Computer Science and Engineering
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Systematic Program Assessment and Revision (SPAR)

Revised: May 24, 1999

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1 Introduction

1.1 Purposes

Systematic Program Assessment and Revision (SPAR) refers to a formal, continuous, documented, and sustainable process for:

- **Defining** the constituencies, objectives and outcomes of our Computer Engineering Baccalaureate Degree program,
- **Assessing** various indicators of the quality of the program offered, relative to the needs of our constituencies,
- **Evaluating** the results produced by the assessment process (i.e. assigning semantic *values* to those results) in order to identify strengths, as well as problem areas in need of improvement,
- **Feeding back** the results of evaluation to the appropriate personnel so that appropriate program revisions may be identified and implemented,
- **Reviewing** the effectiveness of the SPAR process itself, to ensure that it is serving its purposes.

This Standard Operating Procedure (SOP) establishes the policies, procedures and instruments to be used for the SPAR process. Specifically, it:

1. Identifies the *constituencies* served by this department, and representative groups for each;
2. Defines the broad high-level *Program Objectives*,
3. Defines more specific, measurable *Program Outcomes*,
4. Identifies the relationships between the Program Objectives, Program Outcomes, curriculum, and ABET criteria,
5. Defines the structure and implementation of the SPAR process including responsibilities, assessment instruments, reports, and schedules.

1.2 Responsibilities

1. Primary authority for oversight and approval of this SOP is vested in the faculty of the CSE Department.
2. The CSE Department Chair has primary responsibility for execution of this SOP.
3. The *Computer Engineering Joint Curriculum Committee* (CEJCC) has primary responsibility for maintenance of this SOP and for the bulk of the actions it requires.
4. Other individuals and committees are assigned specific responsibilities as specified in Table 2.

2 Constituencies

This section defines the constituencies served by this department's baccalaureate degree program in Computer Engineering, and establishes representative bodies to represent the needs, desires, and opinions of each constituency. This program serves three main constituencies: students, industry/government, and academia.

2.1 Students

Our primary constituents are the students themselves, including current students, prospective students, and their families. As a state-funded institution, we have a special duty to residents of Nebraska. It is our duty to ensure that our graduates are nationally competitive for rewarding and productive careers in the Computer Engineering profession and are prepared to be responsible educated citizens of society.

There are several avenues by which students can voice their opinions, including: a non-voting student representative to department faculty meetings and the CSE Department Curriculum Committee, course-by-course student evaluations, exit surveys, and an annual survey of recent graduates conducted by College of Engineering and Technology (CoET).

The *Undergraduate Advisory Panel* (UAP) is the primary representative body for undergraduate input into the SPAR process. This panel normally meets at least once per academic year. The UAP comprises up-to 10 undergraduate students appointed by the CSE Department Chair for terms of one academic year. In forming the UAP the CSE Chair shall:

1. Confer with the heads of the department's professional organization student chapters (e.g. ACM, IEEE, SWE, AWC),

2. Attempt to balance the panel with respect to major (CompSci, CompEng), class (Soph, Jr, Sr), gender, ethnicity, and other factors considered relevant, with the understanding that the motivation and dedication of the individual members are critical factors for appointment,

3. Normally include the undergraduate representatives to faculty committees.

If a panel member demonstrates chronic lack of involvement or participation, the Department Chair may remove or replace that member at any time.

2.2 Industry/Government

As the primary employers of our graduates, commercial, industrial and governmental entities have a major stake in the quality and content of our program. It is our duty to serve this constituency at both the national level and the local level; this duality imposes a wide range of dynamic needs on our program. Thus, considerable breadth and flexibility must be built into the curriculum.

The CSE Department's Industrial Advisory Panel (IAP) is the primary representative body for this constituency. This panel plays an important role in representing external constituents (including commercial, governmental, and other organizations) in the Department's assessment and planning.

Membership in the IAP is by invitation only. The CSE Department Chair consults with the faculty to develop a list of invited participants. The IAP includes members from both large and small

organizations, and members from both inside and outside Nebraska. Given the multiple missions of the Department, the IAP includes members engaged in science, in engineering, and in business.

The IAP meets annually during the fall semester, with several goals: to help assess the Department's teaching, research, and service programs; to serve as a sounding board in the Department's planning process; and to provide a front-line perspective on industrial applications of computer science and engineering. At each meeting, IAP members are briefed on the state of the CSE Department, tour the Department facilities, receive special briefings related to the meeting foci, engage in discussions, offer advice, describe their own work and organization, and have informal interactions with faculty and students.

