Northeastern
College of Engineering

INFO5100 Application Engineering and Development

Fall 2024

Course Information
Course Title: Application Engineering and Development
Course Number: INFO5100 - Lab
Term and Year: Fall 2024
Credit Hour: 4.0
CRN: 12025
Course Format: On-Ground

Instructor Information
Full Name: Frank Kadwell
Email Address: f.kadwell@northeastern.edu
Office Hours: By Apt

Instructor Biography
Frank earned his Bachelor of Science from the University of Minnesota, majoring in Computer Science. In 2008, Frank earned his Master of Science from Capella University. Frank earned his PhD in Information Technology from Capella University in 2019.

Frank has over twenty-eight years of industry experience. Frank's major area of expertise is in data engineering, analytics, and machine learning. Frank has helped companies take advantage of their competition through predictive and data analytics. Frank has been teaching for four years and his research focus is on Algorithms and specifically, generative AI. Frank is passionate about teaching and helping students to achieve their greatest potential.

Teaching Assistant Information
Full Name: NA
Email Address:NA
Office Hours: NA

Course Prerequisites
NA

Course Description
Takes students in a step-by-step manner through the process of systematically combining UX techniques, business processes, and complex data models to assemble applications that are user friendly and meet business requirements. Employs the object-oriented paradigm, visual user experience, and system design principles to put together complicated, powerful, real-world applications. The primary objective of this course is to practice social-technical software engineering methods and tools to solve real-world problems. Offers students an opportunity to learn innovative design and programming techniques to build significant business applications quickly; to practice simple and smart ways of making software construction enjoyable; and to master the art of how to systematically write software programs to solve any business problem.

Course Learning Outcome

The primary objectives of this course are to practice social-technical software engineering techniques to solve real-world business problems. Students will be equipped with practical design and programming techniques to build significant business applications quickly. In a step-by-step manner, the instructor will take you through the process of systematically combining UX techniques, business processes, and complex data models to assemble designs that are user friendly and meet business requirements. You will learn how to employ systems thinking, the object-oriented paradigm, visual user interface design principles, the visual Programming technique, as well as productivity tools to put together complicated, powerful designs. We will practice simple and smart ways of making software programming enjoyable. Students will learn how to build models that represent the full functionality of software applications. The modularity principle will be used to build powerful models that lend themselves to specifications for software implementation. In addition, the student will learn basic programming techniques to prepare them for INFO 5100 and other technical courses. Overall, the class will teach the students how to be a functional architect and take the lead in using software to drive innovative solutions to business problems, in healthcare, financial, as well as other social challenges.

Besides the lectures, the class will have lab sessions, which will permit continuous interaction. The time will be divided into lecture, lab, help sessions; students will engage in hands-on design and application modeling under instructor supervision. For the duration of the class, we will focus on a single business problem – you will focus on one problem for the entire semester and that you will start small and gradually expand the scope. Students will practice the art of how to break down business requirements into small manageable components, program the components, and assemble those components into useful designs.

Students will select a practical business problem and articulate its underlying user requirements. They will engineer an information model capturing the important aspects of the business problem and define the business processes necessary to deliver the solution that will satisfy the stated business requirements as well as define the user tasks as screen designs. We will work on identifying and incorporating the information needed for the task (screen) at hand. The information model will be linked to user screens through input and output flows and data transformation.

This course will review the essential elements of any programming language—such as arrays, control structures, class definitions, as well as visual forms and components. It shows how to develop and execute Java applications. Various assignments, which strengthen the understanding of how programming works will be studied.

Required Tools and Course Textbooks

This class will use visual programming tools like VSCode, Eclipse or IntelliJ for basic programming and form design. It is recommended that students use VSCode because examples will be provided in VSCode.

Additional tools include Docker and possibly Kubernetes which we use to better understand overall system programming.

Course Schedule/Topics Covered. Please note – this is the MINIMUM assignments. There will be more throughout the term.

Week	Date	In Class Topic	Assignment Due
1	**09/04**	Introduction to the course. What is programming, different types of languages, java virtual machine, compilation	
2	**09/11**	Create and display multiple objects	**Lab 1 Hello Word**
3	**09/18**	User interaction design	**Lab 2 Weighted Grades**
4	**09/25**	Encapsulation and data hiding, parameter passing in Java	**Lab 3 Weighted Grades Extension 1**
5	**10/2**	Logging into an application, saving a password as a hash	**Lab 4 Weighted Grades Extension 2**
6	**10/9**	Data processing in Java, CRUD operations	**Lab 5 Weighted Grades Retrospective**
7	**10/16**	Object databases	**Lab 6 GUI**
8	**10/23**	Overloading operators	**Lab 7 Data**
9	**10/30**	Unified Modeling Language (UML)	
10	**11/6**	Graphical User Interface, Thread and Concurrent programming	**Requirements Final Project**
11	**11/13**	Model/View/Controller (MVC Programming) in Java	
12	**11/20**	Eco-System design	**UML Final Project**
13	**11/27**	Case Studies	
14	**12/4**	Other advanced topics, networking and sockets	**Final Coding**
15	**12/11**	Final Project Presentation	

Assignment Grading

- Attendance – 10 %
- Assignments – 20%
- Quizes – 20%
- Final Project – 50%

Grading Scale

	87-89.9% B+	77-79.9% C+	
95-100% A	84-86.9% B	74-76.9% C	
90-94.9% A-	80-83.9%B-	70-73.9% C-	69.9% or below F

Attendance/Late Work Policy

Attendance Policy

Students registered in MGEN courses (INFO, CSYE, and DAMG) are allowed **a maximum of 2 absences per course, with 3 or more absences resulting in an automatic 'F' for that course.** Students are expected to inform their instructors of any absences in advance of the class; if a student is sick long-term or experiences a medical issue that prevents class attendance, it is strongly encouraged that they speak with their Academic Advisor (coe-mgen-gradadvising@northeastern.edu) to learn more about the Medical Leave of Absence. Should a student anticipate being unable to attend 3 or more classes, they should discuss their situation with their Academic Advisor to explore other types of leave in accordance with the University's academic and global entry expectations. International students should review the Office of Global Services webpage to understand their visa compliance requirements.

Teaching Assistants (TAs) or Instructional Assistants (IAs) will be present at each class to collect student attendance.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus. Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late. Work submitted late without prior communication with faculty will not be graded.

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is particularly important to the College of Engineering. 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 Northeastern University Mail 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.

MGEN Student Feedback
Students who would like to provide the MGEN unit with anonymous feedback on this particular course, Teaching Assistants, Instructional Assistants, professors, or to provide general feedback regarding their program, may do so using this survey: https://neu.co1.qualtrics.com/jfe/form/SV_cTIAbH7ZRaaw0Ki

University Health and Counseling Services
As a student enrolled in this course, you are fully responsible for assignments, work, and course materials as outlined in this syllabus and in the classroom. Over the course of the semester if you experience any health issues, please contact UHCS.

For more information, visit https://www.northeastern.edu/uhcs.

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 https://drc.sites.northeastern.edu.

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 https://library.northeastern.edu
Network Campus Library Services: Northeastern University Library Global Campus Portals

24/7 Canvas Technical Help
For immediate technical support for Canvas, call 617-373-4357 or email help@northeastern.edu

Canvas Student Resources: https://canvas.northeastern.edu/student-resources/

For assistance with my Northeastern e-mail, and basic technical support:
Visit ITS at https://its.northeastern.edu
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, members 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 **https://www.northeastern.edu/ouec** for a complete list of reporting options and resources both on- and off-campus*.