Object-oriented Software Development

SE 350 (601-610)

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Office: CDM 829

Office Hours: Wednesdays 2-5 PM - via Zoom / BlueStar Appointment

Lecture: Tuesdays & Thursdays, 1:30-3:00 PM - via Zoom

Course Forum: MS Teams

Quarter: Spring 2021

Last update: *March 29, 2021*

Contents

SE 350 : Course Syllabus

Course Description

This course studies Principle, techniques and tools of object-oriented modeling, design, and implementation of large-scale software systems. The students will learn the real-world aspects of object orientation by putting the concepts into practice.

Topics include:

- Principles of object-oriented programming languages
- Principles of object-oriented design
- UML diagrams
- Design Patterns
- Quality metrics and Refactoring of object-oriented design
- Testing methodologies

Prerequisite

- Required
    - CSC 301 | DATA STRUCTURES II (or equivalent courses on data structures)
- Optional and useful
    - SE 333 | SOFTWARE TESTING
    - SE 330 | OBJECT ORIENTED MODELING

Note *Java and UML will be used for source code examples, assignments, and exams.*

Note *Some experience programming in Java or another C-like language is required. This is not an introductory Java course. You will practice coding in this course and must be comfortable implementing simple data structures.*

Course Objectives & Learning Outcomes

- **Object-Oriented Design Principles**: You will have a deeper understanding of object-oriented concepts and how to use them, and will be able to design and develop software applications using object-oriented design principles.
- **Visual Modeling**: You will be able to model a software solution visually using UML sequence and class diagrams.
- **Design Patterns**: You will be able to design and implement an executable solution to a given problem in a programming language using the most suitable set of common software and architectural design patterns.
- **Object-Oriented Programming Paradigm Principles**: You will be able to effectively translate design patterns and object-oriented design principles into an object-oriented programming language.
- **Implementation**: You will be able to apply advanced object-oriented programming language features/capabilities to design and implement a given software application using object-oriented best practices. You will be proficient with incremental/iterative development, refactoring, and writing higher-quality codes.

Grading

- **Assignments** (50%)
  - 5% - In-class and Forum Participation
  - 5% - Quizzes
  - 40% - Home works and Programming Projects
- **Exams** (50%)
  - 20% - Midterm Exam
  - 30% - Final Exam
- **Optional Bonus *** (10%)
  - 10% - Research OR Implementation Project

Note *The topics and requirements for the optional research and implementation projects will be explained after the midterm exam.*

Grading Scale:

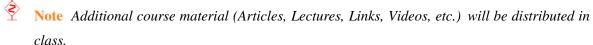| A	93-100	B-	80-82	D+	65-68
A-	90-92	C+	77-79	D	60-64
B+	87-89	C	73-76	F	<60
B	83-86	C-	69-72		

Note *The grading rubric is a rough guideline, and may change based on the overall distribution of the class.*

Resources

⚠ **Note** *None of the following books are required. If you want to use an alternate resource as a reference, you are welcome to do so.*

- **Design Patterns** Optional Texts:
  - **Beginning Java Programming: The Object-Oriented Approach, 1st Edition** by Bart Baesens, Aimee Backiel, Seppe vanden Broucke. ISBN-13: 978-1118739495 [Amazon]
  - **UML Distilled: A Brief Guide to the Standard Object Modeling Language, 3rd Edition** by Martin Fowler. ISBN-13: 978-0321193681 [Amazon]
  - **Design Patterns Explained: A New Perspective on Object Oriented Design, 2nd Edition (Software Patterns)** by Alan Shalloway, James Trott. ISBN-13: 978-0321247148 [Amazon]
  - **Design Patterns: Elements of Reusable Object-Oriented Software, 1st Edition** by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides. ISBN-13: 978-0201633610 [Amazon]
  - **Head First Design Patterns: A Brain-Friendly Guide, 1st Edition** by Eric Freeman, Bert Bates, Kathy Sierra, Elisabeth Robson. ISBN-13: 978-0596007126 [Amazon]
  - **Head First Design Patterns: Building Extensible and Maintainable Object-Oriented Software, 2nd Edition** by Eric Freeman, Elisabeth Robson. ISBN-13: 978-1492078005 [Amazon]
- **Java** Optional Texts:
  - **Java How to Program, Early Objects, 11th Edition** by Paul Deitel, Harvey Deitel. ISBN-13: 978-0134743356 [Amazon]
  - **Head First Java, 2nd Edition** by Kathy Sierra, Bert Bates. ISBN-13: 978-0596009205 [Amazon]

⚠ **Note** *Additional course material (Articles, Lectures, Links, Videos, etc.) will be distributed in class.*

