OSU Oregon State University

COLLEGE OF ENGINEERING

Electrical Engineering & Computer Science

Building a Computer Science B.S. Degree Program

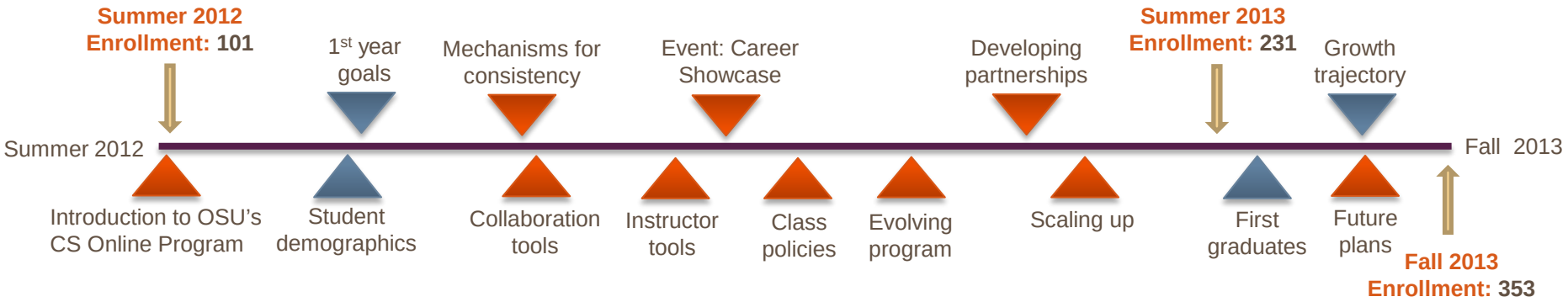
Online for Post-Baccalaureate Students

Launch Process

Launching a Computer Science Online Degree Program

Launch

Mechanics of the program, Characteristics of program: First year

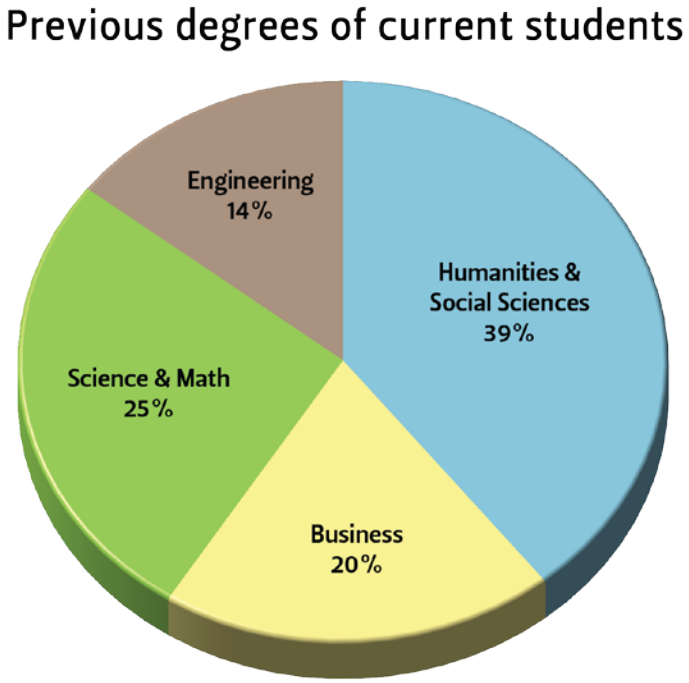


Introduction to OSU's CS B.S. Degree Program

Joseph Jess, computer science instructor, describes the learning materials, interaction tools, evaluation types, and feedback methods used in OSU's Professional Computer Science B.S. Degree Program (see video).

Student Demographics

- Median age of students in program: 29 years
- 20% are women
- Student backgrounds' are as diverse as journalism, psychology, political science, anthropology, chemistry, business, accounting, history, engineering, music, law and philosophy.



