

INF 1342H **Section 0102** (Winter 2017) System Requirements and Architectural Design

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Lectures:	Saturdays 9am-noon and 1-4pm.
Rooms:	<ul style="list-style-type: none">▪ Feb 4 – BL507▪ Feb 18 – BL538▪ Mar 11 – BL224/BL2256▪ Apr 8 – BL538
Office hours:	TBD. Skype – available. Please, contact the instructor.

Syllabus

[Last modified: Jan 25, 2017]

COURSE DESCRIPTION

Design is a crucial activity in the creation of an information system. It is challenging because of competing goals from multiple stakeholders, and the complexity of issues that can arise. In this course, we focus on design processes resulting in system requirements, as well as high-level architectural design of an information system. A design has to deliver desired functionalities and also meet non-functional qualities such as performance, cost, usability, timeliness, security, privacy, reliability, flexibility, maintainability, and so forth. Increasingly, system design is focused not only on a single isolated system, but on portfolios or families of systems, with more attention to interoperability, sharing, reuse, and evolution.

This course focuses on the design of networked information systems in the face of multiple competing or synergistic goals from many stakeholders. Examples will be taken from settings in e-health, e-learning, e-government, etc. A number of design approaches will be examined, with an emphasis on systematic, model-based approaches. The emphasis of the course is to help students gain an appreciation of the strengths and limitations of various techniques, and of the concept of design itself. These concepts of design are placed within the larger context of contemporary information systems development and software engineering. The significance of design representations (models and notations), methods and tools, and reusable design knowledge will be discussed. Students will work on projects to apply selected design methods and techniques.

COURSE OBJECTIVE

To gain a broad understanding of the concepts, issues, and techniques of requirements discovery and system design in the context of information systems development, and to practice selected techniques through course projects.

Student Learning Objectives

At the end of this course, students will be able to:

- Understand and articulate the role of stakeholder involvement, interdisciplinary collaboration and specific techniques of requirements elicitation in the requirements discovery, systems analysis, and design process (as demonstrated in class discussions and Assignment 1);
- Discover, document, and validate system requirements in a variety of contexts (as demonstrated in Assignments 1 and 2);
- Collaborate effectively in teams working on realistic requirements and system design problems (as demonstrated in Assignments 1 and 2);
- Determine the scope of a design problem and articulate system context and boundary (as demonstrated in Assignment 1);
- Apply and evaluate techniques for eliciting, specifying, and communicating system requirements including goals, scenarios, and qualities to a wide range of stakeholders (as demonstrated in Assignment 1);
- Apply, evaluate, and discuss techniques and models for creating, documenting, communicating, and evaluating architectural designs based on key system requirements (as demonstrated in Assignment 2);
- Systematically identify, analyze, explain, synthesize, and critique concepts, methods, techniques, and problems in the areas of system requirements and architectural design (as demonstrated throughout the course).

Relationship to Master of Information (MI) [Program-Level Student Learning Outcomes](#)

The course introduces the conceptual foundations and frameworks that describe how system designers address social needs by negotiating technology and its social context through requirements and design choices (SLO 1). The course design combines practice-oriented systems design perspectives with the underlying theory that articulates and explains those conceptual frameworks, models, and techniques (SLO 4). The discussion of the role of cloud computing in architectural design decisions contributes to SLO 5. In identifying emerging perspectives on the long-term effects of technology choices and the corresponding responsibility of the designers regarding sustainability, the course also aims to contribute to SLO 2.

Prerequisites

ISD concentration or INF1003 or permission of instructor. INF1341 is strongly recommended.

Course Materials

There is no one single textbook required for this course. Selected readings from a number of textbooks will be provided on Blackboard. There are a number of textbooks that students might find useful:

Requirements books:

- Alexander, Ian and Ljerka Beus-Dukic. *Discovering requirements: how to specify products and services*. Wiley, 2009. Referred to as **ABD** in course schedule. TA180 .A435 2009X. Book website: www.scenarioplus.org.uk/dr_book/ [Acquisition to Inforum course reserves in progress].

