Size of CIS Minor program: We do not have exact information about the number of students who have completed the CIS Minor program in recent years. However, based information from the CSE Advising Office (tel: 292-1900), approximately 25 students finish the program each year. Of these, approximately two-thirds follow the Information Systems track, the remaining follow the Programming & Algorithms track. These numbers are not expected to change following the proposed changes in the program.

Syllabi of required courses: The syllabi of all the courses that will be required (in both the IS and P&A tracks) once the proposed changes in the minor program are approved appear in the pages that follow.

Descriptions of elective courses: Here are the bulletin descriptions of CSE courses that students in the CIS minor program will be to use as elective courses once the proposed changes are approved.

314 Business Programming with File Processing U 4 Business data processing principles and programming: sequential file processing algorithms, sorting, data validation. COBOL is taught.
Au, Wi Qtrs. 3 cl. Prereq: 214.

360 Introduction to Computer Systems U 4 Introduction to computer architecture at the machine language and assembler language level; assembler language programming and lab.
Su, Au, Wi, Sp Qtrs. 3 cl, 1 3-hr lab. Prereq: 214 or 222/H222.

541 Elementary Numerical Methods U G 3 Survey of basic numerical methods; number systems and errors of finite representation, solution of a single non-linear equation, interpolation, numerical integration, and solution of linear systems.
Su, Au, Wi, Sp Qtrs. 3 cl. Prereq: 221/H221 or 230 or 502; Math 153.

551 Introduction to Information Security U 3 Introduction to security of digital information including: threats, regulations, risk management, attack detection and response, cryptography, forensics, and technical training and certification.
Wi Qtr. 3 cl. Prereq: 314 or 321 or 502 or Acct&MIS 531 or equiv, and second writing course; or permission of instructor.

581 Interactive Computer Graphics U G 4 Introduction to interactive graphics programming, Graphics APIs, display hardware, graphics processing pipeline (geometry processing, rasterization, texture mapping, etc.), geometric modeling, image formats, color theories.
Au, Sp Qtrs. 3 cl. Prereq: 560; Math 254.

616 Object-Oriented Systems Analysis U G 4 Information systems analysis; object-oriented analysis models and tools; use cases, system modeling using UML; requirements specification development; term project.
Su, Au, Wi, Sp Qtrs. 3 cl. Prereq: 670 and Math 366; or grad standing in CS&E. Not open to students with credit for 516 or 694E.

621 Introduction to High-Performance Computing U G 3 High-performance computer architecture, scientific/engineering computation, development of parallel programs, parallelization overheads; performance evaluation.
Au Qtr. 3 cl. Prereq: 541; Math 568 or Math 571 or Math 601. Course is well suited to grad students from science/engineering in addition to CS&E students.

625 Introduction to Automata and Formal Languages U G 3 Machine based and formal grammar based models of computation: finite automata; regular languages, context free languages, pushdown automata, and Turing machines; Church-Turing thesis; introduction to the halting problem.
Au, Wi, Sp Qtrs. 3 cl. H625 (honors) may be available to students enrolled in an honors program or by permission of department or instructor. Prereq: 321 and Math 366. Honors section offered Wi Qtr.

630 Survey of Artificial Intelligence I: Basic Techniques U G 3 A survey of the basic concepts and techniques, problem solving, and knowledge representation, including an introduction to expert systems.
Au, Wi, Sp Qtrs. 3 cl. Prereq: 222/H222 or 230 or 502; Math 366.

670 Introduction to Database Systems I U G 3 Database systems use; query languages-SQL and relational algebra; logical database design; entity-relationship model, database normalization; introduction to transaction processing; database design project.
Au, Wi, Sp Qtrs. 3 cl. Prereq: 314 or 222 or 230 or 502; Math 366.

671 Introduction to Database Systems II U G 3 Object-oriented and extended relational database systems; data warehousing; active databases; GUI interface to a relational database system; introduction to data and file storage.
Au, Wi, Sp Qtrs. 3 cl. Prereq: 670.

675 Introduction to Computer Architecture Computer system components, instruction set design, hardwired control units, arithmetic algorithms/circuits, floating-point operations, introduction to memory and I/O interfaces.
675.01 Introduction to Computer Architecture U G 3 Wi, Sp Qtrs. 3 cl. Prereq: 360 or ECE 265; Math 366; ECE 261. Not open to students with credit for 675 or 675.02. Intended for students with previous knowledge of Digital Logic Design.
675.02 Introduction to Computer Architecture U G 4 Su, Au, Wi, Sp Qtrs. 4 cl. Prereq: 360 or ECE 265; Math 366. Not open to students with credit for 675 or 675.01. Intended for students without previous knowledge of Digital Logic Design.

677 Introduction to Computer Networking U G 3 Data communications, network architectures, communication protocols, data link control, medium access control; introduction to local area networks, metropolitan area networks, and wide area networks; introduction to Internet and TCP/IP.
Au, Wi, Sp Qtrs. 3 cl. Prereq: Physics 112 or 132; 360 or ECE 265; 459.21. Lab assignments are programmed in C.

680 Introduction to Analysis of Algorithms and Data Structures U G 3 Performance analysis considerations in design of algorithms and data structures; asymptotic analysis, recurrence relations, probabilistic analysis, divide and conquer; searching, sorting, and graph processing algorithms.
Au, Wi, Sp Qtrs. 3 cl. H680 (honors) may be available to students enrolled in an honors program or by permission of department or instructor. Prereq: 560 or 668 or ECE 668; Stat 427; Math 566.