First Year Goals

- Institute mechanisms to drive consistency.
- Promote collaboration and a sense of community through better collaboration tools.
- Continue to evolve program to meet student and industry needs.

Mechanisms for Consistency

Goal: **Provide high-quality teaching and practices that are consistent across courses.**

Several standard practices were established and documented for new instructors and TAs. Documents are updated as new techniques evolve.

1. Developed video process standards for lectures to make it easier to replace and update content.
2. Developed an instructor protocol to help new instructors get started and promote consistency in course management, availability to students (consideration of time zones), collaboration and communication and student evaluation.
3. Created a centralized location for storing files to make it easier for instructors to share knowledge and materials.
4. Required an introductory video of instructors and TAs.

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Mechanisms for Consistency

5. Developed a conversation rubric for evaluating online conversation.
6. Established weekly instructor meetings
   - Cross-communication between instructors and advisors on classes and students
   - Sharing of best practices at program at the instructor and TA level
7. Established a lead TA to be a designated resource for all TAs to help them with teaching in the online environment.

Collaboration Tools

Computer science education requires real-time collaboration and interaction with other students and instructors. Collaboration also fosters a sense of community.

To supplement Blackboard, instructors sought out additional communication tools.

- One-to-one real-time communication
  - Google chat: One-to-one communication with a specific person.
  - IRC (Internet Relay Chat): Found to be more useful than Google Chat because each class can set up a shared space for chatting, so students could more easily find someone to help at the time they needed it. There is also a mechanism to store chat sessions.
- Group real-time communication
  - Adobe Connect: Tools, such as screen sharing, are valuable for presenting to a group. Instructors or TAs use this for office hours where students can ask questions and the instructor can write out the solution for everyone logged in to see.
  - Google Hangout: Allows text, voice and video communication for groups of up to 10. Sessions are easily archived on YouTube.
- Topic discussions
  - Piazza: A forum for posting questions and answers that is not in real-time. Students can post deeper questions about broader topics to engage thoughtful discussion.

Instructor Tools

- Developed automated grading tool for database class (CS 275)
  - Assignments are automatically graded when students submit an SQL query against a database, have it evaluated and compare their result to correct result without explicitly giving them the correct SQL query code
- MOSS by Stanford
  - A system for detecting plagiarism in code
- Developed a method for students to give feedback during a video lecture
  - Students could click an “I’m confused” button while watching a lecture. Time stamp data was collected and graphed to identify problem areas in course lectures.

Career Showcase

The career showcase involves activities to help students get a jump start on networking in the computing job market by introducing them to the culture of the computer science field.

- In the morning, students interact during small group sessions and panel discussions with the instructors and staff. The second half of the day is focused on networking and mock interviews with industry representatives.
- The showcases are held twice a year in Portland, Oregon. A wide range of over 20 companies attend the event.
- Scholarships provided to help students to attend.

December 2012 Event: Eric Byers of Tillamook, Ore. stood up at the end of the conference to thank the staff for hosting the conference. “This was just amazing,” he said. Read the full story with videos.

June 2013 Event: Online computer science degree students network with industry recruiters during the Career Showcase. Click to see video.

Class Policies

Working Ahead

The current policy is to provide learning materials typically one week in advance or in some cases, in advance of the weekend prior to that one week. Check with your class instructor for specifics or to cover instances where an exception may be granted.

Code Sharing Policy

Unrestricted code sharing outside of the class to publicly accessible external sites is not useful to yours or future students' learning of this material and in fact, constitutes a violation of Academic Dishonesty as per the Oregon State Student Conduct Code. Additionally, it is never allowed on examinations, assignments or projects unless explicitly allowed by the instructor and in those cases, specificity of what kind and how much code sharing can occur will follow. If you ever have questions about posting code outside of the confines of your class and its associated collaboration tools, email your instructor privately to ask for guidance.