Tentative Schedule

Date	Activity	Lecture

Week 1
Mar30 & Apr1
	Environment Setup	• Introduction to OO
		• UML Diagrams
		• OO Principles
		  • Abstraction
		  • Encapsulation
		  • Inheritance
		  • Polymorphism
		  • Composition
		  • Interface
		  • Delegation
		• Design with Exceptions
		• Principles and Foundations of OO Design
		  • SOLID Principles
		    • Single Responsibility
		    • Open-Closed
		    • Liskov Substitution
		    • Dependency Inversion
		    • Interface Segregation
		• Design Patterns
		  • Creational
		  • Structural
		  • Behavioral
		• Anti-patterns
		• Refactoring OO Design
		• JUnit
		• OO Design & Development Research Trends

Week 2 Apr6 & Apr8		
Week 3 Apr13 & Apr15	**Assignment 1**	
Week 4 Apr20 & Apr22	**Assignment 2**	
Week 5 Apr27 & Apr29	**Mid-term Exam**	
Week 6 May4 & May6		
Week 7 May11 & May13	**Assignment 3**	
Week 8 May18 & May20		
Week 9 May25 & May27	**Assignment 4**	
Week 10 Jun1 & Jun3	**Bonus Projects Due**	
Week 11 (Finals) Jun8 & Jun10	**Final Exam**	

Important Dates

Monday April 5, 2021 Last day to add classes to SQ2021 schedule

Friday April 9, 2021 Last day to drop SQ2021 classes with no penalty

Monday April 12, 2021 Last day to select pass/fail option for SQ2021 classes

Friday May 14, 2021 Last day to withdraw from SQ2021 classes

Note *Please visit DePaul Academic Calendar-Spring Term for the complete list.*

Course Policies

Communication Policy

- Submit all questions regarding class, homework, lectures, etc. to the course discussion forum on MS Teams. The channel will be introduced during the first session of the course. Posting in the course forum allows others who may be online to answer questions more immediately; Also, it helps the other students with the same question.

- MS Teams private message and Email are secondary means of communications for this course only for the personal or sensitive topics.

- I will do my best to respond to all questions and posts within 24 hours, but most of the time/hopefully much less.

- Everyone is required to join the course forum. You can access MS Teams via desktop, web app, or phone applications and setup notifications. You are responsible for the announcements posted in the course forum.

- Everyone is expected and encouraged to participate in the discussion forum.

- You are responsible for understanding the course materials and presented lectures in class. Everyone is encouraged to ask questions when struggling to understand a concept or schedule a meeting during the office hours.

- Keep the forum professional and positive. Help each other out whenever you can.

Assignments and Exams Policy

- Late home works are not accepted because the solutions will be posted and we will review them in class after due date.

- All assignments must be submitted to the D2L and you are expected to follow the submission guidelines carefully. Submissions via course forum or email will not be accepted.

- The programming assignments must satisfy the explained requirement and tasks for each home work, must be compiled, and must satisfy proper project structure.

Changes to Syllabus

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class and posted under Announcements in D2L and MS Teams.

COVID-19 Policy

COVID-19 Health and Safety Precautions Keeping our DePaul community safe is of utmost importance in the pandemic. Students, faculty and staff are expected to (1) wear a cloth face covering at all times while on campus, both inside buildings and outside on the grounds; (2) maintain physical distance (at least six feet) in all DePaul spaces (including classrooms, meeting rooms, hallways, rest rooms, offices, and outdoor spaces); (3) conduct a daily self-screening process for the symptoms of COVID-19 using the **CampusClear** app before coming to campus; (4) complete the online Health and Safety Guidelines for Returning to Campus training; and (5) abide by the City of Chicago Emergency Travel Order. By doing these things, we are Taking Care of DePaul, Together. The recommendations may change as local, state, and federal guidelines evolve. Students who have a medical reason for not complying should register with DePauls Center for Student with Disabilities (CSD).

Zoom - Guidelines and Expectations

Note *Attendance is **required** for Sync Section students and **optional**/encouraged for Async section students.*

This class will use Zoom, a video conferencing tool, for instruction and/or collaboration. Students should follow general guidelines and meet participation expectations for Zoom meetings.

General Guidelines

- You can find the meeting links in D2L under the calendar.
- You can join the session ONLY with you DePaul Zoom account.
- Use your given or preferred name as your display name.
- It is preferred/encouraged to have your video turned on during the class unless there is any constraint which is required to notify the instructor in advance. You can use any appropriate Zoom background too. If your video is turned off, you have to use a profile photo or avatar to facilitate the communications.
- Dont use distracting or inappropriate profile photos or virtual backgrounds.

- Dont share meeting links, passwords, screenshots, recordings, or other meeting information with people outside the class.
- Mute your microphone when youre not speaking to minimize background noise.
- If connectivity issues impact your audio/video quality, try turning off your camera.
- Contact DePauls Technology Support Center at *312.362.8765* if you need assistance during a video call.

Participation Expectations

- Be on time or notify your instructor if you will be late or unable to attend.
- Minimize distractions, such as televisions and cell phones, when possible.
- Dont engage in other activities during sessions (driving, cooking, cleaning, etc.)
- Try to put your device at eye level on a solid surface. Holding your device or placing it in your lap can add movement to your video, which can be distracting.
- If you think you might have trouble actively participating in meetings, let your instructor know in advance, if possible.

