

ISMT529
Information Systems Development Methodologies

Fall 2006-2007

(Sat 2:30 pm - 5:50 pm, Rm 4116)

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COURSE DESCRIPTION

Nowadays, information technology (IT) and information systems (IS) affect all management functions and have become essential to firms' competitive advantage and survival. IT becomes a key enabler for successful business transformation, which will in turn help organization to deal with challenges in an increasingly competitive business world. On the other hand, IT investments do not automatically improve business performance and contribute to business success. We can observe as many failure stories as success ones. In fact, there has been a lot of doubt on the productivity impacts and business value of IT. The bottom line is that the critical path to business success is not the technology itself. IT should be aligned with firms' strategic goals, and IS should be developed in such way that it reflects business requirements and facilitates process transformation.

One of the largest pitfalls of organizations is not taking the time and investment to analyze and design the business processes that will lead to successful IS development. Analysis and design of business processes take a critical role in IS development, and organizations should begin their IS development efforts by identifying current and future processes. These processes should then be presented and modified during interactive work sessions with a group of experts and finally validated by a larger audience of stakeholders inside and outside the organizations. IS development methodologies provide organizations with useful guides to efficient and effective IS development, facilitating the required transformation changes and helping organizations to fully benefit from IT. Therefore, it is important for business managers as well as IS managers to understand the IS development methodologies and the related managerial issues.

This course will provide an overview of fundamental principles of IS development methodologies. The primary objective of this course is to provide business students with the basic skills to:

- (1) understand the process of developing systems;
- (2) develop a vision of systems to be implemented to provide value to business stakeholders;
- (3) capture and analyze user requirements for the work that the system will support; and
- (4) model those requirements using the use cases and object methodologies, and be ready to move into the design and implementation phase of the systems development cycle.

The course includes three key components:

- (1) reading assignments and lectures - to provide students with the basic fundamentals of systems analysis;
- (2) in-class exercises and homework - to illustrate the application of the concepts discussed in class; and
- (3) lab sessions and a case study - to provide the student with hands-on experience of how to conduct systems analysis for real applications and how to use modeling tools used in practice.

TEXTBOOKS

Required:

- System Analysis and Design with UML Version 2.0: An Object-Oriented Approach, 2nd Edition, Alan Dennis, Barbara Wixom and David Tegarden (*DWT*), Wiley, 2005
- Advanced Use Case Modeling, Frank Armour and Granville Miller (*A&M*), 2001, Addison Wesley

Reference Books: (Not needed for the class, only if you want to learn more)

- Requirements Analysis: [S. Robertson & J. Robertson, Mastering the Requirements Process](#)
- Use Cases: [A. Cockburn, Writing Effective Use Cases](#)
- Unified Modeling Language (UML): [M Fowler & K. Scott, UML Distilled](#)
- Unified Process (UP): [P. Kruchten, The Rational Unified Process](#)
- Software Engineering: [R. Pressman, Software Engineering: A Practitioners Approach](#)

STUDENT REQUIREMENTS

- (1) Students need to be familiar with this syllabus and the Class Schedule, and to check the schedule regularly to make sure that they are aware of any changes in meeting venues or assignments. All assignments and class events will be posted in the Class Schedule.
- (2) Students also need to check all announcements posted on WebCT site before each class and to check their HKUST **e-mail** regularly for class announcements.
- (3) Students are required, per University policy, to be familiar with HKUST Academic Integrity Policy. These policies will be strictly enforced in this course.

- (4) Students read all assigned material prior to class, participate actively in class discussion, and take a proactive role to maximize their learning from this class and in helping others benefit from the course.
- (5) Students need to follow proper classroom ethics, so that the best possible classroom environment can be provided to each and every student in class.

