CS 4550 Spring 2019 – Software Architecture and Design

Contact Information

Instructor	Dr. Robert Dyer
Office Hours	MTRF 1:30-2:30pm OR by appointment
E-mail	rdyer@bgsu.edu
Office	HAYES 244
Phone	(419) 372–3469

Prerequisites

Math 2220/3220 and grade of C or better in CS 2020

Class Meeting Time

Mondays/Wednesdays/Fridays, 3:30-4:20pm, HAYES 117

Textbook

======> DO NOT PURCHASE A BOOK <======

The textbooks for this course are all freely available from Safari, via the BGSU library website. While the books are highly recommended, you won't need to physically own any of them to complete this course! The course itself does not 'follow' any of the books.

======> DO NOT PURCHASE A BOOK <======

1. "*Software Architecture in Practice,*" (2010), Bass, Clements, and Kazman. Addison-Wesley Professional. 978-0-132-94279-9
2. "*Head First Design Patterns: A Brain-Friendly Guide,*" (2004), Freeman, Robson, Sierra, and Bates. Pearson. 978-0-596-00712-6
3. "*Software Architecture: Foundations, Theory, and Practice,*" (2010), Taylor, Medvidović, and Dashofy. Wiley. 978-0-470-16774-8
4. "*Pattern-Oriented Software Architecture, A System of Patterns,*" Volume 1 (1996), Buschmann, Meunier, Rohnert, Sommerlad, and Stal. Wiley. 978-0-471-95869-7
5. "*Design Patterns: Elements of Reusable Object-Oriented Software,*" (1994), Gamma, Helm, Johnson, and Vissides. Addison-Wesley Professional. 978-0-201-63361-0

Outcomes for the course

After successfully completing CS 4550, students will be able to say:

- I can select and use appropriate design patterns;
- I know how to specify a software system's architecture using UML;
- I understand separation of concerns and its impact on software design;
- I can architect a software system based on the given requirements; and
- I can perform a design review on a software system.

Grading

The final grade will be composed of the following weights. (The instructor reserves the right to make changes at any time.)

Assessments

Item	Points Each	Total
Exams *(2)*	50	100
Final Exam	75	75
Team Project	100	100
Team Project Presentation	25	25
Assignments *(4)*	20	80
Activities *(4)*	5	20
Total		**400**

Grading Scale

Point Range	Percentage	Grade
360 - 400	90 - 100%	A
320 - 359	80 - 89%	B
280 - 319	70 - 79%	C
240 - 279	60 - 69%	D
0 - 239	below 60%	F

Assessments

Assignments

There will be several assignments completed outside of class and individually. To receive credit for your assignments, they must be submitted online by the due time. **There are no late submissions allowed.** Partial credit will be given for any completed portion of the assignment, so be sure to submit on time even if you are not finished with the assigment!

Team Project

There will be a semester long team project. The project will require the design and several iterations/redesigns of a software project. I will act as the client for the project. The culmination of the project is an in-class presentation.

Exams

Exams will consist of a variety of question types, including multiple choice, true/false, short answer, short programming questions, and interpreting code. The final exam is approximately 67% new material and 33% cumulative questions.

Technology

Canvas

The syllabus, all assignments, and due dates are posted on Canvas. Your grades will also be available on Canvas throughout the semester. Canvas is the main entry point for this course - everything you need to do is linked and organized from the Canvas course. Always start there!

Plickers

Each student will be assigned their own Plickers card. Plickers cards are 3D barcodes, and depending on the orientation of the card (4 possible sides can face up) you are able to respond to questions with answers A, B, C, or D. This allows quick, interactive feedback from the class. I also use these to quickly record attendance near the start of each class.

Course Policies

Withdrawal Deadline

Friday, April 26, 2019. University policy states that after this date, anybody withdrawing from the course will have the grade automatically turn into an F.

Office Hours and Help

Please check your Canvas course site, Canvas messages, and your BGSU email regularly. [You may have your Canvas messages forwarded to your BGSU/other email, and have your BGSU email forwarded to another favorite email address, if necessary, but do check it (multiple times) daily.] I do forward my own Canvas messages to my BGSU email and check my BGSU email multiple times everyday (with rare exceptions). I check BGSU email more often than I access Canvas, so if you need to contact me urgently, use both Canvas and BGSU email, if necessary multiple times. I will do my best to accommodate you ASAP, even if outside my posted office hours and without appointment. In general, if you need to see me in my office outside of my regular office hours, please make an appointment.

Attendance

Students are expected to attend each class and be on time. I take attendance at the start of each lecture. I typically use good attendance as a factor when considering final grades. I reserve the right to penalize students up to 1% of their final grade, per absence, for more than 3 un-excused absences.

