

Major Changes to Curriculum (2009 – 2015)

1. A joint BS/MS degree program was approved in Fall 2009. This is a 5-year program and allows a student to get a Bachelor of Science and Master of Science degree in Computer Science.
2. Requests for courses in specific programming languages come from several departments. Since teaching computer programming languages is one of the primary duties of the Computer Science department, a new course, Com S 105, Computer Programming Short Course with multiple sections, each covering a different language was proposed and approved. Currently 105A covers Perl, and 105B covers MATLAB. Other sections covering different languages can be added in the future.
3. Smart home technology plays a critical role in the 21st century because it addresses two important trends: the rapidly ageing demographics in developed countries and the pervasive and mobile computational devices and services. Based on a curricular initiative in an awarded NSF CPATH grant, we developed an interdisciplinary course, Com S 415, Smart Home Technologies for Older Adults, jointly with the Gerontology department and its Gerontology Certificate program. The course is designed to achieve a balanced coverage of software engineering process, service computing, and practical issues faced by the senior population.
4. Interaction with industry: Faculty constantly interact with industry professionals either when they come to recruit students or when they come to give presentations on campus. In recent years the department has proactively visited with companies in close proximity to establish various linkages including more scholarship opportunities, infrastructure enhancement, support for learning communities, and career shadowing for undergraduate students to gain a real-world picture of their future career as IT professionals. Through these industrial exposures both faculty and students have gained knowledge on the need for combining computing fundamentals with practical programming experiences and the need for software engineering skills, which are developed adequately in Computer Science and the Software Engineering program.
5. To keep up with changes in the discipline, courses are continually updated to cover new concepts and to improve students' abilities in programming. These include courses such as Web Services (Com S 430), nanoassembly (Com S 433), and requirements engineering (Com S 409).
6. Technologies used in video games have become ubiquitous with applications ranging from medical imaging to aircraft simulation. To keep our department competitive with computer gaming curriculums we introduced a new course, "Com S 437: Computer Game and Media Programming," an interdisciplinary course with the department of Art and Design, emphasizing digital media and video programming.
7. To emphasize team work in software development, our chaired professor of software engineering, David Weiss, proposed a novel course on Distributed Software Development, Com S 410 (dual listed with Com S 510). This course was proposed and approved and the goal is to team up with students at foreign universities to develop a software application. A truly distributed approach and global also, requiring from students tremendous skills in communication and resolving cultural and language issues.
8. An Undergraduate Information Technology Certificate program has been proposed and is under consideration. The goal is to provide critical training to increase the technical knowledge base, employability, and technical skills of non-computer-science majors at Iowa State, high school students entering ISU, or other adult students interested in studying computing technology.

9. A computer science capstone course, Com S 402, was proposed and introduced. This course is similar to capstone courses in other departments and majors except that the topics are focused on the computer science curriculum. Depending on the topic, each semester-long or year-long course can have a variable number of credits (2 or 3). Keeping the same course number, but using a different section like 402A, 402B, etc., different topics are offered in this course.
10. Since Fall 2010, a new elective course in Computer Graphics, Com S 336 was proposed and taught. Such a course is often a required course in many research and teaching universities. In this course students write significant computer programs demonstrating competence in the fundamentals of computer graphics. Students are also given a solid understanding of low-level concepts used to create high-level computer graphics libraries.
11. We revised our natural science electives to offer some flexibility to students. The intention was that students would take some breadth in their natural science electives.
12. The LAS College has recognized and supported our need to maintain a respectable student/TA ratio. We have been maintaining total TA hours in a consistent manner in recent years.
13. The institution is keenly aware of the critical space needs of the Department of Computer Science and is doing everything within its power to improve it. Several new areas of Atanasoff Hall were converted into Computer Science space. The department acquired new space for its instructional laboratories in Pearson Hall and consequently, many research laboratories are now utilizing space in Atanasoff Hall. Plans to pursue additional space have been discussed with the LAS College.
14. An online course on Web programming, Com S 106X was approved and offered in Spring 2014. Requests for such a course came from several departments in the Colleges of Engineering and LAS.
15. Com S 252 (an elective course on the Linux Operating System) was changed from a 2-2 designation with a two-hour lab to a 3-0 designation. It is now offered online.
16. Com S 101 (a required orientation course with R credit) is now being taught by a faculty member, Professor Leslie Miller, instead of the academic advisor.
17. It was found by the College of Business faculty that many of their students lacked skills in spreadsheets and databases before taking the 200, 300, and 400 level courses in their programs. So we proposed a course, "Com S 113x: An introduction to spreadsheets and databases" that is required by all Business students and provides them with the necessary basic knowledge so the College of Business faculty could teach the more advanced analytical techniques increasingly demanded by industry in their courses.
18. A number of changes were made to the catalog in terms of pre-requisites and minor changes to the catalog descriptions. Care was exercised to see that the catalog description was consistent with the degree audit form.
19. One of the substantive changes in the catalog was renumbering of the existing 229 to 327. The DFW (drop, fail, withdraw) rates for 229 were quite high and the LAS college felt that renumbering it to a 300-level would help students be prepared for the difficulty of the course.

20. Assessment: Tools for assessing program outcomes use a combination of direct and indirect methods, some of which are quantitative and some of which are qualitative. The single-most important process we use to assure that graduates are achieving the program outcomes is the continuous monitoring of student work by the faculty who teach the respective classes. Faculty who carry out the assessment are the ones involved in preparing course objectives and outcomes and teaching the course, so evaluation is a part of their ongoing responsibility. Data from these evaluations of homework, projects, laboratory work, and examinations are used to make improvements wherever necessary.

In addition to this assessment, the **Iowa Legislature passed a bill in 2012 (HF 2284)** that requires the implementation of “a continuous improvement plan in every undergraduate program offered by an institution of higher education governed by the board.” The implementation of this plan was started by the university in Fall 2013. In AY 2014-15 the department’s Assessment team required every course to file an assessment plan and submit their results for evaluation by the Assessment team. Any action, if necessary, will be considered by the Undergraduate Committee for continuous improvement of the curriculum.

21. Student feedback over the years has indicated that many computer science students were not as prepared in Com S 227, and would have liked a course prior to that to better prepare them. The Undergraduate Committee has proposed an experimental course, Com S 127X, to address this need. This course is expected to be taught for the first time in Fall 2015.
22. Based on enrollment data gathered, especially the number of female students, and feedback from our assessment surveys and the External Advisory Board, the Undergraduate Committee has started the development of a curriculum that may be more “track-oriented” to attract more female students to the program. The proposals are in a very preliminary stage so far.
23. With the new thrust in the area of Big Data, we proposed a new 400-level dual-listed elective course, “Com S 435X: Algorithms for Large Data sets: Theory and Practice.” This course was taught first in Spring 2015. We hope that students will gain the ability to apply mathematical ideas and algorithmic principles in modeling computational problems that arise in the context of massive data sets.