

CS846 Advanced Topics in Software Engineering (0.50) SEM Requirements  
Engineering (RE) Spring/Summer 2023

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Class Meetings: Tuesdays and Thursdays, 10:30–12:20 (2 class-hours), Room TBA  
but for only 36 class-hours over about 18 of the 24 sessions  
so that it ends up being equivalent to a normal course.

Course Web Site: <http://se.uwaterloo.ca/~dberry/ATRE/>

### The Reason For the Strange Schedule

A long time ago, the School of Computer Science asked me to teach this graduate seminar in the Summer instead of the Fall to shift the course from a term with too many graduate courses to one with not enough. I explained that I normally travel a lot in the Summer, including to up to two conferences. Therefore, I would be gone about half the weeks of the term. I told them that I could do it *only* if we could meet longer per time, but for only fewer times. They agreed.

After teaching this course a few times in the Summer term, I found that I liked the idea of having longer, but fewer class meetings. So, I continue to do it. If any of you have a conference to attend in the summer, let me know. I will try to take it into account when I determine on which dates we will not be meeting.

### Course Structure

I will give most the first few lectures, the first two based on my famous Requirements Iceberg slides, describing RE and its research, and then several others based on research that I and colleagues have done. Occasionally, we may have a guest lecturer. Besides giving an overview of RE, these lectures will show some RE-related experiments, case studies, and research topics. The rest of the lectures will be given by students, reporting on what they are doing. If one of you does an experiment as er<sup>1</sup> project, we might use part of a meeting to conduct this experiment. I hope that you will agree to be a subject. At least watching these experiments being done in class is considered part of this course.

### Course Requirements

Each student will either

1. do some project, e.g., an experiment with volunteering subjects,
2. do some research, e.g., solving some open RE problem,
3. explore RE issues in your own research area, e.g., privacy, security, HCI, AI, big data,
4. do a case study, e.g., describe an RE experience at some job in the past, or even now, from which we can learn something, or
5. research a topic, i.e., read a bunch of research papers on a topic,

and then write it up *and* present it to the class in a 25-minute (the standard conference presentation time)

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<sup>1</sup> “E”, “em”, and “er” are gender non-specific third-person singular pronouns in subjective, objective, and possessive forms, respectively.

presentation. If the number of students permits longer times for everyone, I will announce how much extra time is available.

Any of these could end up being the basis for a master's essay or a master's or doctor's thesis.

To avoid potential problems with a too-small or a too-big project, study, or topic, I strongly suggest running it by me before going too deeply in it. Also if more than one want to work on the same project, study, or topic, we can ensure that there will either be cooperation or no overlap.

To encourage people to volunteer to present early, let it be known that the earliest presentations will be evaluated with greater leniency than the latest presentations.

### **Initial Reading Assignment**

Please read three golden oldie papers that give overviews of RE. Please be on campus or using a campus VPN so that you are allowed to download these files for free.

1. "Requirements engineering in the year 00: a research perspective" by Axel van Lamsweerde at ICSE 2000 in the IEEE Xplore site:  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=870392>
2. "Requirements Engineering: A Roadmap" by Bashar Nuseibeh Steve Easterbrook at Future of SE Workshop at ICSE 2000:  
<http://www.cs.toronto.edu/~sme/papers/2000/ICSE2000.pdf>  
(This is publically available, and you don't have to be at the library site to get this.)
3. "Research Directions in Requirements Engineering" by Betty H.C. Cheng and Joanne M. Atlee at Future of Software Engineering (FOSE'07) Workshop at ICSE 2007 in the IEEE Xplore site:  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4221627>

### **Course Themes**

The two overriding themes of the class are:

1. requirements engineering: everything covered in the course must be related to requirements engineering.
2. empirical evidence: try to find empirical evidence for the claims being made about requirements engineering and its artifacts, methods, tools, etc.

### **A Nice Case Study Topic**

Find empirical evidence comparing upfront RE in waterfall software development methods and incremental RE in agile software development methods, particularly in developments you have participated in.