Southwest Tennessee Community College
Memphis, Tennessee

ACADEMIC AUDIT

INDUSTRIAL COMPUTER FUNDAMENTALS
TECHNICAL CERTIFICATE (TCCF)

SELF STUDY REPORT

Submitted to the Tennessee Board of Regents
For an Academic Audit Review

Engineering Technologies
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January 29, 2010
I. INTRODUCTION

The Industrial Computer Fundamentals Certificate program was approved by the Tennessee Board of Regents in April 2004 for implementation during Fall 2004. The first graduate completed the program in Spring 2005.

The program emphasizes the basic skills needed to begin a career in the computer engineering technology field. Designed for high school graduates or those entering industry for the first time, the program covers several essential areas. These areas include: (a) introduction to engineering technology; (b) computer systems installation and maintenance; (c) microcomputer applications such as word processing and spreadsheets; (d) introduction to electric circuits; (e) digital circuits; (f) introduction to C++ programming.

Certificate candidates may not already hold a degree in Computer Engineering Technology. Candidates must also meet the requirements of a first-time college student or transfer student. Candidates must take at least 15 of the 18 hours at Southwest.

The program is designed as a two-semester sequence. Four of the courses in the certificate program (CPET 1114, ELET 1110, CPET 1124, and CPET 1144) transfer to the Computer Engineering Technology associate degree program.

Certificate holders may find employment as entry level technicians with companies that design, manufacture, test, utilize, or maintain computer systems or computer peripherals. Graduates may work in areas such as software testing, computer network testing and maintenance, and computer systems installation and maintenance. Appendices 1 and 2 contain course descriptions and enrollment data for the program.

II. OVERALL PERFORMANCE

The Industrial Computer Fundamentals (TCCF) program is a strong program as is evidenced by the TAC/ABET accreditation of the Computer Engineering Technology Associate’s degree which is the basis for the TCCF certificate program. Four of the six courses required for the TCCF certificate are also required in the TAC/ABET accredited associate’s degree. Since the faculty are bound under the requirements for TAC/ABET accreditation, the same guidelines and procedures are used to ensure a quality TCCF program. The outcomes for the TCCF program were developed under the guidelines of the TAC/ABET criteria with input from the Advisory Board.

The self-study process for the program started several years ago in preparation for the TAC/ABET site visit in 2008. The faculty members developed program and learning outcomes in 2005 using TAC/ABET criteria as a foundation for the outcomes, and the program’s Advisory Board approved the outcomes in 2006. Certain of the program’s faculty have attended workshops
and seminars on developing measurable outcomes and methods of assessing those outcomes and have brought back this information to the department. Faculty members have a good method in place for assessing outcomes, but the process could be streamlined in particular through better communication with adjuncts regarding the collection of assessment data. Each faculty member evaluates the outcomes of the courses taught. If the assessment falls below a predetermined benchmark, the faculty member completes a Continuous Improvement and Corrective Action form to indicate how the outcome will be improved. The cycle of assessing student outcomes then continues. The program has a good method in place, but ensuring that adjunct faculty members follow the process is a weakness in the program. This weakness will be addressed under Focal Area 4 of this report.

As part of the program assessment process, the Career Services Office tracks TCCF graduates for up to 12 months (by calendar year) after graduation and collects employment measures that provide valuable information to the program including data on graduates attending school for further education, in the military, employed in a related field, employed in an unrelated field, not employed – seeking employment, and not employed – not in the labor market. The results are reported to the program annually including a list of graduates, their contact information, and their employment information. In addition, Career Services obtains the graduate’s employer, supervisor, job title, and salary.

The program reviews the contact information received by the Career Services Office and calls employers and graduates after graduation to arrange and encourage responses to the surveys. The surveys are reviewed in departmental continuous quality improvement meetings to assess and evaluate the program’s educational objectives. The employer survey includes contact information, whether the employer has hired graduates, and if so, how many, job titles, salary ranges, classification of technical function, ratings of graduates, and ratings of job related skills.

