

MIS 620 - Analysis and Development of Information Systems

General Information

Course Number: MIS 620

Program: Information Systems (MS, MBA and Certificate)

Concentration: Information Management (mandatory), all others (optional)

Course Coordinator: Arnold Schron (Overall)

Course Committee: Arnold Schron, Michael zur Muehlen, Rajkumar Kempaiah

Terms Offered: Fall, Spring, Summer I

Major Topics

- Application categories.
- Software Project Management
- Project feasibility assessment; risk analysis.
- SEI Capability Maturity Model Analysis (CMMI).
- Software and System Quality Metrics.
- Life cycle phases including systems selection and planning, analysis, logical design, physical design, implementation and operation, maintenance.
- Rational Unified Process.
- Techniques for requirements determination, collection, and organization; questionnaires, interviewing, document analysis, observation.
- Object-oriented Analysis and Design.
- Data Modeling (ERD, Class Diagrams)
- Process Modeling (BPMN, UML Activity Diagrams, EPC).
- Software package evaluation and acquisition. Outsourcing.
- Globalization issues such as cultural values, information privacy, and data exchange.

Course Overview

This course focuses on the analysis and development of systems to meet the increasing need for information within organizations. It presents and analyzes various topics such as systems development life cycle, analysis and design techniques, information systems planning and project identification and selection, requirements collection and structuring,

process modeling, data modeling, design of interface and data management, system implementation and operation, system maintenance, and change management implications of systems. It looks at current methods and tools such as rapid application development, prototyping, and computer-aided software development (CASE). Procedure models like the waterfall model, spiral, and prototyping approaches as well as the rational unified process are examined in detail and juxtaposed. (3.0 credits)

Relationship to the Rest of the Curriculum

Analysis and Development of Information Systems (MIS 620) is a fundamental course in the Information Systems Curriculum. It provides the basic analytical and modeling skills that are required in the later courses on Business Process Innovation (MIS 710) and Integration in the Large (MIS 730). It should be taken parallel to MIS 630 (Data and Knowledge Management) and MIS 640 (Network Management). The course strengthens basic project management skills that were taught in Introduction to Project Management (MGT 609).

Learning Goals

- To understand and apply system analysis and design processes
- To evaluate and choose appropriate system development methodologies
- To analyze and document requirements
- To create structural and behavioral models of a system
- To develop effective communication with users
- To develop interpersonal skills for use with clients, users, team members, and others associated with the development, operation and maintenance of systems

Pedagogy

The course will employ lectures, online discussion, and individual homework's and projects. One individual project will involve a CMMI analysis of an Information Technology organization. Final project will involve the application of material covered in the class to a case study.

Required Text

Whitten, Jeffrey L.; Bentley, Lonnie D.: Systems Analysis and Design Methods. 7th Edition. McGraw-Hill 2007.