- Robertson, Suzanne, and James Robertson. *Mastering the Requirements Process* (3rd Ed.). Addison-Wesley, 2013. Referred to as **RR** in course schedule. [Inforum: 3rd Ed. 2-hr reserve; 2nd Ed. 2-day reserve].
 - Available through Safari Books Online (@ Toronto Public Library):
<http://proquestcombo.safaribooksonline.com.ezproxy.torontopubliclibrary.ca/book/software-engineering-and-development/software-requirements/9780132942850>
- Pohl, Klaus. *Requirements Engineering: Fundamentals, Principles, and Techniques*. Springer, 2010. Referred to as **Pohl** in the course schedule.
- Wiegers, Karl E. *Software Requirements* (2nd Ed). Microsoft Press, 2003.
 - Available through Safari Books Online (@ Toronto Public Library):
<http://proquestcombo.safaribooksonline.com.ezproxy.torontopubliclibrary.ca/book/software-engineering-and-development/software-requirements/0735618798>

Software Architecture books:

- Cervantes, H., & Kazman, R. *Designing software architectures: a practical approach*. Addison-Wesley, 2016. Referred to as **CK** in the course schedule. [Acquisition to Inforum course reserves in process].
 - Available through Safari Books Online (@ Toronto Public Library):
<http://proquestcombo.safaribooksonline.com.ezproxy.torontopubliclibrary.ca/book/software-engineering-and-development/9780134390857>
- Rozanski, B. & Woods, E. *Software Systems Architecture: Working with Stakeholders Using Viewpoints and Perspectives* (2nd Ed.). Addison-Wesley Professional, 2011. Referred to as **RW** in the course schedule. [Inforum: 2-hr reserve].
 - Available through Safari Books Online (@ Toronto Public Library):
<http://proquestcombo.safaribooksonline.com.ezproxy.torontopubliclibrary.ca/book/software-engineering-and-development/9780132906135>
- Bass, L., Clements, P., & Kazman, R. *Software Architecture in Practice* (3rd Ed.), Addison-Wesley, 2013. ENGSCI QA76.754 .B37 2013X and Inforum 005.1 B317S3. Referred to as **BCK** in the course schedule.
 - Available through Safari Books Online (@ Toronto Public Library):
<http://proquestcombo.safaribooksonline.com.ezproxy.torontopubliclibrary.ca/book/software-engineering-and-development/9780132942799>

Software Design books (used in INF1341):

- Whitten, J.L., Bentley, L.D. *Systems analysis and design methods* (7th Ed.), McGraw-Hill, 2007. (Referred to as **WB** in course schedule). ISBN 0073052337 [[Check Availability](#)], 005.1 W624S7 (STL, 2 copies), and 6th Ed., (2004) [[Check Availability](#)] 005.1 .W624S6. Textbook website: www.mhhe.com/whitten
- Satzinger, J., Jackson, R., Burn S. *Systems Analysis and Design in a Changing World* (6th Ed.). Thomson Course Technology, 2012. [[Check Availability](#)] 004.2 S253S4 (STL) (Referred to as **SJB** in the course schedule.) Textbook website: www.course.com/mis/sad4

Course Requirements

Students are required to complete a course project focused on system requirements and architectural design split into two assignments. The project is to be done in teams of 3 or 4. Each team will design an information service, specifying the requirements for the service and proposing a system architecture designed to address these requirements. The project progresses in a number of steps. The due dates below are **tentative**.

Assignment	Value	Due Date
Assignment 1 – System Design: Service Definition and System Requirements (Team Work)	60% overall	
▪ 1A – Pitch/Project Proposal	5%	Feb 12
▪ 1B – Vision/Project Definition and Scope	10%	Feb 26
▪ 1C – Requirements (Scenarios and Goals) – Individual	15%	Mar 19
▪ 1D – Combined Requirements	20%	Mar 19
▪ 1P - Presentation	10%	Mar 11
Assignment 2 – Architectural Design (Team Work)	40% overall	
▪ 2A – Written Report	25%	Apr 16
▪ 2P – Presentation	15%	Apr 8
Total	100%	

Late Policy

Unless a formal extension has been negotiated with the instructor in advance of the due date, late assignments (i.e., submitted after the deadline) will be penalized by one full letter grade per 24 hours (e.g., from A to A-), for a maximum of 72 hours. After that point, late assignments will no longer be accepted.