2.3 Academia

The baccalaureate degree is the foundation upon which post-graduate education is built. The department is therefore mindful of its duty to provide graduates with the background, skills and perspective needed to pursue a career in research and education.

The primary representative body for academia is the CSE Department Graduate Committee. Their role is to represent the needs and wants of graduate programs regarding the knowledge base and abilities of our graduates.

3 SPAR Process Overview

The SPAR process employs a diverse set of formal and informal assessment instruments to evaluate and revise the program in order to better meet the needs of our constituencies. The goal is to establish a continuous process that is as responsive as practicable to the needs of our constituencies without creating an unsustainable workload or causing "thrashing" in the curriculum.

3.1 Definitions

The SPAR process defines a hierarchical relationship between *Program Objectives*, *Program Outcomes*, and *Curriculum*, as follows:

- **Program Objectives** are broad, general statements of the program's response to constituent needs, expressed in layman-friendly terms. They represent the ultimate high-level skills and knowledge base desired of our graduates. As such, they are inherently difficult to assess directly. However, they are amenable to *indirect* measurement by mapping them into a set of more specific Program Outcomes.

- **Program Outcomes** are detailed, measurable statements derived from the objectives, which provide the means of measuring the degree of objectives achievement.

- **Curriculum**, combined with extracurricular activities, constitutes the formal academic means for accomplishing the outcomes.

3.2 Structure

The SPAR process consists of two separate and concurrent SPAR cycles (loops), as defined by the Accreditation Board for Engineering and Technology (ABET), in the Engineering Criteria 2000 (EC2000) accreditation documents [1,2]. As implemented in this program, the two loops illustrated in Figure 1 have the following properties:

- **The left-hand loop** (or slow loop) represents a *three-year cycle* focusing on assessment and revision of the high-level *Program Objectives*. The goal of this loop is to determine whether the Program Objectives are relevant, appropriate, and serve the needs of our constituencies. This assessment loop does *not* attempt to determine how well the current Program Objectives are being satisfied. The details of this cycle are presented in Section 6 of this SOP.

- **The right-hand loop** (or fast loop) represents an *annual cycle* of activities focusing on assessment and revision of the *Program Outcomes* and *Curriculum* to improve the manner in which the program achieves the Program Objectives defined in the slow loop. The details of this cycle are presented in Section 5 of this SOP.