Required Readings

- Ackoff, Russell L.: A System of System Concepts. Management Science 17 (1971) 11, pp. 661-671.
- Alvarez, Rosío; Urla, Jacqueline: Tell me a good story: Using narrative analysis to examine information requirements Interviews during an ERP implementation. ACM SIGMIS Database 33 (2002) 1, pp. 38-52.
- Butler, Kelley L.: The Economics of Software Process Improvement. Online Paper at www.stsc.hill.af.mil/crosstalk/1995/07/Economic.asp July 1995.
- Curtis, Bill; Kellner, Marc I.; Over, J.: Process Modeling. Communications of the ACM 35 (1992) 9, pp. 75-90.
- Ewusi-Mensah, K.: Critical issues in abandoned information systems development projects. Communications of the ACM, 40(1997) 9, pp. 74-80.
- Herbsleb, James; Carleton, Anita; Rozurn, James; Siegel, Jane; Zubrow, David: Benefits of CMM-based Software Improvement: Initial Results. Technical Report CMU/SEI-94-TR-013, Carnegie Mellon University, Pittsburgh, PA 1994.
- Hoffer, A.: When Will the Rubber Hit the Road for Web Services. eAI Journal, October 2002, pp. 8-11.
- Humphrey, W. S.: Characterizing the Software Process: A Maturity Framework. IEEE Computer, 21 (1988) 3, pp. 48-56.
- Kruchten, P. (2001). What is the Rational Unified Process. The Rational Edge January 2001
- Markus, M. L., & Keil, M. (1994). If We Build It, They Will Come: Designing Information Systems That People Want to Use. Sloan Management Review, 35(4), pp. 21-31.
- Paulk, M. C.; Curtis, B.; Chrissis, M. B.; Weber, C. V.: The Capability Maturity Model for Software. IEEE Software 10 (1993) 4, pp. 18-27.
- Reifer, D.; Chatmon, A.; Walters, C. D.: The Definitive Paper: Quantifying the Benefits of Software Process Improvement. Software Tech News 5 (2000) 4. Online Paper at: www.dacs.dtic.mil/awareness/newsletters/stn5-4/definitive.html
- Sassone, P.G.; Schwartz, A.P.: Cost-Justifying OA. Datamation, 32 (1986) 4, pp. 83-84.
- Sassone, P.G.: Cost Benefit Analysis of Information Systems: A Survey of Methodologies. ACM Conference on Supporting Group Work (SIGGROUP) 1988, pp. 126-133.
- zur Muehlen, M.: Process Modeling Methods - An Overview. White Paper. Stevens Institute of Technology. Hoboken, NJ 2002.

Assignments

Week-to-week Assignments

(Weighting: 30%, Due: Continuously)

Nearly every week you will be given an assignment which deals with particular aspects of the topics dealt with in class that week. Each assignment will require the composition of a document that is between ½ and 2 pages long. The purpose of these assignments is to explore some key aspects taught in this class and to apply them in a “real” situation.

Midterm (CMMI Assessment and Plan)

(Weighting: 20%)

The mid-term paper assignment is an analysis of your organization in terms of the SEI Capability Maturity Model Integration (CMMI). For the assignment use this model (framework) to analyze some portion of your organization. You do not have enough time or resources to do a complete analysis of the complete organization! Select some portion of the organization and do the best analysis you can. Not only should you indicate the current state of the organization, but explain what you would do to improve it if you were assigned to manage that organization. The paper should be in the 10-12 page range before references and appendices are included. See (Humphrey, 1988) for one explanation of how this model works, and visit the SEI web site for more information. There are a variety of writings available for doing a maturity model analysis, it is up to you to find some and come to an understanding of the framework. See "Writing Papers for Class" for more information about writing style. If you are a full time student and do not have access to a corporation to analyze you will be given an alternative assignment.

Course Quiz

(Weighting: 20%)

In the 12th week of the course your progress in the course will be assessed through an online exam. The exam will be administered via WebCT and can be completed from home. The exam will consist of a mix of multiple-choice and open ended questions. There is a 45 minute time limit on the exam.

Final Presentation

(Weighting: 20%)

The final project will be your opportunity to demonstrate what you have learned in the course. Each student will work on a software development project and will have to present a feasibility analysis, requirements specification, and architecture designs, including cost and schedule estimates.

Student Reliability/Participation

(Weighting: 10.0%, graded on constructive participation in class)

Class discussion is an important aspect of the class. You are expected to have done the readings and participate in online discussion by expressing your understandings and viewpoints on the readings. You do not have to agree with the readings or the instructor. However, whatever position you take, you should be able to back up your arguments. In online discussion, content of your discussion is most important. Effectiveness in orally communicating and conveying your points is also counted.

Grading

Grading for each deliverable will be done with a letter grade, and, as appropriate, a + or -. The final grade will be computed based on the weighting of the deliverables. However, the Stevens Graduate School only recognizes full letter grades for courses, so a B+ or B- average will become a B on the grade sheet. Assignments are typically graded on a scale from 0-100 (0-10 in some instances), with the following resolution:

Points	Grade
90-100	A
85-89	B+
75-84	B
70-74	B-
50-69	C
0-49	F

Ethical Conduct

The following statement is printed in the Stevens Graduate Catalog and applies to all students taking Stevens courses, on and off campus.

