**ITEC 630**

*Information Systems Analysis, Modeling, and Design*

***Lecture Notes***

**System Analysis and Development Methodologies**

Created by Daniel LeRevised by Daniel Le 08/11/2016

**Learning objectives**

1. Types of computer-based information systems that a systems analyst needs to address.

2. Understand how new technologies affect the traditional information systems.

3. Recognize the many roles of the systems analyst in build information systems

4. Recognize the Human-Computer Interaction (HCI) factors during all phases of SDLC.

5. Understand the fundamentals of several development methodologies including SDLC, the agile approach, the object-oriented systems analysis and design, the Unified Modeling Language, and the Unified Process.

6. Learn what CASE tools are and how they help a systems analyst.

**About this course**

This course, ITEC 630, Information Systems Analysis, Modeling, and Design, is one of the core courses in University of Maryland University College's degree, Master of Science in Information Technology. In this course, we will study systems analysis and design by exploring all topics related to analyzing, designing, implementing, and maintaining information systems.

Information is considered as a key resource for a business and, with the rapid expansion and utilization of the Internet and World Wide Web technology, the amount of information requested for accessing, analyzing, modifying, and storage is increasing. Therefore, it is important to manage information correctly in a systematic way using information systems. The goal of this course is to teach students all major aspects of information systems analysis and design: (1) systems analysis fundamentals, (2) information requirements analysis, (3) the analysis process, (4) the essentials of design, and (5) software engineering and implementation.

In order to help students understand the course material, we have created a weekly “Class Discussion” section in the Conference area to discuss topics mentioned in the current session. To apply knowledge learned from this course to reality, we have an “Individual Project” assignment to allow students have hands-on experience in the design of real information systems. In addition, we have a “Group Project” assignment so students could explore further topics covered in this course and learn to work well in groups.

**Overview**

This week lecture introduces systems analysis and development methodologies by first defining the term “system”, identifying the system concepts and analyzing the flow of information within organizations. It then presents an overview of a variety of information systems that systems analysts might be involved in developing and maintaining. This week lecture points out the roles of systems analysts, briefly discusses the systematic approach – systems development life cycle (SDLC) – and productivity software tools – Computer-Aided Software Engineering (CASE) tools – used by systems analysts in working with the analysis, design, implementation, and maintenance of information systems. Other important systems analysis and design concepts are covered including Human-Computer Interaction (HCI) factors during phases of SDLC, integration of new technologies into traditional systems, and alternatives to structured analysis and design and to the SDLC

***Note #1: All links provided in this lecture can be activated with a "Ctrl + Click"; however, you can also activate these links by copy and paste the link content to the Web browser address bar, just in case.***

***Note #2: To access links associated with "http://library.books24x7.com.ezproxy.umuc.edu", you might have to log into UMUC Library and activate the link "Books24x7" first.***

* ***System Introduction***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=144578432&rowid=5&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=144578432&rowid=5&noteMenuToggle=0&leftMenuState=1)

* ***System and Its Parts***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=400645728&rowid=7&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=400645728&rowid=7&noteMenuToggle=0&leftMenuState=1)

* ***System Concepts***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=243463257&rowid=14&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=243463257&rowid=14&noteMenuToggle=0&leftMenuState=1)

* ***Organizations, Managers, and Information***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=278149368&rowid=18&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=278149368&rowid=18&noteMenuToggle=0&leftMenuState=1)

**COMPUTER-BASED INFORMATION SYSTEMS**

Information is a key resource for a business, so it must be organized systematically and managed correctly and carefully to help businesses make decisions, using information systems. Currently, there are six types of information systems arranged in three levels of management that system analysts might develop:

A. Lower management

1. Transaction processing systems (TPS)

B. Middle management

2. Management information systems (MIS)

C. Top management

3. Decision support systems (DSS)

4. Executive support systems (ESS).

D. All levels

5. Office automation systems (OAS)

6. Expert system or knowledge-based system

* ***Computer-based Information Systems***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=930808768&rowid=27&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=930808768&rowid=27&noteMenuToggle=0&leftMenuState=1)

**INTEGRATING TECHNOLOGIES FOR SYSTEMS**

As more and more organizations are using Web applications and web-based technologies are developing and improving, the systems analysts should be aware of the affects of these new technologies to all systems users and the traditional information systems. They should be prepared to learn, adapt, and integrate the new technologies with the traditional information systems. Some technologies are being integrated into traditional systems as follows.