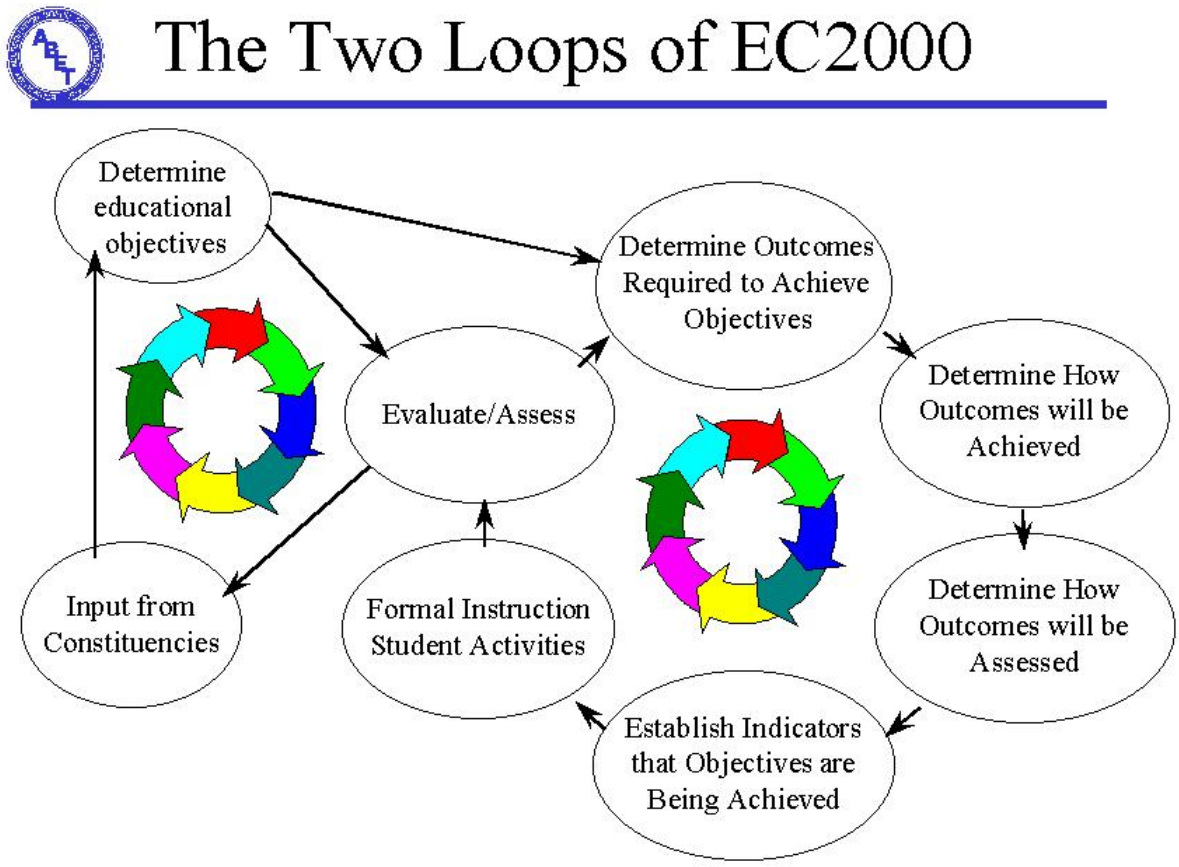

Figure 1: Two loop ABET assessment process [1]

3.3 Statement of Program Objectives

In recent years, an increasing number of systems, products, and processes have become dependent on computers for design, control, data acquisition and a variety of other functions. The computer engineer is the one person with the range of expertise to view a computer-based system as a complete, integrated system and to make the necessary global design decisions. To prepare our graduates to take their place in this environment, we have established the following educational objectives.

1. A computer engineer must be able to span the traditional boundary between Computer Science and Electrical Engineering, and to view a system as an integrated continuum of technologies and methodologies. Thus, *the primary focus and emphasis of this program* is on those topics particularly critical to integrated system-level design and hardware/software tradeoffs.

   Therefore, graduates shall demonstrate mastery in the areas of *mathematics, logic design, computer organization and architecture, operating system kernels, system level programming,* and *system level design*.

2. A computer engineer must be familiar with a wide range of computer-related topics, allowing the computer engineer to collaborate effectively with related professionals working over the entire spectrum of system design.

   Therefore, graduates shall have a broad foundation in *computer science, computer programming, the physical sciences, engineering principles,* and *digital electronics*.

3. A new computer engineer must be able to enter commercial engineering practice and quickly become a productive member of his/her employer's engineering team. Thus, s/he must be able to assimilate an employer's corporate culture and quickly adapt to in-house technologies and methods.

   Therefore, graduates shall achieve *technological breadth,* and shall be adept in the areas of *communication, teamwork,* and *problem solving skills*.

4. A graduate must have the background and perspective necessary to pursue post-graduate education.

   Therefore, graduates shall possess a *depth of knowledge* in some focus area and the *critical thinking skills* necessary to pursue advanced research, and must recognize the need for continuing educational and professional development whether or not advanced degrees are being sought.

5. A computer engineer's work can have significant social, political, and environmental impacts well beyond any immediate technological objectives.

   Therefore, graduates shall have the broad educational background in *professional ethics,* the *humanities,* and the *social sciences,* to allow them to function as responsible and ethical members of the profession and society.

3.4 Statement of Program Outcomes

Program Outcomes represent specific academic achievements that serve to implement the Program Objectives, act as a link between Program Objectives and the curriculum, and provide a means for assessing accomplishment of the Program Objectives and ABET criteria.

1. **Graduates will demonstrate** mastery of the mathematical foundations and familiarity with the scientific foundations of Computer Engineering. These include:

    a) Mastery of discrete mathematics, differential and integral calculus, differential equations, probability and statistics, linear algebra, and numerical analysis;

    b) Familiarity with the fundamentals of inorganic chemistry, along with classical and modern physics, including electricity, magnetism, electromagnetic theory, optics, and solid-state semiconductor physics;

    c) Familiarity with electrical circuits, electronic circuits, and solid-state electronic devices.

2. **Graduates will possess** depth of knowledge in topics critical to system-level design, including both hardware and software design and hardware/software tradeoffs. These include:

    a) Mastery of digital logic design, including logic families and contemporary digital technology;

    b) Mastery of computer programming, including data structures, algorithms, and proficiency with representative programming languages;

    c) Mastery of the topics necessary to design combined hardware/software systems, including computer organization and architecture, systems level programming, operating system kernels, and the interdependencies between these topics.

