Northeastern University
College of Engineering

CSYE 6200 Concepts of Object-Oriented Design

Course Information
Course Title: Concept of Object-Oriented Design
Course Number: CSYE 6200
Term and Year: Spring 2024
Credit Hour: 4
Course Format: On-Ground

Course Prerequisites
N/A
Course Description
Introduces object-oriented design and programming via the Java programming language; the use of inheritance, composition, and interface classes in software design; development of Java applets and applications; study of the Java class libraries, including the swing tool kit for building human computer interfaces, the network package for development of client-server systems, and the collections' package for data structures and sorting algorithms. Requires a course project. Requires knowledge of C programming.

Standard Learning Outcomes

Learning outcomes common to all College of Engineering Graduate programs:

1. *An ability to identify, formulate, and solve complex engineering problems.*
2. *An ability to explain and apply engineering design principles, as appropriate to the program's educational objectives.*
3. *An ability to produce solutions that meet specified end-user needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*

The Information Systems Program accepts students of different engineering backgrounds with minimum programming skills and produces first class Information Systems engineers that operate at the intersection of real-world complexity, software development, and IT management. Graduating students will be able to construct end-to-end advanced software applications that meet business needs.

Specific Learning Outcomes for the Information Systems program:

1. *Create a strong technical foundation through diverse, high-level courses*
2. *Built crucial interpersonal skills needed to succeed in any industry*
3. *Foster a deep level of applied learning through project based case studies*

Text:

1. *Java The Comploete Reference* by Herbert Schildt, 9th Edition, McGraw-Hill Professional Publishing (ISBN-10: 0071808558 ISBN-13: 9780071808552)
2. *Thinking in Java by Bruce Eckel*, 4th Edition, Prentice Hall (ISBN-13: 978- 0131872486 ISBN-10: 0131872486)
3. *Effective Java by Joshua Bloch, 2nd Edition*, Addison-Wesley (ISBN-13: 860- 1300201986 ISBN-10: 0321356683)
4. *Head First Design Patterns* by Eric Freeman, Bert Bates, Kathy Sierra, Elisabeth Robson, 1st Edition, O'REILLY (ISBN-13: 000-0-596-00712-4 ISBN-10: 0-596- 00712-4)

Course Objectives:

5. Understand the pragmatic use and benefits of Objects Oriented Design.
6. Gain a working knowledge of Encapsulation, Data Abstraction and Polymorphism.
7. Learn design decomposition for distributed and managed software development.
8. Learn the use of Design Patterns and SOLID design principles.
9. Understand GUI programming with Swing components.
10. Learn Network Programming with Sockets.
11. Develop familiarity with Eclipse IDE and NetBeans RCP Framework.
12. Learn Java 8 **features** including Lambdas, Stream API and Date/Time API

Grading:

- **Attendance and Participation: 10%**
- **Quizzes/Assignments: 40%**
- **Mid-term Exam: 25%**
- **Final Exam: 25%**

Individual Assignments:

There will be multiple individual assignments. These assignments are to be completed individually, submitted to blackboard **on time and as a complete executable project. Incomplete or late assignments will receive an automatic 1/3 deduction in assignment grade**. Assignments may presented in class. Submittals consist of a presentation slide and a written report.

Group Project Assignments:

The group projects will be completed by a team of 2 - 5 students. The group project affords students an opportunity to exercise creativity in application of knowledge gained in the course to real world scenarios.

Final Team Project Assignment:

The final project will be completed by a team of 2 - 5 students. The project details will be provided during the second week of the course. Students are encouraged to choose their topic of choice either from healthcare, business and/or technology related fields.

Course Schedule (subject to change):

WEEK	TOPIC
1	INTRODUCTION • Software Development Environment and Tools • UML and Object Oriented Principles • Java run-time, JDK (java, javac)
2	CLASSES AND OBJECTS • Variables, String, Arrays, Object vs Class instance • Encapsulation, Method Overloading •
3	INHERITANCE, POLYMORPHISM , API ABBSTRACTION & INTERFACES • Super and Derived sub classes • Abstract and Concrete classes, Interfaces • Data and Functionality Hiding
4	JAVA GENERIC PROGRAMMING, COLLECTIONS AND ALGORITHMS • Collections • Sort Algorithm
5	Inner Classes, File I/O & EXCEPTION HANDLING • Loops • Try with Resources • File Handling
6	DESIGN PATTERNS • S.O.L.I.D. Design Principles • Design Clarity, Code Readability & Robustness • Singleton & Factory Design Pattern
7	JAVA 8 LAMBDA • Anonymous Inner Classes • Functional Interface •
8	MIDTERM EXAM
9	JAVA 8 LAMBDA • Anonymous Inner Classes • Functional Interface
10	JAVA 8 STREAM API & Functional Style Programming • Anonymous Inner Classes • Functional Interface • 11

11	Introduction to Data Structures • FIFO Queue • LIFO Stack 11
12	JAVA SWING & GRAPHICAL USER INTERFACE COMPONENTS • Frames • Panels • Text Fields, Text Areas • Buttons • ComboBoxes Tables
13	JAVA THREADS AND NETWORK PROGRAMMING • Synchronization & Critical Race Condition • UDP • TCP • Performance Scalability, Extensibility, Distributed Functional Flexibility
14	FINAL EXAM
15	FINAL PROJECT PRESENTATIONS

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is very important to the College of Professional Studies. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at **https://neu.evaluationkit.com**. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your HuskyMail account notifying you when surveys are available.

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of

assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to http://www.northeastern.edu/osccr/academic-integrity-policy/ to access the full academic integrity policy.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit http://www.northeastern.edu/drc/getting-started-with-the-drc/.

Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for Education specific resources, visit http://subjectguides.lib.neu.edu/edresearch.

24/7 Blackboard Technical Help

For immediate technical support for Blackboard, call 617-373-4357 or emailhelp@northeastern.edu

Within Blackboard, open a support case via the red support button on the right side of the screen, click Create Case

myNortheastern, e-mail, and basic technical support
Visit the Information Technology Services (ITS) Support Portal
Email: help@northeastern.edu
ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit http://www.northeastern.edu/oidi/ for complete information on Diversity and Inclusion

TITLE IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

In case of an emergency, please call 911.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.