GRADING

Individual efforts (50%): Final Exam and Class Participation

- Final Exam: 45%
- Class participation: 5%

Team efforts (50%): Homework Assignments and Case Study

- 3 Homework assignments: 20% (2 best scores out of 3, 10% each)
- Case Study – Report: 25%
- Case Study – Presentation: 5%

Final Exam (45%): An open-book final exam will be administered at the last day of class. The exam is expected to measure the degree to which you *individually* have understood the key concepts we have covered in class. The exam will be **open book and open notes**, and will consist of short-answer questions and problem-solving questions. It will be designed to last about 3 hours. The use of laptop or desktop computers is permitted; however, you are **NOT allowed to communicate with anyone or anything else** except the instructor about the exam during the exam. Again, the exam is an *individual* effort and no cooperation of any kind is permitted.

Class Participation (5%): Attendance is important for this course because of the sequential nature of the material (i.e., the sequence of the class topics and lecture materials roughly follows widely used system analysis process steps). Your final attendance and participation grade will be based on attendance (which will not be strictly taken, but will be observed) and quality (more than quantity) of participation during class.

Important notes:

- Some students don't participate during class but stay actively engaged during the course – proactive communication with the instructor about course content via e-mails or in person can make up lack of participation during class;
- *Points may be subtracted for **negative participation** (e.g., late arrivals, leaving the room during class, taking cell phone calls, disruptive conversations while class discussion or presentations are in progress, etc.).*

Homework (20%): You will complete 3 homework assignments with your team (of 4 or 5 students). Each homework assignment is worth 10% of your final grade, and two best scores out of 3 will be counted. The purpose of the homework assignments is to give you hands-on experience with system analysis and modeling methods and tools. Homework assignments are team efforts, and you are allowed to work with your team members. However, you are not allowed to work with or get help from other teams. **Any work that is copied from other teams, all or in part, will receive a grade of 0 in the assignment and result in possible further consequences, as described in HKUST's Academic Integrity Policy.**

Important notes:

- *Assignments are due on the date specified in the syllabus at the beginning of class. “Late” submissions refer to those submitted after class on the due date or after the due date.*
- *Late submissions of your answers to assignments will be assessed an initial penalty of 40% if submitted on the due date day after class; and subsequently will be assessed a penalty of 20% for each day late after the due date.*

Case Study (30%): You will conduct a case study with your team. The objective of this case study is to help you put in practice what you have learned in the course by conducting a systems analysis for a real application. At the beginning of the course, your team will propose a case from a company, preferably a real one but it could also be a fictitious company or a startup, and suggest a system that will provide business value to that company. Or, if you prefer, you are welcome to work on an example case that will be provided in class. Throughout the course, you will apply the methods described in class to produce a full requirements specification for the system of your choice. Further detailed instructions for the case study will be provided as the class proceeds. You are required to submit a report and present your work in class with your team, which will account for 25% and 5% of your total grade, respectively.

Grading for Team Efforts: Your final grade for team assignments (i.e., 3 homework assignments and case study) will be determined by your contributions to your team assignments. You are expected to be an active and equal contributor to your team on the homework assignments and the case study. This includes attending meetings scheduled by your team, suggesting and implementing ideas, and effectively completing tasks. Each team member will complete a team peer evaluation in which you evaluate team members as well as yourself on their contributions. Individuals whose performance is rated as sub-par by a majority of their team’s ratings will receive reduced points for team assignments. Further details will be provided in class.

Re-grade Policy: If you wish to request a re-grade of an item on an assignment, you must submit to me: (1) the original document containing the item to be re-graded and (2) a *written* request (email or

hardcopy) explaining your re-grade request (what you are requesting to be re-graded *and* why you believe your answer is correct). Note that your entire exam may be subject to re-grading. Re-grade requests must be submitted to me within 1 week after the assignment is returned; any re-grade requests submitted after this will not be considered.

In conclusion, there is no doubt that information technology (IT) is an important component of any successful business nowadays, and organizations have been making huge investment in IT. Knowledge and skills related to information system development are critical for organizations to fully benefit from IT investments. I, as your instructor, am committed to help you acquire key knowledge and skills that will help you achieve a great success in your current and future business careers as IT managers or any other functional managers. Success is not only achieved by receiving promising job offers upon graduation, but by excelling at what you do. My job is to help you move in this direction by providing you with a balanced mix of basic fundamentals and hands-on experience with systems developments methods and tools. I look forward to your helping me do my job through your proactive and diligent participation in our collaborative learning process. I am sure that we all will be very much proud of ourselves about our accomplishments at the end of the semester. Welcome all of you to the course!!!