Make-up policy

If you cannot take an exam/assessment as scheduled, you (or an authorized person, only in case you are unable to do so) must contact me ahead of time with the reason. Note however that any make-up assessment normally done in groups will count 100% toward your score (there will be no averaging with the team's score). Make-ups are considered typically for health emergencies only.

Academic honesty

All coursework for this class is expected to be YOUR OWN work. The MINIMUM penalty for copying someone's work (including current classmates, students from a previous offering of the course, or postings found on the web) or knowingly allowing someone to copy your work is a zero for the homework/project/exam/paper/presentation. The offense is also reported to the dean of your college. Turnitin and Moss, plagiarism detection tools, will be used in this course. I will follow the Department's policies and the University's code of academic conduct as defined in the BGSU Student Handbook. For details refer to:

1. Department of Computer Science Academic Honesty Policy
2. BGSU Code of Academic Conduct
3. The Academic Charter, section B-I.G

Disability Policy

In accordance with the University policy, students with disabilities must verify their eligibility through the Office of Disability Services, 38 College Park Office Building, 419–372–8495 (https://www.bgsu.edu/disability-services.html). Contact me as soon as possible this semester to arrange any accommodations needed to assist with your success in this course.

Religious Holidays

It is the policy of the University to make every reasonable effort allowing students to observe their religious holidays without academic penalty. In such cases, it is the obligation of the student to provide the instructor with reasonable notice of the dates of religious holidays on which he or she will be absent. Absence from classes or examinations for religious reasons does not relieve the student of responsibility for completing required work missed. Following the necessary notification, the student should consult with the instructor to determine what appropriate alternative opportunity will be provided, allowing the student to fully complete his or her academic responsibilities (The Academic Charter, section B–I.F–4.b).

Classroom Environment, Language, and Behavior Expectations

In order to promote an inclusive and constructive learning environment, demeaning, marginalizing, and otherwise negative language and behavior will not be tolerated in the classroom. Respect and courtesy toward the instructor, classmates, and classroom guests are expected. Language and behaviors that are disruptive, abusive, or harassing may result in disciplinary action as specified by the Student Code of Conduct.

Title IX

Bowling Green State University (BGSU) is committed to providing a safe learning environment for all students that is free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are antithetical to the university's mission and core values, violate university policies, and may also violate federal and state law. Faculty members are considered "Mandatory Reporters" and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit www.bgsu.edu/TitleIX to access information about university support and resources.

Tentative Course Schedule

Week	Day	Date	Topics	Homework	Project
1	M	Jan 28	Introduction and Importance of Design		
	W	Jan 30	Introduction to Software Architecture		Teams formed
	F	Feb 1	Introduction to Software Architecture		Proposal
2	M	Feb 4	Unified Modeling Language	*HW1 out*	
	W	Feb 6	Unified Modeling Language		
	F	Feb 8	Software Architecture Patterns		Prototype
3	M	Feb 11	Client Meetings		Client Meeting
	W	Feb 13	Software Architecture Patterns	**HW1 due**	
	F	Feb 15	Architecture and Requirements	*HW2 out*	
4	M	Feb 18	Designing an Architecture		
	W	Feb 20	Architecture Tradeoff Analysis Method		
	F	Feb 22	Software Product Lines	**HW2 due**	
5	M	Feb 25	Agile Architecture		Architecture 1
	W	Feb 27	Exam 1		
	F	Mar 1	Aspects		
6	M	Mar 4	Object-oriented Analysis & Design		
	W	Mar 6	Software Design Principles		
	F	Mar 8	Style + Design		
7	M	Mar 11	OO Metrics	*HW3 out*	
	W	Mar 13	GRASP		
	F	Mar 15	GRASP		
		Mar 18–22	*Spring Break - No classes*		
8	M	Mar 25	SOLID	**HW3 due**	Design 1
	W	Mar 27	Dependency Injection		
	F	Mar 29	Dependency Injection		
9	M	Apr 1	project work day, exam review		
	W	Apr 3	Exam 2		
	F	Apr 5	Design Patterns		
10	M	Apr 8	Client Meetings		Client Meeting
	W	Apr 10	Design Patterns - Creational		
	F	Apr 12	Design Patterns - Creational		Verification
11	M	Apr 15	Design Patterns - Structural		
	W	Apr 17	Design Patterns - Structural		
	F	Apr 19	Design Patterns - Structural		
12	M	Apr 22	Design Patterns - Behavioral		
	W	Apr 24	Design Patterns - Behavioral		
	F	Apr 26	Design Patterns - Behavioral		Architecture 2
13	M	Apr 29	Code Smells		
	W	May 1	Code Smells and Refactoring		
	F	May 3	Refactoring	*HW4 out*	
14	M	May 6	Exam 3		
	W	May 8	Team Project presentations		Design 2, Presentations
	F	May 10	Team Project presentations	**HW4 due**	Presentations
15	R	May 16	3:00pm-5:30pm, *Hayes 117* - 5550 Research presentations, activity		