* ***Ecommerce***

[**https://www.youtube.com/watch?v=AhgtoQIfuQ4**](https://www.youtube.com/watch?v=AhgtoQIfuQ4)

* ***Enterprise Resource Planning (ERP)***

[**https://www.youtube.com/watch?v=2sa6lS3APo8**](https://www.youtube.com/watch?v=2sa6lS3APo8)

* ***Cloud Computing***

[**https://www.youtube.com/watch?v=uYGQcmZUTaw**](https://www.youtube.com/watch?v=uYGQcmZUTaw)

* ***Wireless and mobile devices such as the Apple iPhone, iPod, or the BlackBerry***

[**http://library.books24x7.com.ezproxy.umuc.edu/toc.aspx?bookid=93364**](http://library.books24x7.com.ezproxy.umuc.edu/toc.aspx?bookid=93364)

* ***Wireless ecommerce (mobile commerce or M-Commerce)***

[**https://www.youtube.com/watch?v=QtpTTpgpELg**](https://www.youtube.com/watch?v=QtpTTpgpELg)

* ***Open source software***

[**https://www.youtube.com/watch?v=Tyd0FO0tko8**](https://www.youtube.com/watch?v=Tyd0FO0tko8)

**ROLES OF THE SYSTEMS ANALYST**

In an organization, system analysts study the problems, gather the requirements, design and implement information systems to improve the organization's businesses and they usually have to communicate with all people involved with the systems (owners, users, designers, builders, etc.). Therefore, they must possess many skills and knowledge in order to build working systems and work well with others.

* ***Typical systems analyst roles and skills***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=982984782&rowid=111**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=982984782&rowid=111)

**SYSTEMS DEVELOPMENT LIFE CYCLE**

The systems analysts may work with information systems using a systematic approach called the systems development life cycle (SDLC). There are four fundamental phases of the SDLC.

1. Planning
2. Analysis
3. Design
4. Implementation

* ***Four Fundamental Phases of the SDLC***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629/chapter-1-the-systems-analyst-and-information-systems-development/navpoint-21#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODExMTgwNTc2MjklMkZuYXZwb2ludC0yMCZxdWVyeT0=**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629/chapter-1-the-systems-analyst-and-information-systems-development/navpoint-21%23X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODExMTgwNTc2MjklMkZuYXZwb2ludC0yMCZxdWVyeT0=)

**HUMAN-COMPUTER INTERACTION (HCI) FACTORS AND SDLC**

Since user involvement is recognized as a critical success factor in the development of information system, the Human-Computer Interaction (HCI) factors should be considered in all phases of the SDLC. In reality, HCI factor plays a very important role starting from the beginning to the end in designing and building information systems today.

In the past, solving systems problems and completing tasks are the most important things and human needs were not the main concern even though the systems were built for human operations. As an example, after the systems have been built, users usually were brought in for system evaluation regarding user interface. Since users were not involved in many parts of the SDLC, the user interface usually was not user-friendly that made the systems hard to use. Fixing user interface problems at this stage is more expensive and it required a lot of code change that might create problems in other areas of the systems. By focusing on human needs, analysts get users involved early in the SDLC processes and they could identify and fix user interface problems in the early stages with much less effort and less expensive.

* ***Human-Computer Interaction (HCI) factors and all phases of the SDLC***

[**http://melody.syr.edu/hci/amcis04/AMCIS\_04\_Zhang\_etal\_HCI\_in\_SDLC.pdf**](http://melody.syr.edu/hci/amcis04/AMCIS_04_Zhang_etal_HCI_in_SDLC.pdf)

**ALTERNATE APPROACHES TO THE SDLC**

The structured analysis and design with the SDLC is not the only systematic approach to solving business problems. Alternate methodologies to the traditional SDLC include the agile approach and the object-oriented analysis design. Object-oriented analysis (OOA) and object-oriented design (OOD) based on the Unified Modeling Language (UML) could be used to build object-oriented information systems that can adapt quickly to dynamic business environments. The agile approach is similar to iterative prototyping that can respond quickly to changing requirements and, as a result, it is a preferred methodology for many Web-based information systems development projects.

