**Software Architecture for Managers 17-638/45-991**

**Class Syllabus**

Spring 2016

**Instructor:**
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**Motivation and Objectives**

The extent to which software intensive systems exhibit certain properties, such as performance, modifiability, security, and so forth, often dictate the extent to which the resulting system supports the strategic objectives of the organization. The decisions that impact these properties, however, are often made by technical folks without guidance or input from the people responsible for developing the business strategy.

This course introduces key architectural concepts, techniques, and guidance to aspiring technical managers enabling them to improve their ability to manage effectively. Although the course introduces technical concepts, the focus is on managerial challenges rather than technical implementation.

This is neither a pure technology course, nor a pure management course. Students are encouraged to explore the ways in which business context drive architectural decisions, as well as the ways in which architectural decisions can support and constrain future business decisions and opportunities.

When you have successfully completed this course you will:

- Be better equipped to organize, manage, and lead high tech organizations building and deploying large scale, software intensive systems.
- Understand what software architecture is, what it is used for, and how it relates to the overall business context of the organization.
- Be better equipped to help identify architecturally relevant aspects of the business context and articulate relevant architectural drivers to reflect these objectives.
• Better understand how to manage business tradeoffs based on the architectural options available

• Understand the basics of architectural documentation and how, as managers, architectural documentation can be used to facilitate your responsibilities.

Prerequisites:

The only formal pre-requisites for this class are good standing in the Masters in Software Engineering, the Masters in Business Administration, or similar program.

That said, I expect that students in the course will have some experience building, designing, specifying, or working with large software intensive systems. This does not necessarily mean that you need to have worked as an IT specialist or software developer. Having purchased or evaluated a major IT system, or participated in the rollout of a significant software system, for example, are probably sufficient to appreciate the issues discussed in class when combined with an interest in the topic. If you are unsure whether you have sufficient technical background for the course please come talk with me.

Class Etiquette:

In the interest of providing a comfortable environment for learning, I ask that you observe the following points of etiquette.

• Please arrive to class on time. Coming in late disrupts and distracts the rest of the class. Likewise, please stay until the end of the class. As a courtesy, please let the day’s lecturer know before class begins if you will need to leave early and sit near the door to minimize the disruption that your departure will have on the rest of the class.

• Be respectful of other members of the class. We will spend time exploring ideas, expressing opinions, and trying to work through interesting problems in class that don’t necessarily have clear-cut answers. Expressing strong opinions is fine but please avoid personal attacks during discussion.

• Please turn off your cell phone/pager/beeper/blackberry during class. Having your cell phone ring or your pager go off in class will result in a “0” grade for that day’s participation. If unusual circumstances absolutely require you to keep your phone or beeper on during a class, please see the day’s lecturer before class to explain your situation.

• Web surfing, tracking your portfolio, instant messaging, playing solitaire, etc., during class are poor uses of your time and tuition dollars, as well as a distraction to other people in the class. We reserve the right to ask people to close their laptops during class if this becomes an issue.
Evaluation

- 40% Group Exercises
- 40% Reading Questions
- 20% Participation

Online Course Management and Support:

We will use Blackboard (blackboard.andrew.cmu.edu) for posting slides, readings, handouts, and assignments. In addition to Blackboard, we may use other tools throughout the course to examine what they do, how they work, and to recognize design ideas (both good and bad).

Course Materials:

We will distribute readings in class and/or post links to them online. All of the CMU/SEI tech reports are available for free download from the SEI web pages – http://www.sei.cmu.edu/publications/

Schedule:

This is a tentative schedule. There will likely be updates and additions to the readings and/or schedule as the course progresses. You are required to complete all readings listed for each day before that day’s class. Readings listed as supplemental are interesting, relevant to the day’s discussion, and recommended by the instructors. They are a good place to start looking deeper into topics that you find particularly interesting. You are not, however, responsible for having read them before class.
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Statement on Academic Integrity:

The university’s policies on academic integrity govern the class. These policies are available at: http://www.studentaffairs.cmu.edu/acad_integ/acad_integ_text.html

Resources: In general, we encourage students in the class to make use of resources available outside of the assigned readings. These resources include, but are not limited to, web sites, articles, books, online discussion groups, Google searches, etc. There is a tremendous amount of information available on the web and elsewhere. Make use of it. If you choose to make use of somebody else’s work, however, you must provide appropriate attribution for the work and add a significant contribution of your own to the original work. If you have questions regarding how to appropriately attribute work that you have built on or incorporated into your own, or what constitutes an acceptable amount of extension of the prior work, please talk with an instructor to discuss an appropriate course of action.

Although we encourage you to use the wide array of resources available to you to answer questions, learn the material, and figure out technical problems, everything that you turn in to be graded must be your (or your team’s) own work. You can synthesize and build on what you have found elsewhere (with appropriate citations) when completing homework assignments or solving technical problems. The final write-up and/or presentation submitted for the assignment, must have been produced, packaged, developed, and written by the person or team submitting it.

Collaboration: The ability to collaborate with others to solve problems and produce items of value is a tremendously important skill. To that end, we encourage you to collaborate with other students in the class in discussing reading and lecture material. As mentioned in the discussion of using external resources, however, everything that you turn in to be graded must be your (or your team’s) own work. The actual documents, exercise answers, software, etc. that you submit must have been produced, developed, and written by the person (or people) submitting them.

In general, the purpose of the assignments is to require you to think deeply through the material presented and apply it to solve specific problems. In both cases, you will be best served if you do this work yourself or working closely with your teammates.

We recognize that ethical dilemmas do not always have clear-cut right and wrong alternatives. If you find yourself wondering whether a particular course of action will violate the academic integrity policy or get you into a difficult situation, we suggest that you use the following guidelines:
(1) Be conservative and choose not to take the questionable course of action,

(2) ask yourself whether you would be embarrassed or concerned if the instructors or your peers found that you had completed your assignment in this way (in which case you should probably not do it…),

or (3) come talk with an instructor to discuss whether we are likely to consider the course of action a violation of the academic integrity policies.