3. **Graduates will be able to** identify, formulate, and solve computer engineering problems, and shall demonstrate:

    a) the capacity to apply theoretical knowledge in solving advanced, practical problems;

    b) the ability to design and conduct experiments and to analyze and interpret data;

    c) proficiency with current tools and techniques for both hardware and software design;

    d) the ability to design, implement, and document integrated hardware/software solutions to realistic computer engineering problems.

4. **Graduates will possess** a depth of knowledge in one selected area of more advanced computer engineering topics, such as: system level architectures, software systems, hardware design implementation, communications and distributed systems, or computer engineering applications.

5. **Graduates will demonstrate** proficiency at communicating their technical knowledge and accomplishments in both written and oral forms and in styles consistent with industry norms.

6. **Graduates will demonstrate** an understanding of contemporary social, political, cultural, organizational and ethical issues and the demands they place upon a computer engineer over his/her professional lifetime. These include:

   a) a broad education in the humanities and social sciences, in order to understand the impacts of his/her professional activities in the broader societal context;

   b) an understanding of the range of ethical, legal, environmental, and safety issues relevant to computer engineering;

   c) the ability to work with others, including interdisciplinary teams;

   d) an understanding of the importance of and opportunities to engage in life-long learning.

3.5 Relationships Between Components

This subsection defines the relationships between our specific Program Objectives, Program Outcomes, Curriculum (including individual courses), and relevant ABET criteria.

The Program Outcomes are the pivotal elements in the SPAR process. Each outcome is a measurable phenomenon that maps to one or more Program Objectives, as well as to ABET EC2000 Criteria 3, 4, or 8 [2]. Similarly, the curriculum is mapped directly to outcomes. Thus, Program Outcomes are the link between the curriculum and the Program Objectives. Table 1 summarizes these relationships.

Table 1: Relationships between Outcomes, Objectives, ABET Criteria, and Curriculum

Out-come	Prog. Object	ABET Criteria	Courses and Activities Contributing to the Outcome **Double-underlined** font indicates new required courses pending final approval. **~~Strikethrough~~** font indicates current required courses to be removed or replaced.
1.a	1	4(a), 8	**MATH** 106, 107, 208, 221, 314, 380; **CSCE** 235
1.b	2	4(a)	**CHEM** 111; **PHYS** 211, 212/222, 213/223
1.c	2	4(b)	**PHYS** 212/222; **ELEC** ~~213~~, 215/233, ~~214~~, 216/234, ~~260~~, 316, 362/363
2.a	1	4(b), 8	**CSCE** 230/230L, **ELEC** 362/363, 370
2.b	1, 2	4(b), 8	**CSCE** 155, 156, 230/230L, ~~231~~, 310, 322, 351, ~~451~~
2.c	1	4(b), 8	**CSCE** 230/230L, 322, 351, 430, **ELEC** 476/492
3.a	3, 4	3(a, e)	**CSCE** 494, 495
3.b	3, 4	3(b, e)	**CSCE** 310, 494; **ELEC** 492
3.c	3	3(e, k)	**CSCE** 230L, 494, 495; **ELEC** 363, 492
3.d	1, 3	3(c, e), 4(b)	**CSCE** 494, 495
4.	4	3(j)	Technical Elective Tracks (12 hrs)
5.	3	3(g)	**ALEC** 200; **CSCE** 494, 495
6.a	5	3(h, j), 4(c)	Humanities and Social Sciences Requirements (18 hrs)
6.b	5	3(f)	**ENGR** 400; **CSCE** 494
6.c	3	3(d)	**CSCE** 494, 495
6.d	4	3(i)	**CSCE** 494, ACM/IEEE membership, Course Prerequisite Tests.

3.6 Implementation and Schedule

Several distinct and diverse assessment instruments are used to assess and evaluate Program Objectives, Program Outcomes, the curriculum, and the SPAR process itself. There are three classes of reports to be filed:

1. Several reports to the CEJCC reporting the results of individual assessment instruments. These reports are described individually in Section 4.

2. An annual *Outcomes Level SPAR Report* is due in the spring semester of every year. This report, defined in Section 5, addresses:

    a. How well the program meets the current Program Outcomes,

    b. How well the Program Outcomes meet the Program Objectives,

    c. How well the annual Outcomes level SPAR process functions.

3. A triennial *Objectives Level SPAR Report* is due during the fall semester of every third year. This report, defined in Section 6, addresses:

    a. How well the Program Objectives serve the needs of our constituencies,

    b. How well the triennial Objectives level SPAR process functions.

Table 2 contains a listing of all reports, along with the responsible parties and deadlines. This table also indicates whether a particular report is relevant to Objectives level or Outcomes level SPAR process.

