Course Syllabus

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INFO 5100: Application Engineering and Development, Fall 2022

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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 architects and take the lead in using software to drive innovative solutions to business problems, 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, and 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 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, programming the components, and assembling 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	Lab Work/Testing		Homework	Java Lecture with examples		
Week 1	Introduction to the course: Socio-technical engineering and Eco-system Design. Functional vs Component structures	SDK and Netbeans installation, Completing lab 1	Extend lab with additional class attributes		Program structure, java virtual machine, compilation steps		
Week 2	Creating and displaying multiple objects	Implement Model relationships in java as a complete app	Extend the lab with more attributes		Java syntax, class files, classes, objects, attributes, and methods		
Week 3	User Interaction Design	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		Data types, integers, strings, primitive types, variables vs values, reference variables, memory usage		
Week 4	Modeling the supply-side	Finding bugs or learning how to use the debugger	Write a program with bugs and show how you isolate the problem. Prepare a report		Functions and methods, parameter passing in java		
Week 5	Designing the person (subject and user) into the application	Implement the login process using person and user account directories	Show how to save the hash of the password as part of		Program control flow, alternate routes, and executions paths, Boolean variables, conditional statements, if statements		

			the user account		
Week 6	Order Processing Design and model comparison			Simple arrays, indexing, While and For loops	
Week 7	Digital Marketing, customization, and targeting			Introduction to the java collection API	
Week 8	Digital Eco-System Models Final Project Announcement Mid-term exam			Introduction to data structures: stacks and queues with applications	
Week 9	Eco-System Design Techniques part I			Memory management and garbage collection in java	
Week 10	Eco-system Design part II			Advanced collections	
Week 11	Final Project Status Check			Unit testing best practices	
Week 12	Case Studies			Introduction to Lambda functions	
Week 12	Final Project Status Check				
Week 13	Advanced Topics				
Week 14	Advanced Topics				
Week 14					
Week 15	Final Project Submission				
Week 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 basic programming and form design.

Tentative Schedule of the Course

Grading
Coursework will be weighted as follows:

Name	**Percentage**
Assignments	25%
Midterm	25%
Final Project	50%

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.