The graduate survey includes contact information, name of supervisor and contact information, length of current employment, job title, classification of technical function, rating of technical education, rating of job related skills, importance of degree in obtaining the job, certifications, professional organizations, community involvement, suggestions for improvement of the program, and salary ranges.

One major strength of the certificate program is related to the TAC/ABET accreditation of the associate degree program. Since four of the courses in the certificate program are shared by the associate program, these courses are developed, taught, and monitored under strict ABET guidelines and are closely aligned with industry needs and standards. Collaboration among the faculty members within the department is another program strength. The Computer Engineering Technology (CPET) and Electrical Engineering Technology (ELET) programs work very closely together since many of the CPET students major in both CPET and ELET, and CPET and ELET faculty often teach courses in both programs. Another strength of the program is the continuous improvement process that is in place giving the program a strong structure by which learning
outcomes can be assessed and improvements can be made as needed. Additionally, the quality of the laboratory and hands-on equipment is a major strength of the TCCF program. The labs are equipped with the same type of equipment the students will see in the field.

Improving teaching methods by appealing to different learning styles is a challenge the program faces. Incorporating new teaching technologies may aid in this improvement. Soliciting input from a broader base of Advisory Board members may also enhance the program and help direct it so that achievement of student learning outcomes is enhanced.

III. PERFORMANCE BY FOCAL AREA

The purpose of this section is to address quality processes related to the Industrial Computer Fundamentals program at Southwest Tennessee Community College. This section will describe the processes in which faculty draw upon evidence to assess strengths, weaknesses and needs associated with the program in an effort to produce, assure, and regularly improve the quality of teaching and learning. Initiatives and recommendations for improvement to address identified needs are also presented in each of the focal areas.

The TCCF program is strong due in part to TAC/ABET criteria required of the Computer Engineering Technology AAS degree of which TCCF shares four common courses. Some improvement needs that will be addressed in the following sections include the need for establishing a formal forum to share best practices, encouraging improved teaching methods, streamlining the process of adjuncts’ assessments, and expanding the Advisory Board membership.

Focal Area 1: Learning Objectives

1.1. Process for Developing Program Learning Objectives

Student learning objectives have been explicitly defined for each course in the program and are listed on the standardized course syllabi for each course. Course objectives which are deemed as most important for a student’s later success in the field make up the program objectives. In choosing the program objectives, what a student should think, know, or be able to do as a result of completion of the program is considered. Each student learning objective is written in such a way as to be specific, time-based, and measurable. Program learning objectives and the corresponding assessment plan are included in Appendix 6.

Program learning objectives are initiated by the program faculty and/or the program Advisory Board. (A list of Advisory Board members can be found in Appendix 4.) Any newly proposed objectives are tentative, and must be approved by both the program faculty and the Advisory Board before being permanently implemented in the curriculum.
Program Learning Objectives are flexible and are periodically reviewed by the program faculty and the Advisory Board for possible revisions. Proposed modifications to the outcomes are carefully scrutinized to determine the continuous improvement value of the changes and to ensure that the outcomes maintain reasonable alignment with the expectations of industry. The
flowchart given on the previous page illustrates the process for establishing and revising program learning objectives.

In addition to industry requirements and influence, the TCCF program learning objectives are developed based on the TAC/ABET criteria required for accreditation of the Computer Engineering Technology (CPET) AAS degree. Since TCCF is essentially a subset of the AAS degree, the same standards and criteria were used. Four of the six courses in the TCCF program are also included in the ABET accredited Computer Engineering Technology AAS degree. These four courses are: CPET 1114 – Computer Systems Installations and Maintenance with Applications; ELET 1110 – Electric Circuits I; CPET 1124 – Digital Circuits; and CPET 1144 – C++ for Technicians.

The program demonstrates strength in the area of developing learning objectives through involvement of the Advisory Board and the adherence to TAC/ABET criteria.