Notes:

1. All reports are due at the *end* of the week specified in Table 2.

2. Any reports generated during summer sessions are grouped together with those of the following fall semester, and have the same deadlines as the equivalent fall semester report (unless otherwise specified).

3. All reports with deadlines listed as "3rd fall" are due every third year, synchronized with the Objectives level SPAR cycle.

4. The Objectives Level SPAR cycle shall be synchronized so as to occur in the fall of the academic year following each ABET program review (generally on a 6-year cycle). This schedule allows time for the ABET accreditation report from the previous fall to be available.

5. The SPAR program was formally adopted by the CSE Department faculty in the spring 1999 semester. Therefore, partial implementation shall begin in the spring of 1999 (to the extent practicable following adoption). Full implementation shall begin in the 1999-2000 academic year.

Table 2 : Assessment Report Responsibilities and Deadlines

Report Title	Relevant Sections	Outcomes	Objectives	Originator	Destination	Deadline: (Term / week)
Undergraduate Advising Report	4.1	**X**		UAC	CEJCC	Spring / Wk 8
Prerequisite Test Report:	4.2	**X**				
• Individual Test Report Forms				Instructors	Chair, CEJCC	Each / Wk 4
• Summary Report				Chair, CEJCC	CEJCC	Each / Wk 8
Capstone Design Course Critique	4.3	**X**		CSCE-494 Instr.	CEJCC	Each / Wk 8
CSE Exit Survey Summary	4.4	**X**		Chair CEJCC	CEJCC	Spring / Wk 8
CoET Alumni Survey Summary	4.5	**X**		Chair CEJCC	CEJCC	Spring / Wk 8
UAP Outcomes Assessment	4.6	**X**		UAP	CEJCC	Spring / Wk 8
UAP Objectives Assessment	4.7		**X**	UAP	CEJCC	3rd Fall / Wk 8
IAP Objectives Assessment	4.8		**X**	Chair, CSE	CEJCC	3rd Fall / Wk 8
Grad Com. Objectives Assessment	4.9		**X**	Grad Comm.	CEJCC	3rd Fall / Wk 8
ABET Review Team Report	N/A	**X**	**X**	ABET	CEJCC	6th Fall / Wk. 8
Outcomes Level SPAR Report	5	**X**				
• Preliminary				CEJCC	CSE Faculty	Spring / Wk 12
• Final				CSE Faculty	Chair CSE, CEJCC, UAP	Spring / Wk 16
Objectives Level SPAR Report	6		**X**			
• Preliminary				CEJCC	CSE Faculty	3rd Fall / Wk 12
• Final				CSE Faculty	Chair CSE, CEJCC, UAP, IAP	3rd Fall / Wk 16

4 Individual Assessment Reports

This section provides detailed descriptions of the *Individual Assessment Reports* used in the SPAR process.

4.1 Undergraduate Advising Report

4.1.1 Purpose

The objective of the Undergraduate Advising Report is to identify systemic problems with the program that may be most evident from the perspective of the Undergraduate Advising Committee (UAC) and the department Chief Advisor.

4.1.2 Implementation

The Undergraduate Advising Committee shall prepare the Undergraduate Advising Report as specified in the CSE Department's *Admission, Monitoring and Advising* SOP.

4.2 Course Prerequisite Tests

4.2.1 Purpose

Course Prerequisite Tests (CPT's) are given at the beginning of selected CSCE courses. Each CPT covers prerequisite material for the course in which it is given. CPT's are intended to do the following:

- Assess how well prerequisite courses are delivering prerequisite knowledge,
- Identify weaknesses and omissions in the sequence of topics across the entire curriculum,
- Help the instructor identify those students who have not taken the prerequisite courses, and those transfer students whose "equivalent" prerequisite courses may have been inadequate,
- Demonstrate to students the need to independently review previous material and refresh their knowledge on a regular basis,
- Allow instructors to raise course standards by minimizing the amount of time spent on review.

4.2.2 Implementation

CPT's shall be given as early as practicable in each term. Each CPT *must be graded* and the CPT grade *must count* as part of the course grade (so students take it seriously).

4.2.2.1 Applicable Courses

CPT's are required in each term for all CSE department courses that have at least one formal prerequisite course and also meet *either* of the following criteria:

1. The course is a required course for the Computer Engineering Baccalaureate Degree,
2. The course is a 400-level course.

In addition, a CPT may be given in any other course at the discretion of the instructor.

