SE 339 - Software Architecture and Design

Department of Electrical and Computer Engineering
Fall 2018

Catalog Listing: Modeling and design of software at the architectural level. Architectural styles. Basics of model-driven architecture. Object-oriented design and analysis. Iterative development and unified process. Design patterns. Design by contract. Component based design. Product families. Measurement theory and appropriate use of metrics in design. Designing for qualities such as performance, safety, security, reliability, reusability, etc. Analysis and evaluation of software architectures. Introduction to architecture definition languages. Basics of software evolution, reengineering, and reverse engineering. Case studies. Introduction to distributed system software.

Prerequisite: SE319 – Software Construction and User Interface

Software Engineering ABET outcomes

a) Ability to identify, formulate, and solve engineering problems (E)
b) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (K)

Learning outcomes:
1) Understand what a software architecture is and explain why it is important,
2) Understand the relationship between software quality attributes and software architectures,
3) Ability to elicit software architecture drivers,
4) Ability to use architecture styles, patterns, and tactics,
5) Ability to use the attribute-driven method to design software architecture,
6) Ability to document software architecture,
7) Ability to evaluate software architecture.

Lecture: CARVER 0268
       4:10 to 5:30 TTH

Instructor: Lotfi ben Othmane
       Durham Hall #315
       Department of Electrical and Computer Engineering
       Iowa State University
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Office hours: 15:00 - 16:00 Thursdays in Durham 315
                  Other times by email appointment

Teaching Assistant: Resy Verma resy@iastate.edu

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Daniel Lev Dlev@iastate.edu

TA office hours: 12:00 to 2:00 pm MW
We will provide the meeting location.

Textbook: Designing Software Architectures: A Practical Approach
By Rick Kazman, Humberto Cervantes (Book 1)
Library: http://proquest.safaribooksonline.com.proxy.lib.iastate.edu/9780134390857

Essential Software Architecture
By Ian Gorton (Book 2)
Online: https://link-springer-com.proxy.lib.iastate.edu/book/10.1007%2F978-3-642-19176-3

UML Distilled: A Brief Guide to the Standard Object Modeling Language (3rd Edition)
Martin Fowler ((Book 3))
Online: https://www.safaribooksonline.com/library/view/uml-distilled-a/020165783X/?ar

Grading: 30% for individual assignments (3)
10% for quizzes
5% for participation
30% for the project (3 phases)
10% for mid-term exam
15% for final exam

We will use the standard grade levels. Do not expect me to curve the grades. There will be limited bonus points – get them.

Course Format: The course is team-based learning class. Students are required to form groups of 4 to 6 members. We will use the following learning format:
1- Readings— Each student should read the assigned book chapters or papers before coming to class. They answer the test online. We discuss the answers in-class afterwards.
2- Practice activities—Each group works on the in-class activities and presents their answers.
3- Assignments—There will be 3 individual assignments.
4- Project—Students will work to design and implement the architecture of a given software.
5- Reflection—Project teams will meet with the lecturer and TA to reflect about their experience.

Evaluation: All assignments and quizzes must be submitted through Canvas. Submission of late assignments are not considered if submitted after 2 days and will have 10% penalty otherwise. Exams are open book and will also be submitted online.
The score for the participation is given in the end of the term based on the evaluation of instructor.

Communications: The best way to communicate with me is by email—use [SE339] as subject prefix. I usually reply in 2 business days. Remind me if you do not get an answer. Do not expect me to respond to a communication when the exchange exceeds 4 or 5 emails. In such cases, the issue shall be addressed in a face-to-face meeting.

Dishonesty: The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. www.dso.iastate.edu/ja/academic/misconduct.html

Disability Accommodation: Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Harassment and Discrimination: Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation: If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Inclusivity, Professionalism and Mutual Respect: Students are responsible for living the tenets established in ISU's Principles of Community: Respect, Purpose, Cooperation, Richness of Diversity, Freedom from discrimination, and the Honest and respectful expression of ideas. Visit ISU's Principles of Community website (http://www.diversity.iastate.edu/principles-of-community)

All university publications and communication, whether oral or written, shall use inclusive language and illustrations. Inclusive language refers to language that makes every attempt to include comprehensively all groups in the community. Whenever possible, selection of academic materials will also reflect efforts to uphold this university policy." Visit the Policy Library's Inclusive Language website (http://www.policy.iastate.edu/policy/language).

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Your comments to others should be factual, constructive, and free from harassing statements. You are encouraged to disagree with other students, but such disagreements need to be based upon facts and documentation (rather than prejudices and personalities). It is the instructor's goal to promote an atmosphere of mutual respect in the classroom. Please contact the instructor if you have suggestions for improving the classroom environment. It is preferable if students discuss issues directly with the instructor, however, students may also leave a note in the instructor's mailbox.

Students in this course are responsible for being familiar with the University's student rules and policies. Visit the ISU Policy Library website (http://www.policy.iastate.edu/).