* ***Object-Oriented Systems Analysis and Design (OOSAD)***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/uml/9781118037423/chapter-1-introduction-to-systems-analysis-and-design/navpoint-18**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/uml/9781118037423/chapter-1-introduction-to-systems-analysis-and-design/navpoint-18)

* [***Unified Modeling Language (UML)***](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/object/9780124186736/chapter-1dot-introduction/chp001_html#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODAxMjQxODY3MzYlMkZzdDAwMzBfaHRtbCZxdWVyeT1jaG9vc2UlMjBoYXJ)

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/object/9780124186736/chapter-1dot-introduction/chp001\_html#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODAxMjQxODY3MzYlMkZzdDAwMzBfaHRtbCZxdWVyeT1jaG9vc2UlMjBoYXJ**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/object/9780124186736/chapter-1dot-introduction/chp001_html#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODAxMjQxODY3MzYlMkZzdDAwMzBfaHRtbCZxdWVyeT1jaG9vc2UlMjBoYXJ)

* ***Unified Process (UP)***

[**http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/object/9780124186736/chapter-1dot-introduction/chp001\_html#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODAxMjQxODY3MzYlMkZzdDAwMzVfaHRtbCZxdWVyeT1jaG9vc2UlMjBoYXJ**](http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/object/9780124186736/chapter-1dot-introduction/chp001_html#X2ludGVybmFsX0h0bWxWaWV3P3htbGlkPTk3ODAxMjQxODY3MzYlMkZzdDAwMzVfaHRtbCZxdWVyeT1jaG9vc2UlMjBoYXJ)

* ***Agile Methodologies (Go to the section 2.5.5)***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=780086941&rowid=85&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=780086941&rowid=85&noteMenuToggle=0&leftMenuState=1)

**TOOLS FOR SYSTEM ANALYSTS**

In order to help systems analysts in their routine work, productivity tools called CASE (Computer-Aided Software Engineering) tools are used. The CASE tools would help systems analysts increase their productivities, improve the project management, and facilitate communication among users and systems analysts.

Other tools include project management tools such as Microsoft Project and modeling tools such as Microsoft Visio.

* ***The use of CASE in organizations***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=339660464&rowid=170&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=339660464&rowid=170&noteMenuToggle=0&leftMenuState=1)

* ***Components of CASE***

[**http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=464330527&rowid=183&noteMenuToggle=0&leftMenuState=1**](http://library.books24x7.com.ezproxy.umuc.edu/assetviewer.aspx?bookid=30713&chunkid=464330527&rowid=183&noteMenuToggle=0&leftMenuState=1)

**References**

1. <http://melody.syr.edu/hci/amcis04/AMCIS_04_Zhang_etal_HCI_in_SDLC.pdf>
2. http://www.youtube.com
3. Alan Dennis, Barbara Haley Wixom, and David Tegarden (2012). Systems Analysis and Design with UML, 4th Edition, John Wiley & Sons.

<http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/uml/9781118037423>

1. Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth (2012). System Analysis and Design, Fifth Edition, John Wiley & Sons.

< http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/9781118057629 >

1. J.B. Dixit and Raj Kumar (2007). Structured System Analysis and Design, Laxmi Publications

<http://library.books24x7.com.ezproxy.umuc.edu/toc.aspx?bookid=30713>

1. Raul Sidnei Wazlawick (2014). Object-Oriented Analysis and Design for Information Systems, Morgan Kaufmann.

<http://proquestcombo.safaribooksonline.com.ezproxy.umuc.edu/book/software-engineering-and-development/object/9780124186736>

**Disclaimer:** Some articles or sites I select or refer you to may include materials or opinions associated with particular political or other ideological positions. My pointing to these sites in no way suggests that I am encouraging a particular ideology or position on this or any other related topic; these are simply some of the more interesting and informative sites I have found to cover the topic(s) at hand. As always, you must consider the source when reading any materials that may reflect a particular ideological point of view on an issue.