COMPUTER SCIENCE ASSESSMENT

NOTE: Computer science programs usually identify their mission and goals in the framework established by the professional organizations ACM (Association for Computing Machinery) and ABET/CSAB (Accreditation Board for Engineering and Technology/Computer Science Accreditation Board), regardless whether or not the program is formally accredited. In this framework, programs identify "Stakeholders" and "Program Educational Objectives."

I. STAKEHOLDERS FOR OUR PROGRAM. We identify four sets of stakeholders:

1. Students
2. Faculty
3. Alumni
4. Local Industry and Community Employers

II. PROGRAM EDUCATIONAL OBJECTIVES. Program Educational Objectives are (very) broad, long-term, and likely to be attained 2-5 years after graduation. They must be aligned with the Institution's Mission Statement (see below). They are based upon the needs of the program's constituencies and stakeholders. Our Program Educational Objectives are to:

1. produce graduates who are scholastically competitive when compared to graduates holding a B.S. in Computer Science from larger, more well-known universities, and who will engage in the productive practice of computer science to identify and solve significant problems across a broad range of application areas.

2. produce graduates who apply their computer science knowledge and skills for the overall benefit of a diverse society.

3. produce graduates who will enhance the economic well-being of both Kern County and the State of California through a combination of technical expertise, leadership, and entrepreneurship.

4. produce graduates who can work and communicate effectively, either independently or in a diverse team, to solve problems using computers and computer science principles.

5. produce graduates who can enhance their intellectual development and technical skills through life long learning.

Our Program Educational Objectives are clearly fully aligned with the CSUB Mission Statement:

CSUB Mission Statement: "California State University, Bakersfield, is a comprehensive public university committed to offering excellent undergraduate and graduate programs that advance the intellectual and personal development of its students.

An emphasis on student learning is enhanced by a commitment to scholarship, diversity, service, global awareness, and life-long learning. The University collaborates with partners in the community to increase the region's overall educational level, enhance its quality of life, and support its economic development."

III. PROGRAM OUTCOMES AND STUDENT LEARNING OBJECTIVES (SLO's). Program Outcomes are skills and abilities which students should meet upon

graduation. These are more specific, and content dependent. The Program Outcomes should be compatible with and support the long-term Program Educational Objectives. It is clear that ours do this.

Programs are strongly urged to incorporate the ABET/CAC "Criterion 3" Engineering and Computer Science Program Outcomes. These Outcomes, with our local customizations and additions, are:

(3a.) An ability to apply knowledge of computing and mathematics appropriate to the discipline. An ability to understand how computer science relates to mathematics and the physical sciences.

(3b.) An ability to analyze a problem, and identify and define the computing requirements and specifications appropriate to its solution.

(3c.) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs. An ability to understand the analysis, design, and implementation of a computerized solution to a real-life problem.

(3d.) An ability to function effectively on teams to accomplish a common goal. An ability to make an oral presentation which utilizes professional quality presentation aids.

(3e.) An understanding of professional, ethical, legal, security, and social issues and responsibilities. An ability to understand and appreciate the ethical and societal issues related to computers and computer networks.

(3f.) An ability to communicate effectively with a range of audiences. An ability to write a technical document such as a software specification white paper or a user manual.

(3g.) An ability to analyze the local and global impact of computing on individuals, organizations and society.

(3h.) Recognition of the need for, and an ability to engage in, continuing professional development. An ability to do additional reading and research in order to become proficient in a specialty area of computer science.

(3i.) An ability to use current techniques, skills, and tools necessary for computing practices, while, at the same time, understanding the principles of operation.

(3j.) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

(3k.) An ability to apply design and development principles in the construction of software systems of varying complexity. The software life cycle.

The Computer Science department at CSUB adds:

(3l.) An ability to display an understanding and range of experience from hardware and system level programming to application software involving multiple components and distributed systems.

(3m.) An ability to work on different platforms, from personal computers to workstations and servers, and understand how a particular computer platform exemplifies specific design principles and optimizations.

Each Program Outcome must have a mechanism(s) used to measure it. Each core course must address/enable a subset of the Program Outcomes. This is normally done by establishing a Course Matrix.

IV. COURSE MATRIX FOR COMPUTER SCIENCE AT CSUB. In the matrix below Program Outcomes (listed above) are mapped to our ten required core courses with Senior Seminar (CMPS 490) added. A weighting factor (0-5) has been added for each entry of the matrix. A weighting factor of 0 indicates that the particular course does not address the outcome

at all. A weighting factor of 5 indicates that the particular course is very heavily devoted to addressing the outcome.

Outcome	CMPS 295	312	320	321	335	342	350	356	360	376	490
3a. math, physical sciences	5	5	5	5	0	0	2	5	3	5	0
3b. problem analysis	3	5	0	0	5	3	0	3	0	0	5
3c. real-life application	0	0	0	0	5	5	0	2	0	0	5
3d. teamwork, presentation	0	0	0	0	5	0	0	0	0	0	3
3e. prof., ethical, security	0	0	0	0	4	2	2	0	0	5	0
3f. communication, doc’s	0	0	0	0	3	5	0	0	0	0	4
3g. computing & society	0	0	0	0	4	0	0	0	0	0	0
3h. professional development	0	0	0	0	2	0	0	2	0	0	4
3i. current technologies	0	0	3	3	3	0	5	3	0	0	0
3j. design tradeoffs	0	4	3	5	0	2	0	5	3	0	0
3k. software sys./life cycle	0	0	0	0	5	0	0	0	0	0	5
3l. hardware/system software	0	0	3	3	0	0	0	0	5	3	0
3m. cross platform	0	0	0	3	2	0	2	0	5	3	0
Core Areas on Major Field Exam											
Prog. Fundamentals	0	3	0	0	0	0	3	0	0	0	0
Disc. Struct & Algorithms	5	5	0	0	0	0	0	0	0	0	0
Sys: Arch/OS/Netw/Dbase	0	0	3	5	0	5	0	0	5	5	0

Program Outcomes may also be measured by students taking nationally normed exams, such as the Major Field Exam. Our graduating seniors have been taking this test for some time now. We also regularly poll our graduates concerning the effectiveness of our program and how well we have achieved our Program Educational Objectives.