	***HW Assigned***	***HW Due at 11:59PM***	***CASE Tool***
Tues, 9-27	8 - Use-Case Modeling IV: Activity Diagrams and Advanced Documentation	SW. Chapters 6 and 8	Use-Case Modeling II		Poseido, Drawing Software
Thurs, 9-29	**TOC/ BOC- NO CLASS**				
OCTOBER					
Tues 10-4	9 - Use-Case Modeling V: Reviewing Use Cases, Advanced documentation	SW. Chapters 6 and 8			
Thurs, 10-6	10 - Class Modeling I: Find Classes from Use-Case Behavior. Class Diagrams	DWT. Chapter 7			
Fri, 10-7				**Use-Case Modeling II**	
Tues, 10-11	**11 - Review for Midterm EXAM 1**				
Thurs, 10-13	**EXAM 1 – Covers up to 10-11 class**				
Tues, 10-18	12 - Class Modeling II: Multiplicity. Practice Class diagrams	DWT. Chapter 7	Class Modeling		Poseidon Drawing Software
Thurs, 10-20	13 - Class Modeling III: Sequence and Collaboration diagrams	DWT. Chapter 8			
Tues, 10-25	14 - Class Modeling IV: Practice Sequence and Collaboration diagrams.				
Wed, 10-26				**Class Modeling**	
Thurs, 10-27	15 - What are Use Cases good for?: Invited speaker Geri Schneider				
NOVEMBER					
Tues, 11-1	16 - Dividing large systems	DWT. Chapter 9 SW. Chapter 9			
Thurs, 11-3	**17 - Review for Midterm EXAM 2**				
Tues, 11-8	**EXAM 2 – Covers from 10-18 to 11-3 class**				

NOVEMBER	***Lecture Topic***	***Reading Due***	***HW Assigned***	***HW Due at 11:59PM***	***CASE Tool***
Thurs, 11-10	18 - Scenario-Based User Interface Design and Prototyping	DWT. Chapter 12 Reading Packet: RC. Chapter 1 and 6. SW pp. 75-78			
Tues, 11-15	19 - Usability Evaluation I: Think Aloud		Think Aloud		Camtasia
Thurs, 11-17	20 - Usability Evaluation II: Introduction to other usability evaluation methods	Reading Packet: NM. Chapter 1, Chapter 2			
Tues, 11-22	21 - Project Management I: Project Initiation: System Request, feasibility and risk analysis	DWT. Chapters 3 and 4 SW. Chapter 1			
Wed, 11-23				**Think Aloud**	
Thurs, 11-24	**THANKSGIVING BREAK-NO CLASS**				
Tues, 11-29	22 - Project Management II: Create a workplan, staff the project	DWT. Chapter 4	Project Management		Word templates MS Project or Excel
DECEMBER					
Thurs, 12-1	23 - Project Management III: Directing and Controlling				
Tues, 12-6	24 - Project Management IV: Practice project management				
Wed, 12-7				**Project Management**	
Thurs, 12-8	25 - Review for FINAL		Retrospective **Due the day of the FINAL EXAM**		