Limited code sharing amongst your classmates is useful and can occur where it serves to spark discussion and foster learning but it is subject to the following constraints:

1. Lesser option - Code sharing is a means of learning from your peers. It is most effective when you've already attempted the problem yourself and examined external resources first.
2. Snippets - Share a minimal, compiling program in which the problem is contained or that clarifies your point - its not OK to share the entire codebase.
3. Explain - In the case where you are the recipient of shared code, you must be able to explain its operation.
4. Reference - When using shared code, you must reference the source.

Even if these constraints are met, if an instructor believes that code has been shared inappropriately, he/she reserves the right to question, edit or remove any code that he/she finds in the class public domain or as part of your submitted assignment, project or examination and take action accordingly. Again, if you have questions about sharing large code segments or sharing beyond your classmates, please contact the instructor first.

Evolving Program

Goal: **The program continues to evolve to meet the needs of students and stay relevant with industry.**

Feedback is solicited from students by the program advisor, and at the Career Showcase in small group sessions with the instructors and staff. The program head and program manager regularly meet with industry to find out what skills future employees will need.

Changes include:

- Two programming courses migrated to C and C++ instead of Java to better match industry needs and provide a foundation for subsequent courses. The change allowed higher level courses time to cover the material in more depth.
- The Software Projects class replaced an advanced database class in Spring 2013 to give students experience working on a large scope software design project with a team. The “capstone” project requires students to integrate knowledge from several classes (database, web development, software engineering).
- The program continues to add supplemental content to layer multiple types of instructional material, including taped help sessions, tutorials, additional content and lectures.
- A peer mentoring program to improve student retention and foster leadership roles. The peer mentors will act as community facilitators to help foster good communication.

Developing Partnerships

Goal: **Connect with outside agencies and companies to help realign workers with careers in computing, and support the economy of Oregon and the nation.**

WorkSystems Partnership:

- WorkSystems in a non-profit agency that supports economic growth in the City of Portland, and Multnomah and Washington counties of Oregon.
- WorkSystems hosts recruiting events for the OSU's CS B.S. Degree Program, and provides scholarships for students who would otherwise not be able to pay the tuition.
- This partnership extends our outreach, especially into communities affected by layoffs and business closures.

Company Partnerships:

- Exploring programs with companies to provide new opportunities for their employees.
- Ongoing conversations with industry to keep them involved and interested in the program.

Scaling Up

Goal: **Keeping pace with the growing enrollment to maintain a high quality education for the students.**

