

## Program Educational Objectives

The program 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.*

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

**1. Expertise:** 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:** 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 work in teams, 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:** 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.

**Relationship between Program Educational Objectives and Student Outcomes**

Student outcomes 1 to 5 are in Criterion 3 of the ABET Criteria for Computing programs and student outcome 6 is from the ABET program specific criteria for computer science programs. These six outcomes are:

1. An ability to analyze a complex computing problem, and to apply principles of computing and other relevant disciplines to identify solutions.
2. An ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.
3. An ability to communicate effectively in a variety of professional contexts.
4. An ability to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. An ability to function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline.
6. An ability to apply computer science theory and software development fundamentals to produce computing-based solutions.

Table 1 contains a mapping between the program educational objectives and the student outcomes.

Program Objectives	Student Outcomes					
	1	2	3	4	5	6
1: Expertise	√	√			√	√
2: Engagement	√	√	√	√	√	√
3: Learning			√	√		

**Table 1: Relationship between Program Educational Objectives and Student Outcomes**