



COMP 3700

Software Modeling and Design

Syllabus

Instructor

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Office: 3116 Shelby Center

Office Hours: T/H 2:00-3:00 and by appointment

Course Description

This course presents an integrated set of techniques for software analysis and design based on object-oriented concepts and the UML notation. Topics include introduction to object concepts, fundamentals of object oriented analysis and design process, use-case analysis, object modeling using behavioral techniques, design patterns, design quality and metrics.

Course Objectives

Upon completion of this course, each student should be able to (1) understand the role of analysis and design in the software engineering lifecycle, (2) develop object-oriented designs by applying established design principles, (3) develop use-case and scenario descriptions of the requirements, (4) develop richer descriptions of design models using UML diagrams, (5) understand the role and influence of design patterns and frameworks in software design, (6) evaluate the quality of design models, and (7) participate in a collaborative group project.



Required Text

- Michael Blaha and James Rumbaugh, **Object-Oriented Modeling and Design with UML**, Second Edition, Prentice-Hall, 2005.
- Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, **Design Patterns: Elements of Reusable Object-Oriented Software**, Addison-Wesley, 1994.

Recommended Text

- Allan Shalloway and James R. Trott, **Design Patterns Explained: A New Perspective in Object-Oriented Design**. Second Edition. Addison-Wesley. 2005

Course Requirements

- **Final Examination (25%)**. Final exam will be a closed-book comprehensive exam.
- **Midterm Examination (20%)**. Midterm will be a closed-book exam.
- **Homework Assignments (20%)**. You will be required to complete homework assignments on OO analysis and design. All assignments are due at the stated time - no late assignments will be accepted and no make-up exams will be given, except in pre-arranged and emergency situations.
- **Group Project (25%)**. There will be one substantial group project. The group assignment is the development of a software design for a realistic application. Each group is responsible for sketching its projects requirements, identifying the critical design issues, delivering the analysis document as well as architectural design, detailed design, and implementation for the proposed solution. Students will be required to participate in team work, produce design documentation, and make a presentation and demo on the team project. Additional information concerning this assignment will be presented in class.
- **Participation (10%)** You are expected to attend to each class and read the announced material in advance to participate in class discussions. Class discussions are open-ended and designed to promote critical thinking about the content of the reading or presentations. Contributions to project presentations are also considered as part of participation.



Grading

Assignment	Weight	Grading Guidelines
Final Exam	25%	90-100 : A
Midterm Exam	20%	80-89 : B
Homework Assignments	20%	70-79 : C
Group Design Project	25%	60-69 : D
Participation	10%	below 60: F

Exams

I reserve the right to keep all exams. You will be informed as to the exact format of an exam as well as the format of the questions on an exam. Exams will be closed book; however, one 8.5x11 inch HAND-WRITTEN (instead of computer-generated or possibly photocopied) sheet of paper filled with any information a student thinks is necessary is permitted. This 8.5x11 crib-sheet must be handed in along with the exam. Failure to hand in a crib-sheet will result in a zero for that exam. Scratch paper will be provided by the proctor. All scratch paper issued by the proctor must be handed in along with the exam. Failure to hand in scratch paper will result in a zero for that exam.

Accommodation Policy

If you need special accommodations, please contact me during the first week of classes.

Policy on Academic Integrity and Plagiarism

Academic integrity is central to the learning and teaching process. Students are expected to conduct themselves in a manner that will contribute to the maintenance of academic integrity by making all reasonable efforts to prevent the occurrence of academic dishonesty. Academic dishonesty includes, but is not limited to, obtaining or giving aid on an examination, having unauthorized prior knowledge of an examination, doing work for another student, and plagiarism of all types. Plagiarism is the intentional or unintentional presentation of another persons idea or product as ones own. Plagiarism includes, but is not limited to, the following: copying verbatim all or part of anothers written work; using phrases, charts, figures, illustrations, or mathematical or scientific solutions without citing the source; paraphrasing ideas, conclusions, or research without citing the source



Schedule

Date	Topics
8/17,19,21	Course Overview. Introduction to Software Design (Chapter 1). Modeling Concepts. Class Modeling (Chapters 2-3). Design project teams are formed.
8/24,26,28	Advanced Class Modeling (Chapter 4). State Modeling (Chapter 5). HW1 Distributed (8/24).
8/31,9/2,4	Advanced State Modeling (Chapter 6). Interaction Modeling (Chapter 7). HW1 Due (8/31). HW2 Distributed (8/31).
9/9,11	Advanced Interaction Modeling (Chapter 8). HW2 Due (9/9). HW3 Distributed (9/9).
9/14,16,17	Domain Analysis (Chapter 12). HW3 Due (9/16). HW4 Distributed (9/16).
9/21,23,25	Application Analysis. HW4 Due (9/21). Midterm Exam (9/25).
9/28,30, 10/2	Application Analysis (Chapter 13). Architectural design.
10/5,7,9	Architectural design patterns- subsystems, layers, model-view separation, 2 and 3 tier designs. Service-oriented architectures. HW5 Distributed (10/7).
10/12,14	System design (Chapter 14). Collaboration Design. Design Principles.
10/16	Fall Break.
10/19,21,23	Class Design (Chapter 15). HW5 Due (10/19).
10/26,28,30	Group Project Analysis Documents Due (10/26). Group Project Analysis Model Class Presentations (10/26,28). Creational Design Patterns.
11/2,4,6	Structural Design Patterns.
11/9,11,13	Behavioral Design Patterns.
11/16,18, 20	Software Design Evaluation. OO Design Metrics.
11/23,25,27	Thanksgiving Break.
11/30, 12/2,4	Design projects are due (11/30). Group Project Presentations and Class Discussions (11/30, 12/2). Model-Driven Engineering. Course overview (12/4)