1.2 Evidence-Based Learning Objectives

The flowchart presented in Section 1.1 illustrates the process for establishing and revising program learning objectives. Additionally, the program faculty have developed a procedure for improving the objectives based on evidence (See Continuous Improvement Process flowchart on next page). Periodically, data is collected from the following sources:

(a) Custom Assessment Forms
(b) Samples of students’ work
(c) Faculty surveys
(d) Advisory Board surveys
(e) Archival Records (grades)
(f) Student Exit Survey
(g) Questionnaire to Graduates
(h) Questionnaire to Employers of Graduates
(i) Career Services placement data

The data is evaluated by the faculty. Continuous improvement actions are then implemented. These actions may result in the revision of current objectives, the modifications of the program to better meet current objectives, or the introduction of new objectives.

One challenge the program faces is obtaining enough responses to the various surveys, in particular the questionnaires to graduates and questionnaires to employers of graduates. As a result, it becomes difficult to get a true idea of student learning needs.
The Continuous Improvement Process

(1) **Program Learning Objectives**
Composed by the program faculty and approved by industrial constituents.

(2) **Institutional Context**
- Coursework and Curricular
- Classroom Experiences: Facilities, Climate, Faculty and Student characteristics

(3a) **Program Learning Objectives**
What knowledge do the students have and what tasks are they able to perform at this time?

(3b) **Program Learning Objectives**
What knowledge do the students have and what tasks are they able to perform at the time of graduation?

(4a) **Assessment (Measure)**
Collect evidence data.
1. Custom assessment forms for each TCCF course.
2. Samples of students’ work.
3. Faculty surveys
4. Advisory Board surveys

(4b) **Assessment (Measure)**
Collect evidence data.
1. Archival Records (grades).
2. Student Exit Survey.

(5) **Educational Objectives**
What have the graduates accomplished the first few years after graduation? (2-5 years out)

(6) **Assessment (Measure)**
Collect evidence data.
1. Questionnaire to Graduates.
2. Questionnaire to Employers of Graduates.
3. Career Services Placement data.

(7) **Evaluation**
To what extent were the objectives achieved?

(8) **Continuous Improvement (Corrective Actions)**
- Modify objectives and/or
- Make program changes to improve the achievement of the objectives

**Data**

**Flowchart**
Flowchart prepared by the Engineering Technologies Department, Southwest Tennessee Community College
1.3 Best Practices for Learning Objectives

The faculty members have documented a specific plan to take best practices and appropriate benchmarks into account in the analysis of learning objectives. The Continuous Improvement Process flowchart on the previous page illustrates the interconnection between the objectives and the program’s constituents. The table below shows the expected levels of accomplishment for the various objectives.

<table>
<thead>
<tr>
<th>Program Learning Objective</th>
<th>Expected Level of Achievement</th>
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<tbody>
<tr>
<td><strong>PLO-1:</strong> Students will demonstrate the ability to author quality technical reports that follow the guidelines established by the program.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-2:</strong> Students will demonstrate the ability to deliver oral presentations that follow the guidelines established by the program.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-3:</strong> Students will demonstrate a working knowledge of the Windows operating system and application programs; including Word, Excel, Visio, Multisim, and software development tools.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-4:</strong> Students will demonstrate a working knowledge of the C++ programming language including software troubleshooting.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-5:</strong> Students will demonstrate the ability to measure signals and troubleshoot digital circuits and computer systems by means of a digital multi-meter, digital oscilloscope, logic probe, and network test instruments.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-6:</strong> Students will demonstrate an understanding of the basic concepts of a variety of digital circuits and number systems.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-7:</strong> Students will demonstrate the ability to build a computer system component-by-component, install the operating system and application software, and test and maintain an existing computer system.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-8:</strong> Students will demonstrate an understanding of basic mathematical principles and their use in solving realistic technical problems. These principles include arithmetic, algebra, geometry, and trigonometry.</td>
<td>&gt;85%</td>
</tr>
<tr>
<td><strong>PLO-9:</strong> Students will demonstrate an understanding of basic electric circuit theory and methods for performing circuit measurements.</td>
<td>&gt;85%</td>
</tr>
</tbody>
</table>
The accreditation process with TAC/ABET provides valuable best practices information in the area of engineering technologies. This process has made continuous improvement a priority for the Engineering Technologies department. The learning objectives are communicated to students, employers, the advisory board, and adjunct faculty. The students and adjunct faculty receive a copy of the learning objectives as a part of the course syllabi; the employers/Advisory Board review the learning objectives during the program’s annual Advisory Board committee meeting (Appendix 5).