Extensions on assignments within the term must be negotiated in advance, and require supporting documentation (e.g., doctor's note). Students must email requests for extensions to the instructor at least 24 hours prior to the due date. Exceptions will only be made in special circumstances.

Plagiarism

Plagiarism is a serious offence. Offenders will be prosecuted. See U of T SGS Calendar and FIS policies. All sources must be cited fully and properly. Students are expected to have attended the "Cite it right" workshop offered by the Inforum.

Accommodations

Students with diverse learning styles and needs are welcome in this course. If you have a disability or a health consideration that may require accommodations, please feel free to approach me and/or the [Accessibility Services Office](#) as soon as possible. The Accessibility Services staff are available by appointment to assess needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs, the quicker we can assist you in achieving your learning goals in this course.

Writing Support

As stated in the iSchool's Grade Interpretation Guidelines, "work that is not well written and grammatically correct will not generally be considered eligible for a grade in the A range, regardless of its quality in other respects". With this in mind, please make use of the writing support provided to graduate students by the [SGS Office of English Language and Writing Support](#). The services are designed to target the needs of both native and non-native speakers and all programs are free. Please consult the [current workshop schedule](#) for more information.

Academic Integrity

Please consult the University's site on [Academic Integrity](#). The iSchool has a zero-tolerance policy on plagiarism as defined in section B.I.1.(d) of the University's [Code of Behaviour on Academic Matters](#). You should acquaint yourself with the Code. Please review the material in Cite it Right and if you require further clarification, consult the site [How Not to Plagiarize](#). Cite it Right covers relevant parts of the U of T Code of Behaviour on Academic Matters (1995). It is expected that all iSchool students take the Cite it Right workshop and the online quiz. Completion of the online Cite it Right quiz should be made prior to the second week of classes. To review and complete the workshop, visit the orientation portion of the iSkills site: uoft.me/iskills.

TENTATIVE COURSE SCHEDULE

Notes. Readings are to be done before each class. Changes to this schedule will likely be made, with appropriate notice given. Additional readings may be assigned. Lecture notes and most readings will be posted on Blackboard.

Module		
1	Feb 4	Introduction, course overview, and requirements
	Contents	<ul style="list-style-type: none"> - Course overview, introduction - Requirements, importance of requirements - Conceptualizing requirements - The requirements process - Requirements Types
	Readings	<ul style="list-style-type: none"> ▪ ABD Ch. 1 – Introduction ▪ RR Ch. 2 – Requirements Process
	Supplementary Readings	<ul style="list-style-type: none"> ▪ Nuseibeh, B., & Easterbrook, S. 2000. Requirements Engineering: A Roadmap. In Proceedings of the Conference on the Future of Software Engineering (pp. 35–46). ACM. Retrieved from http://dl.acm.org/citation.cfm?id=336523
2	Feb 18	Requirements: Goals and Scenarios, NFRs, Elicitation
	Contents	<ul style="list-style-type: none"> - Goals, social modeling, and scenarios for requirements engineering - Elicitation, negotiation, and documentation - From requirements to architecture
	Readings	<ul style="list-style-type: none"> ▪ TBD
	Supplementary Readings	<ul style="list-style-type: none"> ▪ TBD
3	Mar 11	Assignment 1 Presentations, Architectural Design
	Contents	<ul style="list-style-type: none"> - Assignment 1 presentations - The role of requirements in system design - Architectural design
	Readings	<ul style="list-style-type: none"> ▪ TBD
	Supplementary Readings	<ul style="list-style-type: none"> ▪ TBD.

**Module
4**

Apr 8

Assignment 2 Presentations, Architectural Design, Documentation, and Evaluation

Contents	<ul style="list-style-type: none">- Assignment 2 presentations- Architectural design – documentation, evaluation- Enterprise Architecture- Wrap-up
Readings	<ul style="list-style-type: none">▪ TBD.
Supplementary Readings	<ul style="list-style-type: none">▪ TBD.

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