USC Viterbi
School of Engineering

Course ID and Title: CSCI 578 – Software Architecture
Units: 4
Term—Day—Time: Fall 2024 — Fri 2:00–5:20 PM

Location: OHE 132 + DEN

Instructor: Dr. Jae Young Bang
Office: SAL 322
Office Hours: Fridays 12:30 PM – 2:00 PM PT + by appointment as necessary
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Catalog Description
The topics span from the concept of software architecture (architectural styles and modeling, visualizing, and analyzing software architecture) to implementation and deployment.

Course Description
Software architecture has become a central area of study in software engineering in the last few decades. At the heart of every well-engineered software system is its architecture. Software architecture deals with the key design decisions underlying a software system, reflected in the system's high-level building blocks. These building blocks include the components (units of computation in a system), the connectors (models of the interactions between software components), and the configurations (arrangements of software components and connectors, and the rules that guide their composition). Software architectures that are found particularly useful for families of systems are often codified into architectural patterns and styles.

This course will afford the students a comprehensive treatment of software architecture, its foundation, principles, and elements, including those described above. The class is centered around reading assignments. The readings are complemented by homework assignments and a course project, in which the students will be required to apply the course material. In order to successfully master the required content, students are expected to attend class regularly and participate (as directed) in class discussions.

Readings and Supplementary Materials
Textbook:
R. N. Taylor, N. Medvidovic, and E. M. Dashofy.
Software Architecture: Foundations, Theory, and Practice,
John Wiley & Sons, 2009.
ISBN-10: 0470167742
ISBN-13: 978-0470167748

Reading the textbook along with the course will give you the details my lectures, projects, and assignments might not cover. You are encouraged to read the textbook.

Optional Readings and Supplementary Materials

To aid your note-taking, we will also make the lecture slides available online around each lecture.

Description of Assignments and How They Will Be Assessed

Details will be provided with the assignment descriptions later on D2L.

Grading Breakdown

Assessment Tool (assignments)	% of Grade
Exam #1	25%
Exam #2	25%
Individual assignments	20%
Team projects	30%
TOTAL	100%

Grading Scale

Each exam, assignment, and project will be **scaled appropriately** and applied to the final letter grade. This means that you will not be able to project your letter grade based on your exam and assignment scores.

Assignment Submission Policy

Late work will be accepted with a penalty. The amount of points lost is calculated as follows:
Points lost = d^2, where *d* is the number of days late. Therefore, after being two days late, you lose four points; nine days late results in a loss of 81 points; and 10 days late is no longer accepted. If you submit too close to the end of the semester for a particular assignment, you will also receive no points or credit. If you are late due to extenuating circumstances, we will consider exceptions on a case-by-case basis if appropriate documentation is provided.

Academic Integrity

Unless otherwise noted, this course will follow the expectations for academic integrity as stated in the USC Student Handbook. The general USC guidelines on Academic Integrity and Course Content Distribution are provided in the subsequent "Statement on Academic Conduct and Support Systems" section.

Students must work independently on all individual assignments; collaborating on individual assignments is considered cheating and will be penalized accordingly. All USC students are responsible for reading and following the USC Student Handbook, which prohibits plagiarism. Some examples of behavior that is not allowed are: copying all or part of someone else's work (by hand or by looking at others' files, either secretly or if shown), and submitting it as your own; giving another student in the class a copy of your assignment solution; consulting with another student during an exam; and copying text from published literature without proper attribution. If you have questions about what is allowed, please discuss it with the instructor.

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms the individual, other students, and the university, policies on academic integrity have been and will be strictly enforced.

Please ask the instructor and/or TA(s) if you are unsure about what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

You may not record this class without the express permission of the instructor and all other students in the class. Distribution of any notes, recordings, exams, or other materials from a university class or lectures — other than for individual or class group study — is prohibited without the express permission of the instructor.

Use of Generative AI in this Course

You are expected to use AI (*e.g.*, ChatGPT and image generation tools) in this class. Learning to use AI is an emerging skill; this is an opportunity for you to discuss with the instructor appropriate use of these tools. Keep in mind the following:
- AI tools are permitted to help you brainstorm topics or revise work you have already written.
- If you provide minimum-effort prompts, you will get low-quality results. You will need to refine your prompts to get good outcomes. This will take work.
- Proceed with caution when using AI tools and do not assume the information provided is accurate or trustworthy If it gives you a number or fact: assume it is incorrect unless you either know the correct answer or can verify its accuracy with another source. You will be responsible for any errors or omissions provided by the tool. It works best for topics you understand.
- AI is a tool, but one that you need to acknowledge using. Please *include a paragraph at the end of any assignment explaining if, how, and why you used AI and indicate/specify the prompts you used to obtain the results*. Failure to do so is a violation of academic integrity policies.

Provisional Course Schedule

The course contents and schedule **may change** as the semester proceeds.

	Topics/Daily Activities	Readings/Preparation	Deadlines & Information
Week 1 Aug 30	Course Introduction The Big Idea	Chapter 1	
Week 2 Sep 6	Architecture in Context Basic Concepts	Chapter 2 Chapter 3	
Week 3 Sep 13	Architectural Design Architectural Styles Homework #1 Discussion	Chapter 4	Homework #1 out
Week 4 Sep 20	Software Connectors Modeling Architectures	Chapter 5 Chapter 6	Team formation
Week 5 Sep 27	Modeling Approaches Visualizing Architectures Homework #2 Discussion	Chapter 6 Chapter 7	Homework #2 out
Week 6 Oct 4	Analysis of Software Architectures Architecture Analysis Techniques Team Presentation #1	Chapter 8	
Fall Recess			
Week 7 Oct 18	Implementing Architectures Team Presentation #2 Exam #1 Material Review		Homework #3 out
Week 8 Oct 25	Exam #1		Location and time TBD
Week 9 Nov 1	Exam #1 Recap Implementation Techniques Team Presentation #3	Chapter 9	Team project out
Week 10 Nov 8	Deployment and Mobility Team Presentation #4	Chapter 10	
Week 11 Nov 15	Applied Architectures Team Presentation #5	Chapter 11	
Week 12 Nov 22	Non-Functional Properties Security and Trust Team Presentation #6	Chapter 12 Chapter 13	
Thanksgiving			
Week 13 Dec 6	Architectural Adaptation Domain-Specific Architectures Team Presentation #7 Exam #2 Material Review	Chapter 14 Chapter 15	
FINAL	Exam #2		Location and time TBD.

Statement on Academic Conduct and Support Systems

Academic Integrity:
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Course Content Distribution and Synchronous Session Recordings Policies
USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relation to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Students and Disability Accommodations:
USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each

course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - *988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - *(213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - *(213) 740-5086 or (213) 821-8298*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - *(213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - *UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

Office of the Ombuds - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - *(323) 442-2850 or* otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.