



CS 331: Software Architecture

General Information:

Term: 2022 Summer Session

Instructor: Staff

Language of Instruction: English

Classroom: TBA

Office Hours: TBA

Class Sessions Per Week: 5

Total Weeks: 5

Total Class Sessions: 25

Class Session Length (minutes): 145

Credit Hours: 4

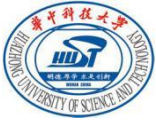
Course Description:

This course will enable students to study Software Architectures and know about practical approaches. The following topics will include in this course: Envisioning Architecture, Software Architecture, A-7# Avionics Systems, Creating Architecture, Achieving Qualities, Designing Architecture, Documenting Software Architectures, Reconstructing Software Architectures, The ATAM, Building Systems from Off-the-shelf components. This course will also talk about Software Architecture in the Future.

Learning Objectives:

Upon completion of this course, students will be able to:

- Gain experience about creating the Software Architecture;
- Understand the Software Architecture structure and designing architecture;
- Understand achieving qualities in Software Architecture, reconstructing architectures;
- Understand the ATAM: A comprehensive method for Architecture Evaluation, and Building Systems from Off-the-Shelf Components;



- Understand the importance of Software Architecture in the Future.

Course Materials:

Len Bass, Paul Clements, Rick Kazman. Software Architecture 3rd Edition, Addison Wesley, 2003.

Course Format and Requirements:

The course will take place in a computer lab and the course format including lecture, programming project, and in-class discussion.

The specific topics that will be covered in the classes are listed in the course syllabus. The class period will consist of an active learning environment. During a majority of the class time, students will be actively working on problems under the instructor's guides.

Attendance:

Attendance will not be taken but is strongly recommended. Each student will have three allowed absences and no grade deduction will be made for the first three absences. More than three unexcused absences will result in an automatic reduction in your participation grade, for instance from A- to B+. Your active participation in the class is expected and encouraged.

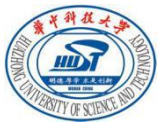
Course Assignments:

Quizzes:

There will be 5 quizzes this semester, given during the discussion sections. Each quiz will be on the material covered that week. There will be NO make-ups for quizzes for any reason. All of the quizzes will be closed book.

Midterm Exam:

The in-class, close-book and non-cumulative midterm exam will be given through this course. The midterm exam will be based on the knowledge covered in class. No excuse will



be accepted if students do not have legitimate excuses for absence. Physician Statement is required for missing the exam due.

Weekly Projects:

There will be four hands-on projects based on course need. It will count for 40% of your grade for the course. The projects will enrich students' knowledge on writing large programs. The score will be given based on the correctness of the program.

Final Exam:

The final will be in-class, cumulative and close-book. The final exams will be based on concepts covered in class. Note that the final will not be taken during the normal class times. Exact time and location for final will be announced later.

Course Assessment:

Quizzes	15%
Weekly Projects	35%
Midterm Exams	20%
Final Exam	30%
Total	100%

Grading Scale (percentage):

A+: 98%-100%

A: 93%-97%

A-: 90%-92%

B+: 88%-89%

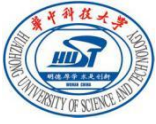
B: 83%-87%

B-: 80%-82%

C+: 78%-79%

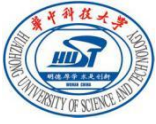
C: 73%-77%

C-: 70%-72%

**D+: 68%-69%****D: 63%-67%****D-: 60%-62%****F: Below 60%****Course Schedule:**

Week	Topics	Assignments
1	<ul style="list-style-type: none"> • Go through syllabus and introduction to the course • The Architectures Business Cycle <ul style="list-style-type: none"> ➤ Architectures Come From ➤ Software Processes and Architecture Business Cycle ➤ What makes “Good” Architecture ➤ Summary and Discussion Questions • Software Architecture <ul style="list-style-type: none"> ➤ Software Architecture Is and Not ➤ Other Points of View in Software Architecture ➤ Architectural Patterns, Reference Models, and Reference Architecture ➤ Important Software Architecture ➤ Architectural Structure and Views • A-7E Avionics System: A Case Study <ul style="list-style-type: none"> ➤ Relationship to the Architecture Business Cycle ➤ Requirements and Qualities <p>Architecture for the A-7E Avionics System</p>	<p>Quiz 1</p> <p>Quiz 2</p> <p>Weekly Project</p>

2	<ul style="list-style-type: none">• Creating Architecture<ul style="list-style-type: none">➤ Understanding Quality Attributes➤ Functionality and Architecture➤ Architecture and Quality Attributes➤ System Quality Attributes➤ Quality Attributes Scenario in Practice➤ Other System Quality Attributes➤ Business Qualities➤ Architecture Qualities• Achieving Qualities<ul style="list-style-type: none">➤ Introducing Tactics➤ Availability Tactics➤ Modifiability Tactics➤ Performance Tactics	Quiz 3 Weekly project Midterm exam
3	<ul style="list-style-type: none">• Achieving Qualities<ul style="list-style-type: none">➤ Security Tactics➤ Testability Tactics➤ Usability Tactics➤ Relationship of Tactics to Architectural Patterns➤ Architectural Patterns and Styles• Designing the Architecture<ul style="list-style-type: none">➤ Architecture in the Life Cycle➤ Designing the Architecture➤ Forming the Team Structure➤ Creating a Skeletal Structure	Quiz 4 Weekly project



4	<ul style="list-style-type: none">• Documenting Software Architecture<ul style="list-style-type: none">➤ Uses of Architectural Documentation Views➤ Choosing the Relevant Views➤ Documenting a View➤ Documentation a cross the views• Reconstructing the Software Architecture<ul style="list-style-type: none">➤ Information Extraction➤ Database Construction➤ View Fusion➤ Reconstruction• Analyzing Architectures<ul style="list-style-type: none">➤ The ATAM: A comprehensive Method for Architecture Evaluation➤ Participants in the ATAM➤ Outputs of the ATAM	Quiz 5 Weekly project
5	<ul style="list-style-type: none">• Building Systems from the Off-the-Shelf Components<ul style="list-style-type: none">➤ Impact of Components on Architecture➤ Architectural Mismatch➤ Components-Based Design as Search• Software Architecture in Future<ul style="list-style-type: none">➤ The Architecture Business Cycle Revisited➤ Creating an Architecture	Quiz 6 Weekly project Final Exam



	<ul style="list-style-type: none"> ➤ Architecture within Lifecycle ➤ The Impact of Commercial Components <p>Review final exam</p>	
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Academic Integrity:

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.

Students are expected to adhere to the standards of academic honesty and integrity that are described in the Huazhong University of Science & Technology's *Academic Conduct Code*. Any work suspected of violating the standards of the *Academic Conduct Code* will be reported to the Dean's Office. Penalties for violating the *Academic Conduct Code* may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the *Academic Conduct Code*.

Special Needs or Assistance:

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.