

IS 301 – Software Engineering

NORWICH UNIVERSITY -- Fall 2004

M. E. Kabay, PhD, CISSP

Associate Professor of Information Assurance

Program Director, Master of Science in Information Assurance

Department of Computer Information Systems, Division of Business & Management

1 COURSE DESCRIPTION

This course presents a broad perspective on software engineering through the entire system development life cycle with special emphasis on systems requirements analysis and specifications, design, implementation, and testing of information systems. Design considerations include distributed systems, object-oriented design, real-time systems, and user interface optimization. Professional ethics and emergent system properties such as system reliability, security, maintainability and evolution are also discussed throughout the course.

Prerequisites: IS240 or permission of instructor.

2 EDUCATIONAL OBJECTIVES

Students will be able to

- Explain the key points of software engineering to managers and colleagues
- Apply ethical reasoning to software engineering projects
- Describe the fundamental phases and components of software engineering including specification, design, implementation, validation and evolution
- List and explain management responsibilities in software engineering projects
- Identify software requirements using feasibility studies, requirements elicitation and analysis, requirements validation
- Express specifications in natural language and pseudo-code
- Describe, explain and apply several methods of system modeling including context models, behavioral models, data models, object models and CASE workbenches
- Select appropriate rapid applications development methodologies such as RAD and JAD
- Explain the costs and benefits of formal specifications methodologies
- Describe the approaches to system architectural design
- Apply object-oriented design methodologies
- Identify the special requirements of real-time software systems
- Discuss the benefits of object re-use in software engineering
- Design and test user interfaces in accordance with best practices
- Identify the requirements for availability, reliability, safety and security in systems

IS 301 – Software Engineering

- Apply the principles of software quality assurance throughout all phases of analysis and development of software systems
- Apply effective mechanisms for finding faults in software
- Describe various standards and methods for validating critical systems
- Explain the elements of software configuration management.

3 Mechanics

- Classes will meet from 08:00:05 to 08:49:55 every Monday, Wednesday and Friday in Dewey 108. Attendance is compulsory; a record of attendance will be kept. Three unexcused absences will result in expulsion from the course.
- Textbook:
Sommerville, I. (2001). *Software Engineering, 7th Edition*. Pearson Education Limited (Harlow, Essex UK), ISBN 0-321-21026-3. xx + 963. Index.
- Additional readings may be provided on the course Web pages.
- There will be no *grading on a curve*. There are no predetermined numbers of A, B and other grades.
- All exams will be open-book.
 - Open-book exams are more difficult than closed-book exams.
 - Students may bring their textbook and notes to each quiz or exam.
- Students are *encouraged* to collaborate during *preparation* for the exams and for exercises. Students are encouraged to proof-read and edit each other's work to improve the quality of these projects.
- Students *may not* collaborate during quizzes or in the final exam.

IS 301 – Software Engineering

4 Grading

4.1 Problems -- worth 50% of the final grade – throughout course

Students will be assigned problems for return one week after they are assigned. Students should note that any delay in respecting these scheduled problems will result in zero credit for the problems unless the student discusses their situation with the professor *in advance* and a delay is approved. No problems will be accepted more than 1 week late under any circumstances.

Additional optional problems will be available with a two-week period for return to add credits to a student's final grade.

4.2 Five quizzes – worth 25% of final grade

There will be five in-class, open-book quizzes, each with 20 questions and lasting 40 minutes. These quizzes have a passing grade of 80%; any grade less than 80% is recorded as a zero.

The dates and coverage are as follows:

Quiz #	Date	Topics
1	22 Sep	Part 1 – Overview (Chapters 1-5)
2	6 Oct	Part 2 – Requirements (Chapters 6-10)
3	27 Oct	Part 3 – Design (Chapters 11-16)
4	17 Nov	Part 4 – Critical Systems (Chapters 17-21)
5	14 Dec	Part 5 (Verification and Validation) & Part 6 (Managing People) (Chapters 22-29)

4.3 Final exam – worth 25% of final grade

Students will take a two-hour open-book exam covering all the material in the course during the official examination period in December. This exam grade will be recorded without truncation (i.e., grades less than 80% will be recorded).

4.4 Grading schema

F < 60% | 60% = D < 70% | 70% = C < 80% | 80% = B < 90% | A = 90%

IS 301 – Software Engineering

5 About the instructor: M. E. Kabay, PhD, CISSP

mkabay@norwich.edu / Tel. (802) 479-7937

M. Kabay began learning assembler at age 15 and had learned FORTRAN IV G at McGill University by 1966. In 1976, he received his PhD from Dartmouth College in applied statistics and invertebrate zoology. Until 1979, he was a university professor in applied statistics. In 1979, he joined a compiler team for a new 4GL and RDBMS in the U.S., being responsible for developing the statistical syntax, writing the parser, error traps and code generation for statistical functions in the command language. Kabay joined Hewlett-Packard in 1980 and became a performance specialist, winning the Systems Engineer of the Year Award in 1982. After a few years working in a large service bureau as operations manager, he formed his own company in 1986. Kabay has specialized in consulting and training for systems performance, systems operations, and systems security. He has written security columns for *Computer World*, *Network World*, *Computing Canada*, *Secure Computing Magazine*, *NCSA News*, *Information Security Magazine* and several other trade magazines. He attained the status of Certified Systems Security Professional (CISSP) in 1997.

Dr Kabay has published over 850 technical papers in operations management and security. He currently writes two columns a week for *Network World Fusion*; archives are at < <http://www.nwfusion.com/newsletters/sec/> > . He won the Best Paper Award at the 16th National Computer Security Conference in 1993 for his submission, *Social Psychology and INFOSEC: Psycho-social Factors in the Implementation of Information Security Policy*. He completed a college textbook, *The NCSA Guide to Enterprise Security: Protecting Information Assets* (ISBN 0-07-033147-2), published by McGraw-Hill in April 1996. He was the technical editor of *The Computer Security Handbook, 4th Edition* published by Wiley in 2002.

Kabay led the International Delegation of Computer Security Experts to China organized by the Citizen Ambassador Program in April 1994. He was the Program Chair for the First and Second *International Conferences on Information Warfare* in Montreal in 1993 and 1995 and was the organizer of the *ICSA Symposia: Interdisciplinary Perspectives on Information Security* at the National Information Systems Security Conferences. Kabay was invited to lecture yearly on computer security at the U.S. Army War College and to the chiefs of the counter-intelligence services of NATO in Germany in 1995. He was invited to a meeting of the President's Commission on Critical Infrastructure Protection in Washington in 1997 and was invited to address INFOSEC specialists at NATO HQ in Brussels in March 2000. He serves as the program chair for the annual e-ProtectIT Conference at Norwich University.

He attained the status of Certified Systems Security Professional (CISSP) in 1997. Kabay was Director of Education for the National Computer Security Association (later ICISA and then TruSecure) from 1991 to January 2000. He was Security Leader for the INFOSEC Group of AtomicTangerine, Inc. from January 2000 to June 2001 and joined the faculty at Norwich University in July 2001. His special areas of research are INFOSEC policy, education and awareness; INFOWAR; and cyberspace law. In January 2002 he was appointed program director of the new Master of Science in Information Assurance program in the Online Graduate Programs at Norwich. In January 2004 he was also appointed program director of the new Bachelor of Science in Information Assurance at Norwich.