CS 4550/5550 Spring 2018 – Software Architecture and Design

Contact Information

Instructor	Dr. Robert Dyer
Office Hours	MWF 2:20-3:30pm, TR 3:45-5p 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: Foundations, Theory, and Practice,*" (2010), Taylor, Medvidović, and Dashofy. Wiley. 978-0-470-16774-8
2. "*Pattern-Oriented Software Architecture, A System of Patterns,*" Volume 1 (1996), Buschmann, Meunier, Rohnert, Sommerlad, and Stal. Wiley. 978-0-471-95869-7
3. "*Head First Design Patterns: A Brain-Friendly Guide,*" (2004), Freeman, Robson, Sierra, and Bates. Pearson. 978-0-596-00712-6
4. "*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.

After successfully completing CS 5550, students will also be able to say:

- I can analyze relevant research and communicate my findings.

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 *(5)*	20	100
(5550 only) Research Presentation	50	50
Total		**400** (4550) / **450** (5550)

Grading Scale

The grading scale for **4550 students** is:

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

The grading scale for **5550 students** is:

Point Range	Percentage	Grade
414 - 450	92 - 100%	A
369 - 413	82 - 91%	B
324 - 368	72 - 81%	C
279 - 323	62 - 71%	D
0 - 278	below 62%	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 6, 2018. 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 Canvas, Canvas inbox, 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 forward my own Canvas messages to my BGSU email and check my BGSU email multiple times everyday (with rare exceptions). 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 to ensure I am available.

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 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. Make-ups are considered typically for health emergencies only.

Academic honesty

All coursework (unless done in pairs/groups) 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. 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 (http://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).

Tentative Course Schedule

Week	Day	Date	Topics	Homework	Project
1	M	Jan 8	Introduction and Importance of Design		
	W	Jan 10	Introduction to Software Architecture		Teams formed
	F	Jan 12	Introduction to Software Architecture		Proposal
2	~~M~~	~~Jan 15~~	Holiday - No class		
	W	Jan 17	Unified Modeling Language	*HW1 out*	
	F	Jan 19	Unified Modeling Language		Prototype
3	M	Jan 22	Client Meetings		Client Meeting
	W	Jan 24	Software Architecture Patterns		
	F	Jan 26	Software Architecture Patterns	**HW1 due**	
4	M	Jan 29	Architecture and Requirements	*HW2 out*	
	W	Jan 31	Designing an Architecture		
	F	Feb 2	Architecture Tradeoff Analysis Method		
5	M	Feb 5	Software Product Lines	**HW2 due**	
	W	Feb 7	Agile Architecture		
	F	Feb 9	Exam 1		
6	M	Feb 12	Style + Design		Architecture 1
	W	Feb 14	Software Design Principles		
	F	Feb 16	Aspects		
7	M	Feb 19	Project work day		
	W	Feb 21	Object-oriented Analysis & Design		
	F	Feb 23	GRASP		
8	M	Feb 26	GRASP		
	W	Feb 28	SOLID		
	F	Mar 2	Guest Lecture - Dependency Injection		
9	~~M~~	~~Mar 5~~	Spring Break - No class		
	~~W~~	~~Mar 7~~	Spring Break - No class		
	~~F~~	~~Mar 9~~	Spring Break - No class		
10	M	Mar 12	Dependency Injection EC		
	W	Mar 14	OO Metrics		
	F	Mar 16	Project work day		
11	M	Mar 19	Design Patterns		Design 1
	W	Mar 21	exam review		
	F	Mar 23	Exam 2		
12	M	Mar 26	Design Patterns - Creational		
	W	Mar 28	Design Patterns - Creational		
	F	Mar 30	Design Patterns - Structural		
13	M	Apr 2	Design Patterns - Structural		
	W	Apr 4	Client Meetings		Verification, Client Meeting
	F	Apr 6	Design Patterns - Structural		
14	M	Apr 9	Design Patterns - Behavioral		
	W	Apr 11	Design Patterns - Behavioral		
	F	Apr 13	Design Patterns - Behavioral		Architecture 2
15	M	Apr 16	Code Smells		
	W	Apr 18	Code Smells and Refactoring		
	F	Apr 20	Refactoring		
16	M	Apr 23	5550 Research presentations		
	W	Apr 25	Team Project presentations		Design 2, Presentations
	F	Apr 27	Team Project presentations		Presentations
17	T	May 1	3:30pm-5:30pm **Final exam** - *Hayes 117*		