4.2.2.2 CPT Format and Content

The form, format, and style of each CPT are left to the discretion of each instructor. For example, it may be an in-class or take-home exam, open book or closed book, a homework assignment, a quiz, a lab practical exam, or any other form that can be graded. The content of each CPT is left entirely to the discretion of each instructor. However,

- **If applicable and practicable**, instructors are encouraged to specifically partition the CPT to cover the general topics listed in the table on the attached *CPT Report Form*.
- **If written reports are required** during the course, then the CPT should include a writing assignment in a style expected in the course.

4.2.2.3 CPT Administration

Instructors shall take steps to ensure that the CPT is appropriate to the course, and to minimize the potential that the students will be penalized for inadequate or incomplete coverage of material in a prerequisite course. In particular instructors shall:

1. Provide a study guide describing the major topics to be covered on the CPT,

2. Adhere to the "Prerequisites by Topic" section of the Course Specification,

3. Consider grading options that allow the student to compensate for possible inadequate or incomplete coverage of material in a prerequisite course. For example, consider giving a Pass/Fail CPT and/or allowing at least one opportunity to "retest" (not necessarily with an identical exam).

4.2.2.4 CPT Reporting

1. **Instructors** shall use the *CPT Report Form* on the following page to report the results of each CPT. If students are allowed to attempt the CPT more than once, then *report only the first attempt* scores.

   It is not expected that all instructors will cover all topics listed on the form. Topics not tested may be left blank on the form. If so desired, the instructor may just report the entire CPT under "General Technical Prerequisites" and leave the other fields blank. On the other hand, instructors may, at their own discretion, define topic areas of their own for separate assessment and list the results under "Other" on the CPT Report Form.

   The "Instructor's Comments" field of the CPT Report Form is *very* important. Instructors' written comments can be much more informative than mere numbers in a table. Instructors may use this section to identify specific strengths or weaknesses that they have uncovered and to make any recommendations that they want the CEJCC to consider.

2. **Department staff** shall collect the forms and forward them to the chair of the CEJCC, as soon as practicable after they are collected,

3. **The Chair of the CEJCC** shall summarize CPT statistical results and report them to the entire CEJCC in writing.

Course Prerequisite Test (CPT) Report Form

Department of Computer Science and Engineering

Due: end of 4th week of classes

Crs. Num: _____ Term: _____ Instructor: _____

Numerical Scores: Please report all mean scores as the *percent of the maximum* attainable on a particular topic. Leave blank all topics not covered or not separately graded. Lump all topics not separately reported under "General Technical Prerequisites".

SPECIFIC TOPICS TESTED	MEAN SCORE (%) (1st Attempt Only)
General Technical Prerequisites	
Mathematics Prerequisites	
General Problem Solving Skills (with minimal math or technical prerequisites)	
Written Expression (grammar, spelling, clarity of explanation, etc)	
Other (specify)	
Other (specify)	

CPT Administration: Describe how your test was organized and administered (e.g. Take-home vs. in-class, number of retries allowed, etc) and comment on how well you think your approach worked.

Instructor's Comments: Your observations, comments and recommendations can be much more enlightening than mere numerical scores. Use back of page or additional pages if necessary.

4.3 Capstone Design Course Critique

4.3.1 Purpose

The capstone design course (CSCE-495) is the primary opportunity for students to demonstrate abilities to participate in a significant design experience, and to exercise many of the higher level capabilities required by the Program Outcomes. Because of this unique and pivotal position in the curriculum, CSCE-495 is deserving of individual assessment.

4.3.2 Implementation

Each semester, students in CSCE-494 *Computer Engineering Professional Development* shall critique the CSCE-495 final project team reports from the previous semester's CSCE-495 class. Subsequently, the CSCE-494 instructor shall conduct his/her own assessment of the previous semester's CSCE-495 course. This assessment may or may not include data from the student critiques of the individual team reports. The CSCE-494 instructor shall submit a written critique to the CEJCC addressing:

- How well CSCE-495 fulfills its course objectives (as stated in its course specification),
- How well CSCE-495 fulfills its role relative to the Program Outcomes (as listed in Table 1),
- Any problem areas identified,
- Any recommendations for improvement of the course.

4.4 CSE Exit Survey Summary

4.4.1 Purpose

The CSE Department Exit Surveys solicit feedback from students regarding their experiences and opinions of the CSE Department, including:

- Job search experiences, employment status, placement satisfaction, and future plans;
- The relevance of the curriculum and extra-curricular activities, and preparation for the workplace and life-long professional practice;
- Program-specific issues, including the quality of instruction, teaching assistants, facilities, advising and administration.