CLASS SCHEDULE

Week/Date		Topics	Readings	Assignments
1	Sep 9	<p>Course Introduction and Overview</p> <p>Intro to System Development Methodologies</p> <ul style="list-style-type: none"> - Information System (IS) concepts - System development concepts - System Development Life Cycle (SDLC) - System development methodologies <p>Intro to Object-oriented (OO) System Analysis and Design</p> <ul style="list-style-type: none"> - Basic Characteristics of OO systems <p>The Unified Modeling Language (UML) and the Unified Process (UP)</p> <ul style="list-style-type: none"> - UML Version 2.0 overview - UML diagrams - Key aspects of UP - UP artifacts 	DWT Ch. 1&2	
2	Sep 16	<p>Requirement Determination</p> <ul style="list-style-type: none"> - The system requirement process - The system requirement specification <p>Functional Modeling: Use Case Modeling</p> <ul style="list-style-type: none"> - Intro to use cases - The use case modeling process - Identifying actors <p>Initial Use Case Modeling</p> <ul style="list-style-type: none"> - Context diagram - Initial use case descriptions - Use case diagrams 	DWT Ch. 5&6 (p.171-186)	<p><i>Case Study Proposal Due (optional)</i></p> <p><i>Team formation</i></p>
		<p>Lab Session 1</p> <ul style="list-style-type: none"> - Basics of Microsoft Visio (MS) modeling tool - Context diagram and use case diagram with MS Visio 	A&M Ch. 5&7	
3	Sep 23	<p>Expanding Use Case Model</p> <ul style="list-style-type: none"> - Base use case descriptions - Elaborated use case descriptions - Activity diagrams <p>More Elaboration of Use Case Model</p> <ul style="list-style-type: none"> - Extend/Include relationships - Generalization relationships - Non-functional Requirements 	A&M Ch. 8-10&11 (p.185-187)	<p><i>Assignment 1 Due (covers up to Week2)</i></p>
			DWT Ch. 6 (p.165-171)	
4	Sep 30	<p>Data modeling</p> <ul style="list-style-type: none"> - Structural model - Class diagrams - Class-Responsibility-Collaboration (CRC) cards <p>Behavioral modeling</p>	DWT Ch. 7&8	<p><i>Case Study Interim Report Due (optional)</i></p>
			A&M Ch. 12	

Week/Date	Topics	Readings	Assignments	
	<ul style="list-style-type: none"> - Behavioral models - Sequence diagrams - Communication diagrams - Behavioral state machines 			
	Lab Session 2 <ul style="list-style-type: none"> - Activity diagrams - Use case relationships - Class diagrams 			
5	Oct 7	Project Initiation/Management <ul style="list-style-type: none"> - Project identification - Feasibility analysis - Project selection - Project size estimation - Project management issues 	DWT Ch. 2, 3(p.85-102) & 6 (p.186-190)	Assignment 2 Due (cover Week3-4)
6	Oct 14	Data Flow Diagram (DFD) <ul style="list-style-type: none"> - Traditional system modeling methods - Data flow diagram (DFD): Concepts - DFD construction rules - Translating into DFD vocabulary - DFD levels - DFD exercises 	TBA	Case Study Report Due
		Lab Session 3 <ul style="list-style-type: none"> - Sequence diagrams - Communication diagrams - State chart diagrams - DFD 		
7	Oct 21	System Design Issues <ul style="list-style-type: none"> - Evolving analysis models to design models - Package diagrams - Design strategies - Alternative matrix - Class and method design - Data management design - Human computer interaction (HCI) design System Implementation Issues <ul style="list-style-type: none"> - Test cases - Documentation - Conversion - Change management Case Study Presentations Course Wrap-up	DWT Ch. 9-12 (selected sections) DWT Ch. 14-15 (selected sections) A&M Ch. 14	Assignment 3 Due (covers Week 5&6)
8	Oct 28	Final Exam	Comprehensive, open-book and open-note Case Study Report – Revision (Due by Oct 31, optional)	