Note *Students should report any incidents of behavioral misconduct (including harassment) in video conference meetings to their instructor. Any incident of harassment and/or behavioral misconduct that impedes the teaching & learning environment may be reported to the Dean of Students Office for referral to the student conduct process. This includes sharing meeting links, passwords, screenshots, recordings, or other meeting information in a way that could facilitate harassment or misconduct by others.*

Students with Disabilities

Students seeking disability-related accommodations are required to register with DePauls Center for Students with Disabilities (CSD) enabling you to access accommodations and support services to assist your success. There are two office locations:

- Loop Campus Lewis Center #1420 (312) 362-8002
- Lincoln Park Campus Student Center #370 (773) 325-1677
- Email: csd@depaul.edu

Students who are registered with the Center for Students with Disabilities are also invited to contact me privately to discuss how I may assist in facilitating the accommodations you will use in this course. This is best done early in the term. Our conversation will remain confidential to the extent possible.

Please see Center for Students with Disabilities for Services and Contact Information.

Academic Integrity

DePaul University is a learning community that fosters the pursuit of knowledge and the transmission of ideas within a context that emphasizes a sense of responsibility for oneself, for others and for society at large. Violations of academic integrity, in any of their forms, are, therefore, detrimental to the values of DePaul, to the students own development as responsible members of society, and to the pursuit of knowledge and the transmission of ideas. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the universitys academic resources; alteration or falsification of academic records; and academic misconduct. Conduct that is punishable under the Academic Integrity Policy could result in additional disciplinary actions by other university officials and possible civil or criminal prosecution. Please refer to your Student Handbook or visit Academic Integrity at DePaul University (http://academicintegrity.depaul.edu) for further details.

Posting work on online sites, such as CourseHero

All students are expected to abide by the Universitys Academic Integrity Policy which prohibits cheating and other misconduct in student coursework. Publicly sharing or posting online any prior or current materials from this course (including exam questions or answers), is considered to be providing unauthorized assistance prohibited by the policy. Both students who share/post and students who access or use such materials are considered to be cheating under the Policy and will be subject to sanctions for violations of Academic Integrity.

Academic Policies

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Information on enrollment, withdrawal, grading and incompletes can be found at CDM Academic Policies Page.

Incomplete Grades

An incomplete grade is a special, temporary grade that may be assigned by an instructor when unforeseeable circumstances prevent a student from completing course requirements by the end of the term and when otherwise the student had a record of satisfactory progress in the course. All incomplete requests must be approved by the instructor of the course and a CDM Associate Dean. Only exceptions cases will receive such approval. Information about the Incomplete Grades policy can be found at CDM Grading Policies.

Online Course Evaluations

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the students identity. Since 100% participation is the our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in **CampusConnect**. Please see This Page for additional information

Diversity and Inclusion

Respect for Diversity and Inclusion at DePaul University as aligned with our Vincentian Values: At DePaul, our mission calls us to explore what must be done in order to respect the inherent dignity and identity of each human person. We value diversity because it is part of our history, our traditions and our future. We see diversity as an asset and a strength that adds to the richness of classroom learning. In my course, I strive to include diverse authors, perspectives and teaching pedagogies. I also encourage open dialogue and spaces for students to express their unique identities and perspectives. I am open to having difficult conversations and I will strive to create an inclusive classroom that values all perspectives. If at any time, the classroom experience does not live up to this expectation, please feel free to contact me via email or during office hours.

In the wake of recent national conversations around anti-Black racism, sexual violence, the immigration crisis, and the impact of the pandemic on marginalized people, I am more awake to the systemic inequities and injustices in our institutions, including DePaul University and the College of Computing and Digital Media, where I teach and serve.

I recognize the rich diversity of our campus community and seek to offer all members of my class an equitable, inclusive, welcoming, secure, responsive and affirming environment that fosters mutual respect, empathy and trust.

Mental Health and Academic Assistance

Balancing the hard work of achieving your educational goals with the other demands of life is difficult at the best of times. For many of us, for a variety of reasons, things are all the more difficult now. I want to make sure you feel comfortable, not embarrassed, reaching out to me for

support. I will also point out where the University has great resources just a phone call or email away. These have been created and maintained for you, so use them. Sometimes people feel like their situation isnt the worst possible, so they assume they do not need help, but dont let that prevent you from reaching out.

- **DePaul University Counseling Services** mental health is as important as physical health, and we have professionals just a phone call away: [Link] (call (773) 325-7779 or 911 for emergency).
- The kind people at the **Office of the Dean of Students** can help you with a wide range of topics, including figuring out if you should withdraw or apply for an incomplete: [Link].
- There are lots of additional, more specific resources listed here with the **Office of Student Affairs**, including crisis hotlines and sexual assault resources (note Title IX refers to a law protecting you from sex discrimination, including harassment and assault): [Link].