COURSE SYLLABUS

INFO 5100: Application Engineering and Development, Fall 2024

Instructor: Professor Kal Bugrara
Classroom: ISEC 102
CRN: 13299
Lecture Time: Mon 3-6pm
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Course Aims

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 for the purpose of building 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.

Course Outcomes

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.

An Interactive Setting

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.

Our Approach

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.

Lecture	Topic/Activity	Java Lecture with examples	Lab Work/Testing	Homework
W 1	Introduction to the course: Socio-technical engineering and Ecosystem Design. Functional vs Component structures	Program structure, java virtual machine, compilation steps	SDK and NetBeans installation, Completing lab 1	Extend lab with additional class attributes
W 2	Creating and displaying multiple objects	Java syntax, class files, classes, objects, attributes and methods	Implement Model relationships in java as complete app	Extend the lab with more attributes
W 3	User Interaction Design	Data types, integers, strings, primitive types, variables vs values, reference variables, memory usage	User flows as screen navigation flows using the card layout in java, passing objects between screens	Extend the lab with additional screens and user flows
W 4	Modeling the supply-side	Functions and methods, parameter passing in java	Finding bugs or learning how to use the debugger	Write a program with bugs and show how you isolate the problem. Prepare a report
W 5	Designing the person (subject and user) into the application	Program control flow, alternate routes and executions paths, Boolean variables, conditional statements, if statements	Implement the login process using person and user account directories	Show how to save the hash of the password as part of the user account
W 6	Order Processing Design and model comparison	Simple arrays, indexing, While and For loops		
W 7	Digital Marketing, customization and targeting	Introduction to the java collection API		
W 8	Digital Eco-System Models Final Project Announcement Mid-term exam	Introduction to data structures: stacks and queues with applications		
W 9	Eco-System Design Techniques part I	Memory management and garbage collection in java		
W 10	Eco-system Design part II	Advanced collections		
W 11	Final Project Status Check	Unit testing best practices		
W 12	Case Studies	Introduction to Lambda functions		
W 12	Final Project Status Check			
W 13	Advanced Topics			
W 14	Advanced Topics			
W 14				
W 15	Final Project Submission			
W 15	Final Project Presentation			

Element of the Smart Programming

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.

Tools

The class will use visual programming tools like scratch and NetBeans for basis programming and form design.

Tentative Schedule of the Course

Grading

Coursework will be weighted as follows:

Name	Percentage
Assignment and Lab	25%
Quizzes	25%
Attendance	10%
Final Project	40%

Professor may do some curve work when he is counting the final grades. Besides, assignments have different weights.

Plagiarism Policy

When there is evidence that a student has committed plagiarism, copied the work of others, allowed others to copy their work, cheated on an exam, altered class material or scores, or has inappropriate possession of exams, or sensitive material, the incident will be investigated. The consequences for academic dishonesty are severe and that will include a straight F in the course with the potential for dismissal.