Software Engineering Course Descriptions


CS/SE 2V95 Individual Instruction in Computer Science/Software Engineering  (1-6 semester hours) Individual study under a faculty member’s direction. May be repeated for credit. Consent of instructor required. ([1-6]-0) R

CS/SE 3341 Probability and Statistics in Computer Science  (3 semester hours) Axiomatic probability theory. Calculation of probabilities of compound events, with illustrations from Computer Science examples. Random variables. Synthesis of important random variables from Computer Science-related random experiments—binomial, geometric, multinomial, Poisson, exponential, and related distributions. Expectation. Important functions of random variables and evaluation of distributions of functions. Generation of random numbers of various distributions, starting from the standard uniform random number generators. Sums of independent random variables. Convolution and the use of transforms in simple cases involving exponential and Poisson random variables. Illustrative examples and simulation exercises from queuing, reliability, and program analysis disciplines. Elements of parameter (point) estimation. Prerequisites: MATH 1326 or MATH 2419, and CS 2305 (3-0) S

CS/SE 3345 Algorithm Analysis and Data Structures  (3 semester hours) Metrics for performance evaluation of algorithms. Formal treatment of basic data structures such as arrays, stacks, queues, lists, trees. Various sorting and searching techniques. Fundamental graph algorithms. Prerequisites: CS 2315 and CS 3305. (3-0) S

CS/SE 3354 Software Engineering  (3 semester hours) Introduction to software life cycle models. Software requirements engineering, formal specification and validation. Techniques for software design and testing. Cost estimation models. Issues in software quality assurance and software maintenance. Prerequisites: CS 2315 or CS 3333, and CS 2305 (3-0) S

CS/SE 3390 Technical Writing  (3 semester hours) This course trains students to develop technical communications skills required by computer professionals and computer science researchers. The course satisfies the Advanced Writing component of core curriculum requirements. (3-0) S

CS/SE 3195 Special Topics in Computer Science/Software Engineering  (1 semester hour) May be repeated for credit (4 hours maximum). Must be taken Credit/No Credit. Consent of instructor required. (1-0) R

CS/SE 3V95 Undergraduate Topics in Computer Science/Software Engineering  (2-9 semester hours) Subject matter will vary from semester to semester. May be repeated for credit (9 hours maximum). ([2-9]-0) S

CS/SE 4140 Computer Architecture Laboratory  (1 semester hour) Laboratory for CS 4340. Must be taken concurrently with CS 4340. Must be taken Credit/No Credit. (0-1) S

CS/SE 4340 Computer Architecture  (3 semester hours) Boolean algebra and logic circuits; register transfer operations; design of a small computer; input, output, and interrupt organization; powerful addressing modes, instruction formats, and their hardware structures; microprogram control. Must be taken concurrently with CS 4140. Prerequisites: CS 2305 and CS 2325. (3-0) S

CS/SE 4347 Database Systems  (3 semester hours) This course emphasizes the concepts and structures necessary for the design and implementation of database management systems. Topics include data models, data normalization, data description languages, query facilities, file organization, index organization, file security, data integrity, and reliability. Prerequisite: CS 3345. (3-0) Y

CS/SE 4348 Operating Systems Concepts  (3 semester hours) An introduction to fundamental concepts in operating systems: their design, implementation, and usage. Topics include process management, main memory management, virtual memory, I/O and device drivers, file systems, secondary storage management, and an introduction to critical sections and deadlocks. Prerequisites: CS 3345 (may be taken concurrently), CS 4340, and a working knowledge of C and UNIX. (3-0) S

SE 4351 Requirements Engineering  (3 semester hours) Introduction to system and software requirements engineering. The requirements engineering process, including requirements elicitation, specification, and validation. Essential words and types of requirements. Structural, informational, and behavioral requirements. Non-functional requirements. Scenario analysis. Conventional, object-oriented and goal-oriented methodologies. Prerequisite: SE 2370, CS/Se 3354 or consent of instructor. (3-0) S
SE 4352 Software Architecture and Design (3 semester hours) Introduction to software design with emphasis on architectural design. Models of software architecture. Architecture styles and patterns, including explicit, event-driven, client-server, and middleware architectures. Decomposition and composition of architectural components and interactions. Use of non-functional requirements for tradeoff analysis. Component based software development, deployment and management. Prerequisite: SE 2370, CS/SE 3354 or consent of instructor. (3-0) S

CS/SE 4376 Object-Oriented Programming Systems (3 semester hours) In-depth study of the features/advantages of object-oriented approach to problem solving. Special emphasis on issues of object-oriented analysis, design, implementation, and testing. Review of basic concepts of object-oriented technology (abstraction, inheritance, and polymorphism). Object-oriented programming languages, databases, and productivity tools. Prerequisite: CS 2315 (C/C++) or CS 3333 or CS 3335 or equivalent programming experience, including knowledge of C++. (3-0) S

SE 4385 Software Engineering Project (3 semester hours) This course is intended to complement the theory and to provide an in-depth, hands-on experience in all aspects of software engineering. The students will work in teams on projects of interest to industry and will be involved in analysis of requirements, architecture and design, implementation, testing and validation, project management, software process, software maintenance, and software re-engineering. Prerequisite: SE 4351, SE 4352, SE 4367 (3-0) S (3-0)

CS/SE 4V95 Undergraduate Topics in Computer Science/Software Engineering (1-9 semester hours) Subject matter will vary from semester to semester. May be used as CS Guided Elective on CS degree plans. May be repeated for credit (9 hours maximum). ([1-9]-0) R

CS/SE 4399 Senior Honors in Computer Science/Software Engineering (3 semester hours) For students conducting independent research for honors theses or projects. (3-0) R