Title: SE2: Software Design and Architecture.
Course ID: CS 446, SE 464, ECE 452, CS 646

WWW: http://www.cs.uwaterloo.ca/~rtholmes/teaching/2015winter/cs446/index.html
Twitter: https://twitter.com/cs446

Lectures: Tuesday & Thursday: 10:00 - 11:20, MC 2034

Instructor: Dr. Reid Holmes; DC 3351. Office hours by appointment. rth.se2@gmail.com
TA: Laura Inozemtseva; DC 3334. Office hours by appointment. lminozem@uwaterloo.ca
TA: Adriaan Labuschagne; DC 3334. Office hours by appointment. alabusch@uwaterloo.ca

Course objective:
To introduce students to the software design process and its models. Representations of design/architecture. Software architectures and design plans. Design methods. Design state assessment. Design quality assurance. Design verification. Group design and implementation of an application.

Course expectations:
It is expected that students attend lecture and tutorial and complete the required assignments. Lectures will often include a hands-on activity; participation in these exercises is essential to succeed in the class. Slides will be provided via the course web page before class, along with videos explaining the slides. Any material discussed in class, in the required readings, or in the posted videos will be testable unless otherwise noted.

By the end of the course you should be able to:
- Propose and analyze software architectures.
- Explain the strengths and weaknesses of various architectural styles and design patterns / techniques.
- Communicate and rationalize architectural and design decisions.
- Ideate, justify, and implement software designs.
- Evaluate, compare, and contrast different architectures and designs.

Required text: None.
Required readings: Posted online.
Optional texts:

Taylor, Medvidovic, and Dashofy. Software Architecture. Foundations, Theory, and Practice.
Gorton. Essential Software Architecture.
Brooks. The Mythical Man Month.
Brooks. The Design of Design.

Overview of topics:
- Software architecture, architectural styles, & architectural representations.
- Software design, design patterns, design representations.
- Software architecture and design conception, analysis, and communication.
- Architecture and design recovery / reverse engineering.
- Architecture and design visualization / understanding.
- Cloud / grid computing architectures.

Course schedule / assessment:

Deliverable 0:	Initial Questionnaire	Jan 6 - in class	Pass/Fail
Deliverable 1:	Project Proposal	Jan 26 @ 0800 & in class Jan 27	5%
Deliverable 2:	Architecture Activity	Feb 3/5/10/12	Pass/Fail
Deliverable 3:	Prototype Demonstration	Mar 2 @ 0800 & in class Mar 3/5	5%
Deliverable 4:	Design Pattern Activity	Mar 10/12/17/19	Pass/Fail
Deliverable 5:	Architecture & Design goals	Mar 22 @ 0800 & Mar 23-27 (oral exam)	30%
Deliverable 6:	Project Presentation + Video	Mar 30 @ 0800 & in class Mar 31/Apr 1	10%
Final Exam:		Date set by registrar	50%

The student **must** pass the final exam **and** all pass/fail assignments to pass the course. Grad students will have different assessment requirements; see course web page. Any individual portion of a deliverable **must** be completed individually without collaboration of any kind. Marked materials can be picked up in class.

Grad student assessment: The midterm will be be worth 0% for grad students; instead an individually-performed paper-based assignment will be required. This will involve synthesizing 3 or more research papers on a relevant (instructor approved) topic, a short report, and a presentation to the class.

Late policy: No late work will be accepted without ***prior*** discussion and documentation.

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check www.uwaterloo.ca/academicintegrity/ for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance. Discipline: A student is expected to know what constitutes academic integrity [check www.uwaterloo.ca/academicintegrity/] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties check Guidelines for the Assessment of Penalties, www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Appeals: A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is aground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.

Note for Students with Disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.