4.4.2 Implementation

Students are required to complete the exit surveys as a condition for graduation.

4.4.2.1 Survey Instruments

Two survey instruments are used:

1. CSE Graduating Seniors Exit Survey,
2. CSE Change of Major Exit Survey.

The Graduating Seniors Exit Survey is given to seniors on the graduation list. When the graduation list is published, the students are contacted and informed of the requirement to complete the surveys.

The CSE Change of Major Exit Survey is given to students changing from a computer science or computer engineering major to another major at the time that they present the change of major form to the CSE Department office.

4.4.2.2 Analysis

The CSE department chair, in consultation with the chair of the CEJCC and the UAP shall write the program-specific questions for the CSE Graduating Seniors Exit Survey and the CSE Change of Major Exit Survey. The CSE Department chair shall ensure that surveys are administered as required.

Upon receipt of the survey results, the chair of the CEJCC shall summarize the relevant results in a written report submitted to the CEJCC.

4.5 CoET Alumni Survey Summary

4.5.1 Purpose

Each year, CoET conducts a survey of recent graduates to assess how well they feel the program has served their needs (from their perspective in the “real world”). A subset of the survey questions is program-specific. Results of the completed survey are reported back to individual departments.

Each year, a report shall be written summarizing the results of the latest CoET survey. The objective of this summary report is to ensure that the results of the survey are fed back to the CEJCC and the department faculty.

4.5.2 Implementation

When so requested by CoET, the CSE department chair, in consultation with the chair of the CEJCC shall write and submit the program-specific questions for the next survey.

Upon receipt of the survey results, the chair of the CEJCC shall summarize the relevant results in a written report submitted to the CEJCC.

4.6 UAP Outcomes Assessment

4.6.1 Purpose

The Undergraduate Advisory panel (UAP) is the primary representative body for student input into the SPAR process. Therefore, the UAP shall meet annually with the purpose of assessing the validity and relevance of the program outcomes and how well the program meets its outcomes, from the viewpoint of the current students.

4.6.2 Implementation

The UAP shall meet annually to discuss the curriculum and the program outcomes. The chair of the CEJCC and the Chief Advisor shall endeavor to provide the panel with whatever data the panel considers useful in this process.

The UAP shall submit a written report to the CEJCC expressing the panel's viewpoint regarding:

- The validity and relevance of the Program Outcomes,
- How well the Program Outcomes achieve the Program Objectives,
- How well the curriculum achieves the Program Outcomes,
- Any problem areas identified,
- Any recommendations for improving the Program Outcomes.

Concurrent with, or shortly after delivery of the report to the CEJCC, the UAP and CEJCC shall meet jointly to discuss the report face-to-face.

4.7 UAP Objectives Assessment

4.7.1 Purpose

The Undergraduate Advisory Panel (UAP) is the primary representative body for student input into the SPAR process. Therefore, the UAP shall meet with the purpose of assessing the validity and relevance of the Program Objectives from the viewpoint of the current students.

4.7.2 Implementation

The UAP shall meet once every 3 years to discuss the Program Objectives. The chair of the CEJCC and the Chief Advisor shall endeavor to provide the panel with whatever data the panel considers useful in this process.

The UAP shall submit a written report to the CEJCC expressing the panel's viewpoint regarding:

- The validity and relevance of the Program Objectives,
- Any problem areas identified,
- Any recommendations for improving the Program Objectives.

Concurrent with, or shortly after delivery of the report to the CEJCC, the UAP and CEJCC shall meet jointly to discuss the report face-to-face.

4.8 IAP Objectives Assessment

4.8.1 Purpose

The Industrial Advisory Panel (IAP) is the primary representative body for employer input into the assessment process. Therefore, the UAP shall meet at least once every 3 years with the purpose of assessing the validity and relevance of the Program Objectives from the viewpoint of the panel.

4.8.2 Implementation

The IAP normally meets annually in the fall to discuss matters of interest to the department. However, once every 3 years, the IAP shall meet for the express purpose of discussing the Program Objectives. The CSE department chair shall endeavor to provide the panel with whatever data the panel considers useful in this process.

The CSE Department chair shall submit a written report from the IAP to the CEJCC expressing the panel's viewpoint regarding:

- The validity and relevance of the Program Objectives,
- Any problem areas identified,
- Any recommendations for improving the Program Objectives.

4.9 Graduate Committee Objectives Assessment

4.9.1 Purpose

The CSE Department Graduate Committee is the primary representative body for graduate program and graduate student input into the assessment process. Therefore, the Graduate Committee shall meet once every three years for the purpose of assessing the validity and relevance of the undergraduate Program Objectives from the viewpoint of representative graduate programs.