Best practices are continually sought by program instructors through multiple sources. Faculty consult other institutions through the use of web-based materials detailing program content. Within the Engineering Technologies department, faculty informally consult with each other on ways to make program improvements. Those instructors with more experience mentor the less experienced ones.

*Improvement Needs for Focal Area 1*

Since the Learning Objectives for the program were developed following the guidelines from TAC/ABET, this is a strong focal area for the program. There are no immediate improvement needs identified for this area.

**Focal Area 2: Curriculum and Co-Curriculum**

**2.1 Faculty Collaboration on Curriculum Design and Improvement**

When the program was in its planning stages, the Engineering Technologies faculty collaborated to establish the initial curricula content for courses that would be common to several technical certificate programs and the content for concentration specific courses. An example is the development of ENTC 1124 Engineering Technology Techniques, which covers applied math concepts common to all of the programs. The program Advisory Board was also consulted in regard to the initial curricula content for the TCCF program. The curriculum choices were directly derived from the learning objectives from TAC/ABET criteria.

The department and program faculty continue to collaborate regarding proposals for improving the curriculum. If changes to the curriculum are required, those changes are submitted to the College’s Curriculum Committee whose members come from various representative areas within the college. The College’s Curriculum Committee reviews curriculum and manages all course change recommendations to ensure that the guidelines of the college are met.

The faculty from the different Engineering Technologies programs collaborate regarding improvements to the curriculum. The TCCF and Electrical/Electronic Fundamentals technical certificate (TCEF), offered by the Electrical Engineering Technology (ELET) program, are very similar, sharing four of the same courses. Since many of the students choose to get both the
TCCF and the TCEF technical certificates, faculty from the two programs are in constant communication regarding ways to more effectively prepare students and develop curriculum. As an example, faculty members from both programs collaborated on converting Introduction to Electrical/Electronic Technology (ENTC 1114) into a hybrid course. Another example of curriculum collaboration between the CPET and ELET faculty was exhibited in Spring 2009 with the creation of a new course, Computer Systems Installations and Maintenance with Applications (CPET 1114), which is a required course for both the TCCF program and the Computer Engineering Technology AAS program as well as the TCEF technical certificate and the Electrical Engineering Technology AAS program. This course creation was the result of an ABET finding that Computer Engineering Technology AAS graduates needed more hands-on experience in building and maintaining computer systems. ELET faculty members had an input into the development of the course and also teach the CPET 1114 course.

One way collaboration is ensured is by having faculty members teach across programs. Discussions among faculty about the best way to teach material and the best texts to use occur on a regular basis throughout the department. Discussion among faculty led to Engineering Technology Techniques (ENTC 1124) becoming a hybrid course. After a lengthy email discussion between several faculty members across programs and a Mechanical Engineering Technology (MEET) adjunct instructor, who had recently taught the class, it was decided that the students would gain more from the class if it were made a hybrid course. This is one example of how Engineering Technologies faculty work collaboratively to design curriculum.