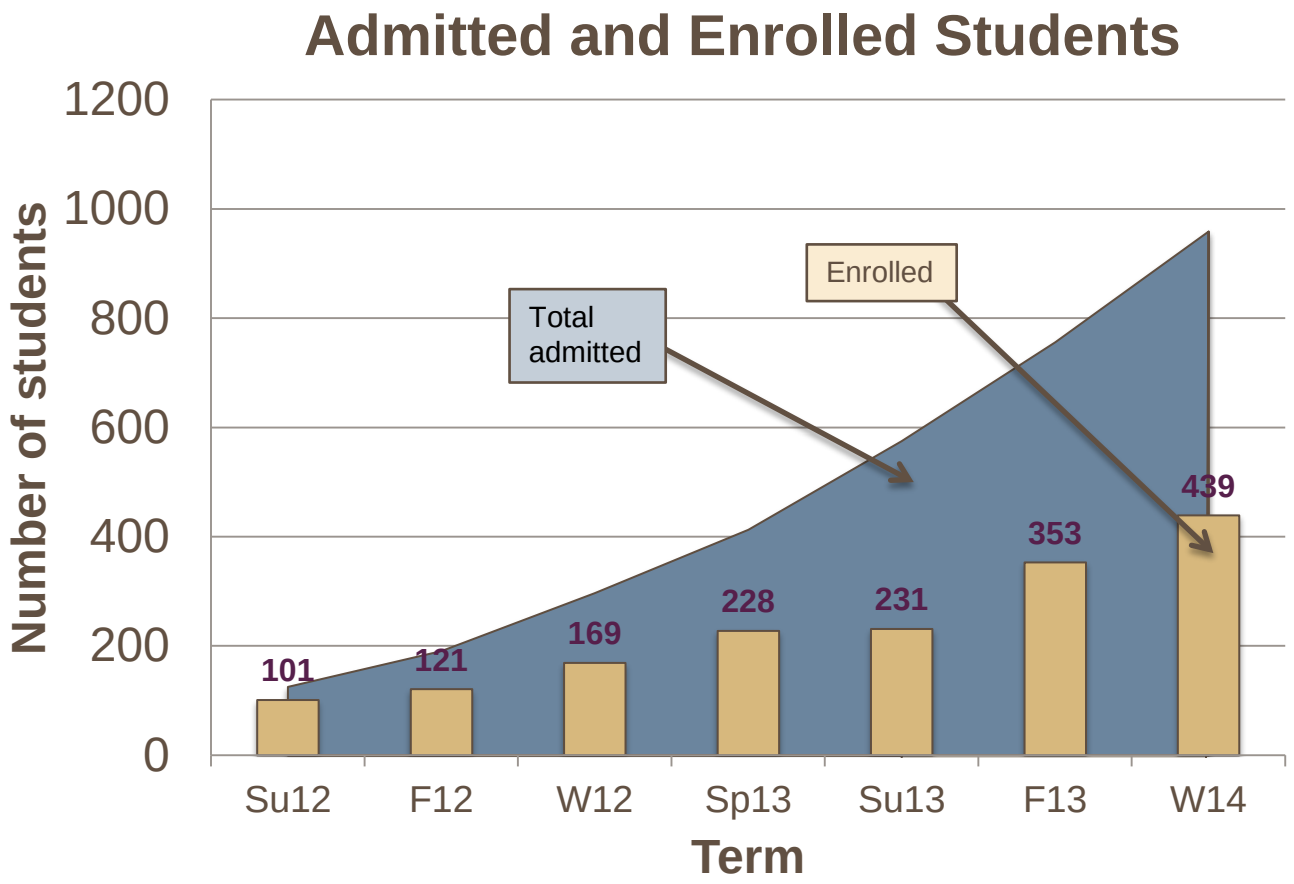
- Additional computer servers needed to support supplemental course materials documents, project storage and video backup files.
- Increased staffing
  - Additional instructor to keep up with increasing enrollment.
  - Two additional advisors to help support the admissions process to achieve the target of a one month turn around for applications.
    - Post-baccalaureate students are considered lowest priority for University Admissions, so it was critical to add more staff to ensure that student applications were handled in a timely manner.
  - Program manager and communications coordinator added to resource base to help market the program.

First Graduates

- There were 23 graduates in June 2013, and 34 by Fall of 2013.
- Recent graduates have found new opportunities through jobs, internships, promotions and graduate school. Graduates are employed as software engineers, software developers, systems engineers, and product specialists at companies like Boeing, Disney, Garmin, and Hewlett Packard.

The program was a life-changing experience for Matt Staten, one of the program's first graduates. Matt started a job with Huron Consulting Group in Lake Oswego, Ore. immediately after graduation. Staten's first degree was in anthropology, which is currently a challenging job market. Click to view video.

Growth Trajectory



Future Plans

Goal: **Expand the reach of the program, and continue to improve the quality of the program.**

Expand Reach

- Build a degree program for community college graduates.
- Target marketing to strategic locations (airport, appropriate technical conferences, specific companies).

Program Improvement

- Develop a tool to allow future students to evaluate whether they would be suited to a career in programming.
- Align with Quality Matters guidelines for online education
- Develop a mechanism to bring a typical CS mock interview with whiteboard experience to Ecampus CS students.