“Cheating during in-class tests or take-home examinations or homework is, of course, illegal and immoral. A Graduate Academic Evaluation Board exists to investigate academic improprieties, conduct hearings, and determine any necessary actions. The term ‘academic impropriety’ is meant to include, but is not limited to, cheating on homework, during in-class or take home examinations and plagiarism.”

Consequences of academic impropriety are severe, ranging from receiving an “F” in a course, to a warning from the Dean of the Graduate School, which becomes a part of the permanent student record, to expulsion.

Reference: The Graduate Student Handbook, Academic Year 2006-2007 Stevens Institute of Technology, page 10.

Consistent with the above statements, all homework exercises, tests and exams that are designated as individual assignments **MUST** contain the following signed statement before they can be accepted for grading.

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination. I further pledge that I have not copied any material from a book, article, the Internet or any other source except where I have expressly cited the source.

Signature _____

Date: _____

Students are encouraged to work in teams and study groups since most management activity is done in teams. Students are, however bound to a principal of academic honesty to neither give nor receive assistance such that the work presented is not essentially their own. **Plagiarism will not be tolerated and will be dealt with harshly.** For the purposes of this class, **that means that if a paper has your name on it, there are no non-attributed co-authors, references are cited properly and explicitly marked as such (i. e., the original source is provided either in the text itself or in a footnote).** First offense will be an 'F' for the assignment. Second offense will be an 'F' for the course and a letter to the Dean.

Please note that assignments in this class may be submitted to www.turnitin.com, a web-based anti-plagiarism system, for an evaluation of their originality.

Course Schedule

Week	Content	Readings	Assignment Due
1	Introduction to Systems Analysis and Design <ul style="list-style-type: none"> • Software Development • Waterfall Model • Rational Unified Process 	Ackoff (1971) Markus, Keil (1994) Ewusi-Mensah (1997) Whitten, Bentley Chapters 2,5	
2	Managing Software Projects <ul style="list-style-type: none"> • Measurements and Function Points • Size and Scope Estimates 	Whitten, Bentley Chapters 3, 4 Sassone, Schwartz (1986)	Assignment 1: SW Project Failure

3	Capability Maturity Model Integration	Humphrey (1988) Paulk (1993) Herbsleb et al. (1994) Butler (1995) Reifer et al. (2000)	Assignment 2: Feasibility Analysis
4	Requirements Elicitation <ul style="list-style-type: none"> • Interviews and User Stories • Perception and Truth • Managing Scope • Use Case Modeling 	Alvarez, Urla (2002) Whitten, Bentley, Chapters 6, 7	
5	Analysis Techniques <ul style="list-style-type: none"> • Modeling and Abstraction • What is a good model? 	Becker et al. (2000)	Assignment 3: Use Case Modeling
6	Analysis Frameworks <ul style="list-style-type: none"> • ARIS • Zachman • SCOR • Enterprise Frameworks 		
7	Data Modeling <ul style="list-style-type: none"> • Entity-Relationship Diagrams • Class Diagrams • Transaction Management 	Whitten, Bentley Chapter 8	Midterm Paper due: CMMI Analysis
8	Process Modeling <ul style="list-style-type: none"> • BPMN • DFDs • EPCs 	Whitten, Bentley Chapter 9 Curtis et al. (1992)	Assignment 4: Data Model

		zur Muehlen (2002)	
9	OO Modeling <ul style="list-style-type: none"> • Object-oriented Modeling • UML Diagram Types 	Whitten, Bentley Chapter 10	Assignment 5: Process Model
10	Architecture <ul style="list-style-type: none"> • Software Architecture vs. Enterprise Architecture • Managing architectural change 	Whitten, Bentley Chapter 13	Assignment 6: OO-Model
11	Integration <ul style="list-style-type: none"> • Data Integration • Process Integration • Application Integration • Integration Platforms 	www.ebxml.org www.rosettanet.org	
12	Service-Oriented Architecture <ul style="list-style-type: none"> • Principles of Web Services • Standardization 	www.w3c.org	Course Quiz (online, open book)
13	Decision Support <ul style="list-style-type: none"> • Monitoring and Controlling • Probes and Reports • Vertical Integration 		
14	Final Project		