Cleveland State University  
Department of Electrical Engineering and Computer Science  

CIS 434: Software Engineering  

Catalog Description:  
CIS 434 Software Engineering (3-0-3)  
Pre-requisite: CIS 433  
Topics in software engineering and performance engineering, including comparison between structured and object-oriented software development, verification and testing, software design for concurrent and real-time systems, and system re-engineering for increased performance.  

Textbook:  

Reference:  

Coordinator:  
Dr. Sanchita Mal-Sarkar  
Associate Professor of Electrical Engineering and Computer Science  
Phone: 216-523-7524  
Email: s.malsarkar@csuohio.edu  
Course URL: http://grail.cba.csuohio.edu/~sanchita/sanchita.html  
Blackboard Learn: https://bblearn.csuohio.edu/MACAuth/login.jsp  

Expected Outcomes:  
Upon successful course completion, a student will be able to:  
• Be familiar with the different stages of the software development life-cycle.  
• Be familiar with the different kinds of documentation generated throughout the development life-cycle  
• Understand the fundamental components of quality software and cost estimation  
• Be able to work successfully in a group with colleagues  
• Be introduced to various new technologies that are being used to produce software in the industry  

Fulfillment of EE, CE and CIS Program Objectives and Outcomes:  
Objectives:  
1. Graduates will apply the concepts of the discipline including analysis, design, and implementation of information and computing systems.  
2. Graduates will be employed in the computing profession, and will be engaged in life-long learning, understanding, and applying new ideas and technologies as the field evolves.  
3. Graduates will be informed and involved members of their communities, and responsible engineering and computing professionals.
Outcomes:
1. An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
3. An ability to function effectively on teams to accomplish a common goal
4. An ability to communicate effectively with a range of audiences
5. An ability to translate fundamental computing concepts to a variety of emerging technologies

Student Characteristics:
(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(d) An ability to function effectively on teams to accomplish a common goal
(f) An ability to communicate effectively with a range of audiences

Prerequisites by Topic:
Basic systems principles and concepts; logical analysis, design, and modeling of software systems.

Topics:
1. Introduction to Software Engineering and course policies, Software Product
2. Software Process, Prescriptive Process
3. Programming and problem solving
4. Software Cost Estimation Requirements
5. Analysis Modeling
6. Classes and Objects
7. Introduction to Software Design, Software Architectural Design
8. Object-Oriented Design, Contract-based Design
9. Design Patterns
10. Aspect-Oriented Programming Verification and Validation
11. Black-Box Testing, White-Box Testing
12. Object-Oriented Testing, Software Model Checking
13. Model Checking with SPIN