CSIS-656 Software Systems Design
Fall 2023

Course Information

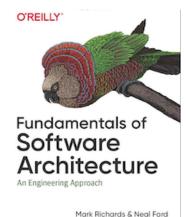|	
Instructor:	Dr. Ralph W. Crosby
Email:	crosbyrw@cofc.edu
Location:	HWEA 300
Time:	5:30PM-8:15PM Thursdays
Slack:	cofc-csis656-f23.slack.com
	Slack will be the preferred method of communication throughout the class. You will be more likely to get a prompt response from Slack than from email.
Office:	HWEA 311
Office Hours:	By arrangement: Before class or over zoom.

Texts

Optional**:**

Fundamentals of Software Architecture, An Engineering Approach
Mark Richards & Neil Ford
O'Reilly Media, Inc., 20202
ISBN-10 : 1492043451
ISBN-13 : 978-1492043454

Course Delivery

All classes will be in-person. Lectures will typically not be recorded. I will have a zoom session available for those that are unable to attend in person but only if needed (e.g. on business travel). There is a possibility that, due to my work travel schedule, a couple of lectures will be recorded in lieu of in person lectures.

Learning Objectives

At the completion of this course the student will be able to:

- Apply common architectural design patterns to software systems
- Evaluate systems design with respect to design constraints prioritizing design tradeoffs
- Apply contemporary technologies and methodologies to software system design
- Understand and leverage the entire software engineering lifecycle as part of systems design

Course Outline

Since the class meets once a week for 2 ½ hours, there will typically be two or three segments in a given class.

Week	Topic(s)	Assignments
1 – 8/24	• Introduction to the class • Design tools • Requirements Analysis	
2 – 8/31	• Design Pattern: Layered Architectures • Constraint: Security • Interview Techniques	
3 – 9/7	• In class case study • Technology: Virtual Machines and Containers	
4 – 9/14	• Design Pattern: Pipelines • Constraint: Availability	Case Study 1 Due
5 – 9/21	• Design Pattern: Microkernel • Constraint: Performance • Technology: Container Orchestration	
6 – 9/28	• Design Pattern: Services • Constraint: SWaP • Technology: Machine Learning	
7 – 10/5	• In class case study • Technology: Messaging	Technology Assignment 1 Due
8 – 10/12	• **Midterm Exam** • Technology: RESTful interfaces	
9 – 10/19	• Design Pattern: Event Driven • Constraint: Data	Case Study 2 Due
10 – 10/26	• Design Pattern: Space-Based • Constraint: Legacy Systems	
11 – 11/2	• Design Pattern: Orchestration-Driven • Constraint: Internationalization and Localization	
12 – 11/9	• In class case study • Technology: DevOps	Technology Assignment 2 Due
13 – 11/16	• Design Pattern: Microservices • Lambda Functions	
14 – 11/23	Thanksgiving Holiday – No class	
15 – 11/30	• Topics to be determined	Case Study 3 Due
12/??	**Project Presentations**	

Evaluation and Grading

Case Studies

Three written case studies will be assigned. While the studies will be inherently academic in nature, the format, writing, and structure should be professional and appropriate to a business environment.

Each case study will be worth 40 points

Technology Assignment

There will be two technology assignments intended to demonstrate understanding of specific technologies but more importantly the ability to prototype the use of technologies. Specific technology artifacts (e.g. scripts) along with appropriate documentation will be required.

Each assignment will be worth 40 points

Tests

There will be one test worth 100 points.

Project

Each student will be expected to produce an architectural design and present that design during the final exam period. The project will be worth 100 points.

Late Work

Late work will generally only be accepted by prior arrangement if a student has extenuating circumstances.

Submitting Your Work

All materials will be submitted digitally into drop boxes in Oaks. I will not be accepting paper or other (e.g., email) submissions. Additional information on submission format will be supplied in the assignments.

Extra Credit

There will not be extra credit at the graduate level.

Grading Scale

There will be approximately 400 points available. Grades will be based on the percentage of the points received but I reserve to right to lower the percentages (e.g. start the B's at 75%). I will NOT raise the percentages (e.g. if you have 90% you will always get an A).

A	90%

B	80%
C	70%
D	60%
F	<60%

Disability Services

The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services / SNAP, located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsibility for notifying me as soon as possible and for contacting me one week before accommodation is needed.

College of Charleston Honor Code and Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the instructor determines the student's actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the X to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the *Student Handbook* at http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php

Attendance

Attendance at regular classes is not mandatory. But, much of the work for the class will be done and or assigned in-class and will be difficult to make up later. Attendance for tests is expected (rescheduling for sickness is accommodated). ***Do not*** attend in-person class if you are sick or believe you are becoming ill.

If you miss a significant number of classes, it will be difficult to pass the course. If you have documented absences for the time missed, I will be happy to work with you to make up some or all of the material.

Computer Requirements

It might be possible to complete this course using the computers available in the department classrooms, library and labs. But most of you will find it much easier to use your own Mac, Linux or Windows laptop.

Use of Electronic Devices

The use of electronic devices, both stand-alone and network capable, will play an increasingly important role in teaching and learning at the College of Charleston, including their use in our classrooms. Just be respectful about unnecessary distractions to yourself and to others seated around you.