

Course Information

Course	Advanced Software Paradigms, CSCI 6221.10
Semester	Spring, 2024
Meeting Time	6:10 pm – 8:40 pm, Wednesdays
Class Location	PHIL 111

Instructor

Name	Yih-Feng Hwang
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Office Hours	8:40 pm – 9:10 pm on <i>Wednesdays</i> or by appointment

Bulletin Course Description

This course introduces students to various software paradigms. Topics include object-oriented, procedural, functional, logic, and concurrent software design paradigms; design patterns; software life-cycle concepts, and tradeoffs between compiled and interpreted languages. Examples from Java, C, Objective-C, C++, Python, and Perl are discussed.

Prerequisites

CSCI-1311 (Discrete Structures), CSCI-1112 (Algorithms and Data Structures)

Recommended Textbooks

Author	Title	Edition
Robert W. Sebesta	Concepts of Programming Languages	12 th
Jeff Magee & Jeff Kramer	Concurrency: State Models & Java Programs	2 nd
E. Gamma, R. Helm. R. Johnson, J. Vlissides	Design Patterns: Elements of Reusable Object-Oriented Software	1 st

Learning Outcomes

As a result of completing this course, students will be able to:

- improve background for choosing appropriate programming languages.
- increase ability to learn new programming languages.
- design new programming languages.
- design and develop code using design patterns.
- design and develop concurrent code.

Class Schedules

Date	Topics and readings	HW / Project Due
Jan 17	pl_ch1: Programming Languages pl_ch2: Preliminaries & Evolution	
Jan 24	pl_ch5: Variable Scopes pl_ch6: Data Types	project proposal
Jan 31	pl_ch7: Expressions pl_ch8: Statements	hw#1 (ch5, 6)
Feb 07	pl_ch9: Subprograms pl_ch10: Implementing Subprograms	hw#2 (ch7,8)
Feb 14	pl_ch11: Abstract Data Types	hw#3 (ch9,10)
Feb 21	pl_ch12: Object-Oriented Programming	hw#4 (ch11)
Feb 28	pl_ch15: Functional Programming Languages	hw#5 (ch12)
Mar 06	pl_ch16: Logic Programming Languages	hw#6 (ch15)
Mar 13	Spring Break, No Class	
Mar 20	dp_ch3_4: Design Patterns	hw#7 (ch16)
Mar 27	cc_ch1: Concurrency Introduction cc_ch2: Process, Threads	hw#8 (dp)
Apr 03	cc_ch3: Concurrent Execution cc_ch4: Mutual Exclusion	hw#9 (ch1,2, 3)
Apr 10	cc_ch5: Monitors, Condition Synchronization cc_ch6: Deadlock	4/14: final project
Apr 17	Project Presentation	
Apr 24	Project Presentation	

Note: class recordings will be available to registered students upon request through GWU emails, on an individual basis.

Grading

- term project 70%
- homework assignments 30%

Term Project

Term Project	Description	Points
project proposal	1-page project proposal	1
final project	project slides/presentation, final report, source code	99

Homework Assignments

Assignment	Description	Points
HW#1	HW: pl_ch5, 6	20
HW#2	HW: pl_ch7, 8	80
HW#3	HW: pl_ch9, 10	40
HW#4	HW: pl_ch11	60
HW#5	HW: pl_ch12	60
HW#6	HW: pl_ch15	40
HW#7	HW: pl_ch16	100
HW#8	HW: dp	60
HW#9	HW: ch1, 2, 3	60

*** There will be **25%** penalty **per day** for any late HW, project submission.

University Policies

Average minimum amount of out-of-class/independent learning expected per week

In a 15-week semester, including exam week, students are expected to spend a minimum of 100 minutes of out-of-class work for every 50 minutes of direct instruction, for a minimum total of 2.5 hours a week. A 3-credit course includes 2.5 hours of direct instruction and a minimum of 5 hours of independent learning, or 7.5 hours per week. More information about GW's credit hour policy can be found at: provost.gwu.edu/policies-forms (webpage); or provost.gwu.edu/files/downloads/Resources/Assignment-Credit-Hours-7-2016.pdf (form)

University Policy on Religious Holidays

In accordance with University policy, students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance. For details and policy, see: students.gwu.edu/accommodations-religious-holidays.

Academic Integrity Code

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For the remainder of the code, see: studentconduct.gwu.edu/code-academic-integrity

Safety and security

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

Support for Students Outside the Classroom

Disability Support Services (DSS)

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information see: disabilitysupport.gwu.edu/

Mental Health Services 202-994-5300

The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals. For additional information see: counselingcenter.gwu.edu/

Diversity Statement (Source: [here](#))

We must treat every individual with respect. We are diverse in many ways, and this diversity is fundamental to building and maintaining an equitable and inclusive campus community. Diversity can refer to multiple ways that we identify ourselves, including but not limited to race, color, national origin, language, sex, disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information.

Each of these diverse identities, along with many others not mentioned here, shape the perspectives our students, faculty, and staff bring to our campus. We will work to promote Diversity, Equity, and Inclusion (DE&I) not only because diversity fuels excellence and innovation, but because we want to pursue justice.

We acknowledge our imperfections while we also fully commit to the work, inside and outside of our classrooms, of building and sustaining a campus community that increasingly embraces these core values.

Each of us is responsible for creating a safer, more inclusive environment.