Computer Science and Engineering

Undergraduate Program

Bachelor of Science in Computer Science

Minimum credit hours required—130

In addition to the General Education Core Curriculum (page 89), the following courses are required:

- CSE 101 (2), 113 (4), 122 (3), 213 (3), 221 (3), 222 (3), 241 (3), 324 (3), 325 (4), 326 (3), 331 (3), 342 (3), 344 (3), 353 (3), 382 (3), 423 (4);
- MATH 352 (3), 382 (3), 382L (1);
- Technical Electives: A sequence of 12 hours of CSE courses numbered 300 or higher, pre-approved by the student's advisor and the CSE Department, with no more than one course numbered CSE 485. Students are encouraged to select a coherent set of courses as technical electives that will prepare them for a specific focus in their career;
- Each of the above courses must be completed with a grade of *C* or better;
- General Electives to complete 130 credit hours.

Computer Science Courses:

In the following, each prerequisite requires a grade of *C* or better.

Some courses are marked 'cannot be used towards graduation' to emphasise that they cannot be used to fulfill the requirements of the major; they *can* be used as general electives to complete 130 credit hours.

CSE 101, Introduction to Computer Science and Information Technology, 2 cr, 2 cl hrs

Usually offered in ~~the~~ both Fall and Spring semesters.

Brief overview of the discipline of computer science and information technology topics including computer architecture, operating systems and networks, automata and models of computation, programming languages and compilers, algorithms, databases, security and information assurance, artificial intelligence, graphics, and social/ethical issues of computing. (Same as IT 101.)

CSE 113, Introduction to Programming, 4 cr, 3 cl hrs, 3 lab hrs

~~*Prerequisite: MATH 103 or equivalent*~~

Co-requisite: MATH 131

Usually offered in both Fall and Spring semesters.

The course is designed to introduce problem solving and programming in *C* to Computer Science majors and those interested in applications of the language that involve dynamic structures and memory management. Topics include algorithm development; top-down design; modular programming; debugging; testing; control structures including selection, iteration and recursion; number systems; data representation; data types including arrays, strings, pointers and dynamic structures involving memory management. Concepts implemented through extensive programming using good programming style. (Same as IT 113.).

CSE 122, Algorithms and Data Structures, 3 cr, 3 cl hrs

Prerequisite: CSE 113
Corequisite: MATH 132
Usually offered in both Fall and Spring semesters.
Fundamental data structures including linked lists, trees, hash tables, and graphs. Algorithms for sorting, searching, and other fundamental operations. Introduction to mathematical foundations for analysis of iterative and recursive algorithms and for bask correctness proofs. Analysis of algorithms. Implementation of selected algorithms using sound programming methodologies. (Same as IT 122.)

CSE 209, Programming Language Practicum, 1 cr, 3 lab hrs
Prerequisite: Knowledge of elementary programming and CSE 101
A practical course teaching the use of a programming language of current interest. May be repeated for credit with different languages.

CSE 213, Introduction to Object Oriented Programming, 3 cr, 3 cl hrs
Prerequisite: CSE 101, 113, 122
Usually offered in the Spring semester.
Introduction to programming in an object oriented language (e.g., Java): review of problem solving, algorithm development, top-down design, modular programming, debugging, testing, control structures including selection, iteration and recursion, data types including arrays, strings, pointers, and dynamic structures. Object oriented concepts will include: objects, classes, inheritance, instances, methods, interfaces, packages, encapsulation, and polymorphism. Concepts implemented through extensive programming using good programming style. (Same as IT 213.)

CSE 221, Computer System Organization, 3 cr, 3 cl hrs
Prerequisite: CSE 101, 122
Usually offered in the Fall semester.
The hardware/software interface. Basic organization of hardware and operating systems. Memories, buses, interrupts, input and output, and instruction set architecture. Programming in assembly language. (Same as IT 221.)

CSE 222, Systems Programming, 3 cr, 3 cl hrs
Prerequisite: CSE 101, -122
Usually offered in the Spring semester
This course provides an introductory overview of operating systems and system programming, mainly focusing on system-level programming based on OS services and other APIs. Topics include system calls, file I/O, files and directories, memory management, process control, inter-process communication (IPC), socket-based network programming, remote procedure call (RPC) programming, and basic security mechanisms. Course work includes substantial programming homework and team-based projects.

CSE 241, Foundations of Computer Science, 3 cr, 3 cl hrs
Prerequisite: CSE 101, Math 132
Usually offered in the Fall semester
Propositional and predicate logic. Analytic reasoning and mathematical proofs. Abstraction, iteration, recursion, and induction. Fundamental discrete structures. Basic concepts of algorithms, formal languages, and computation.

CSE 485 Undergraduate Seminar on Special Topics. 3cr, 3cl hrs.

Prerequisite: Senior standing, one semester of upper division courses in computer science, and consent of the instructor.
A research seminar for undergraduate students with a focus either on special topics in computer science or on the methodology and skills required for research in computer science. *Use as technical electives is limited (see requirements above), but may be taken multiple times as general elective.*