4.9.2 Implementation

The Graduate Committee shall meet once every 3 years to assess the Program Objectives with respect to preparing students for post-graduate education in Computer Engineering. The committee shall consider student preparation relative to our own program and a representative subset of other Computer Engineering graduate programs (selected by the committee). The CSE department chair shall endeavor to provide the committee with whatever data the committee considers useful in this process. The committee shall submit a written report to the CEJCC expressing the committee's viewpoint regarding:

- The validity and relevance of the Program Objectives,
- Any problem areas identified,
- Any recommendations for improving the Program Objectives.

5 Outcomes Level SPAR Report

Program Outcomes will be subjected to an annual formal review process. The lead entity in the review process shall be the Computer Engineering Joint Curriculum Committee (CEJCC). The review shall occur in the spring semester of each academic year in accordance with the schedule listed in Table 2. The process shall include the following sequence of steps:

1. The CEJCC shall meet for the express purpose of reviewing the Program Outcomes, and shall report its findings and recommendations to the department faculty in a written report. The committee shall consider summary data from the formal assessment instruments marked in the "Outcomes" column of Table 2 as well as any other opportunistic data available.

2. The CEJCC shall submit a *Preliminary* Outcomes Level SPAR Report to the CSE Department Faculty. The preliminary report shall include:

    a. The status of all "action items" identified in the previous year's final report,

    b. An assessment of the validity and relevance of the Program Outcomes for achieving the Program Objectives,

    c. An assessment of the quality and effectiveness of the curriculum in achieving the Program Outcomes,

    d. An assessment of the quality and effectiveness of the Outcomes Level SPAR process as practiced during the current year,

    e. A list of recommended action items for improving the curriculum, the Program Outcomes, and the SPAR process.

3. The department faculty shall meet for the express purpose of reviewing the Preliminary Outcomes Level SPAR Report, deciding on final action items to be accomplished, and publishing a *Final* Outcomes Level SPAR Report. The final report shall be structured identically to the preliminary report as specified in item 2 above, with the exception that the *recommended* actions in item 2.e shall be replaced by the *final* action items approved by the CSE Department faculty.

4. The CSE Department Chair, in collaboration with the CEJCC is responsible for overseeing the implementation of the final action items identified in the Final Outcomes Level SPAR Report.

5. The CSE Department Chair shall retain on file the 7 most recent Final Outcomes Level SPAR Reports.

6 Objectives Level SPAR Report

Program Objectives will be subjected to a formal review process at least once every three years during the fall semester. The review cycle shall be synchronized so that each 2nd review occurs in the fall semester of the academic year immediately following regularly scheduled ABET review visits. The lead entity in the review process shall be the Computer Engineering Joint Curriculum Committee (CEJCC). The process shall include the following sequence of steps:

1. The CEJCC shall meet for the express purpose of reviewing the Program Objectives and shall report its findings and recommendations to the department faculty in a written report. The committee shall consider summary data from the formal assessment instruments marked in the "Objectives" column of Table 2 as well as any other opportunistic data available.

2. The CEJCC shall submit a *Preliminary* Objectives Level SPAR Report to the CSE Department Faculty. The preliminary report shall include:

    a. The status of all "action items" identified in the previous report,

    b. An assessment of the validity and relevance of the Program Objectives.

    c. An assessment of the quality and effectiveness of the Objectives Level SPAR process as practiced during the current cycle,

    d. A list of recommended action items for improving the Program Objectives and the SPAR process.

3. The department faculty shall meet for the express purpose of reviewing the Preliminary Objectives Level SPAR, deciding on final action items to be accomplished, and publishing a *Final* Objectives Level SPAR Report. The final report shall be structured identically to the preliminary report as specified in item 2 above, with the exception that the *recommended* action items in item 2.d shall be replaced by the *final* action items approved by the CSE Department faculty.

4. The CSE Department Chair, in collaboration with the CEJCC shall be responsible for overseeing the implementation of the final action items identified in the Final Objectives Level SPAR Report.

5. The CSE Department Chair shall retain on file the 2 most recent Final Objectives Level SPAR Reports.

7 References

1. Accreditation Board for Engineering and Technology (ABET), *The Two-Loops of EC2000*, http://www.abet.org/eac/two_loops.htm, modified March 26, 1999.

2. Accreditation Board for Engineering and Technology (ABET), *Engineering Criteria 2000, 3rd Edition*, Dec 1997.