Program Educational Objectives

The educational objectives of the computer science program at Iowa State University are that its graduates demonstrate expertise, engagement, and learning within three to five years after graduation.

1. **Expertise:** Graduated students should have the ability to establish peer-recognized expertise in the discipline. They should have the ability to articulate this expertise by formulating and solving problems of interest, by creating or deriving value through the application of technology, and by using mathematical foundations, algorithmic principles, and computer science theory in designing, implementing, and evaluating computer-based systems and processes which meet the desired needs of their employers.

2. **Engagement:** Graduated students should have the ability to be engaged in the profession through the practice of computer science in industry, academia, or the public sector. They should demonstrate effective teaming and commitment to working with others by applying communications skills and professional knowledge.

3. **Learning:** Graduated students should have the ability to engage in sustained learning through graduate work, professional improvement opportunities, and self study so that they can adapt to the role played by information processing in ever-changing areas of science, technology, and society.

Educational Objectives Consistent with Department, College, and University Missions

These educational objectives are consistent with the [department mission](#) (excerpt reproduced below) in that attainment of the objectives prepares students to be proficient and engaged in the discipline.

With the increasing reliance of our society on advanced information technologies in almost every aspect of our lives, there is a critical national need for preparing the scientific and technological workforce of the twenty-first century through education in Computer Science. Such education should equip the students not only with a sound knowledge of the foundations of computer science, but also the problem solving and system design skills necessary for designing and building robust, efficient, reliable, scalable, and flexible software systems. Our undergraduate curriculum seeks to address this need.

These objectives are consistent with the [college mission](#) (excerpt reproduced below) in that attainment of the objectives prepares students to become knowledgeable, contributing citizens in a world of diverse cultures.

Students learn the methods of forming and answering questions without bias; the ways to discover, analyze, and integrate knowledge across disciplines; the value of intellectual integrity and rigor; and, the importance of life-long learning as the basis for excellence in any endeavor.

These objectives are consistent with the [university mission](#) (excerpt reproduced below) in that students will attain the objectives through the creation, sharing, and application of knowledge.
Create, share, and apply knowledge to make Iowa and the world a better place.

In carrying out its mission, Iowa State will increase and support diversity in the university community. Diversity enlivens the exchange of ideas, broadens scholarship, and prepares students for lifelong, productive participation in society.

Create knowledge through world-class scholarship in teaching, research, and creative endeavors.

Share knowledge through outstanding undergraduate, graduate, professional, and outreach programs.

Apply knowledge to improve the quality of life for current and future generations.

How Each Objective is Addressed in the Program

The manner in which each objective is addressed in the program is summarized below.

1. Expertise: Graduated students should have the ability to establish peer-recognized expertise in the discipline. They should have the ability to articulate this expertise by formulating and solving problems of interest, by creating or deriving value through the application of technology, and by using mathematical foundations, algorithmic principles, and computer science theory in designing, implementing, and evaluating computer-based systems and processes which meet the desired needs of their employers.

This objective is addressed by ensuring that every graduated student must satisfy the requirements of 44 semester hours of computer science. This consists of 23 semester hours of a broad-based core of fundamental computer science courses, and 21 semester hours of advanced course work that provides breadth and builds on the core to provide depth in the discipline.

2. Engagement: Graduated students should have the ability to be engaged in the profession through the practice of computer science in industry, academia, or the public sector. They should demonstrate effective teaming and commitment to working with others by applying communication skills and professional knowledge.

This objective is addressed by ensuring that every graduated student has the necessary computer science fundamentals which will enable engagement in the computing discipline. We motivate the desire to engage in the computing discipline by providing opportunities for students to participate in broadening activities. Such activities include field trips, seminars, research projects, study abroad, internships, and cooperative study. Students are required to give oral presentations and produce written reports in the advanced elective courses in the discipline. In addition, our students are required to take a course that stresses the importance of social and ethical issues of computers in society.

3. Learning: Graduated students should have the ability to engage in sustained learning through graduate work, professional improvement opportunities, and self study so that they can adapt to the role played by information processing in ever-changing areas of science, technology, and society.

This objective is addressed through challenging and open-ended assignments given in many courses, particularly the technical electives, which require students to take an active role in
obtaining some knowledge or acquiring some skill that is not explicitly obtained or acquired in class. Many faculty members articulate the need for sustained learning in their classes, encouraging students to attend various departmental opportunities such as technical seminars and colloquia given by faculty or outside speakers from academia and industry. Many students are also engaged in undergraduate research projects supervised by faculty. The benefits of graduate school are communicated early and often, and a concurrent program is available to students whereby undergraduate students with a GPA of 3.0 or higher may take up to 6 credits of graduate course work in their last semester and apply those credits to both their BS and MS degrees.