2.2 Course Content and Sequencing to Achieve Learning Objectives

Early in the development of the curriculum, the faculty established a course sequence that would promote the students’ success in accomplishing the program’s learning outcomes. The curriculum has been analyzed and prerequisites are in place for each course in the program. The course sequencing and necessary prerequisites build on each another and thereby provide breadth and depth. The prerequisites are explained to the students during advising and are documented in the College’s catalog. The sequence is illustrated by the prerequisite flowchart on the next page.

Resource material in the TCCF program is determined by the requirements passed down by TAC/ABET for the Computer Engineering Technology AAS program. Research methods are promoted outside of class through assigning written reports that require gathering field-of-study related information. Course material is periodically reviewed and adjusted to reflect current information or, in some cases, current software versions. All faculty members use the same texts. New proposed texts are passed around the department for approval by the faculty.
2.3 Soundness of Curriculum, Including Best Practices

The faculty recognize the need for a diversified constituency in order to develop and maintain a curriculum that reflects established best practices. The faculty periodically involve all constituents in the ongoing refining of the curriculum (See Continuous Improvement Flowchart given in section 1.2 of this document). The Advisory Board’s input on new technology and equipment as well as that of other faculty members is continually taken into account. Employer surveys and requests of employers through the Career Services department at Southwest are reviewed to maintain a viable curriculum. One such example is the inclusion of soldering in Digital Circuits (CPET 1124) at the request of employers who stated the need for graduates to develop that skill. Additionally, by measuring student learning outcomes, decisions are made concerning course content and best practices. The TCCF curriculum is based on TAC/ABET criteria which is the primary indicator of its soundness.

Improvement Needs for Focal Area 2

Since the curriculum for the program was developed following the guidelines from TAC/ABET, this is a strong focal area for the program, and there are no immediate improvement needs indicated for this area.
Focal Area 3: Teaching and Learning

3.1 Focus on Teaching and Learning

The curriculum represents an extensive variety of technical topics. There are common elements in all courses such as lecture presentations and student exams. Since the program is primarily based on hands-on training, most courses approach learning through the process of lecturing on a topic and then reinforcing the new information with hands-on, practical laboratory exercises or computations. The laboratory assignments prove to be the most valuable approach for enhancing the learning process. In addition, online assistance, clicker technology (personal response system), and web-assisted technology promote student learning.

The program offers one semi self-paced course. Computer Systems Installations and Maintenance with Applications (CPET 1114) has books and handouts that give step-by-step instructions. Since students enter this course with varying degrees of competence, the course is designed to give more advanced students the freedom to move ahead at their own paces. The students that require more assistance receive more one-on-one attention from the instructor. A portion of the CPET 1114 course is not self-paced but instead incorporates hands-on exercises in installing and maintaining computer systems. Students work in small groups of a few students per PC, but the overall lab exercise is moderated and paced by the instructor. This allows the instructor to collectively explain concepts and techniques to the entire class while allowing the students to actually perform the techniques and tasks themselves.

The program also initiated active learning in several courses using the Southwest online PAWS (D2L) distance education system which provides automated presentation and grading of assignments and digital data archiving. Additionally, clicker technology or personal response systems have been used in some courses to promote active learning in the classroom. Immediate feedback on student understanding is thus provided to the instructor and gives the instructor the opportunity to immediately adjust the lecture to adapt to students’ level of understanding. Not every lecture lends itself to the use of clickers. Fostering active student learning is a continuing need within the program.

3.2 Use of Instructional Methods and Materials for Mastery

Instructional methods are dependent on the particular courses. For instance, some courses may be suitable for online administration. In any case, the teaching methods are periodically reviewed as a built-in part of the continuous improvement process required by TAC/ABET. When the program outcomes are assessed and evaluated, the need to adjust the instructional approach for certain technical topics may become evident. Instructional methods are then modified as needed. Applied problem solving, critical thinking, and hands-on technology application are integrated throughout the courses through a variety of methods, including classroom instruction, laboratory work, and outside-of-class assignments. Adjuncts are provided with the same instructional material as that used by the full-time program faculty.
3.3 Collaboration in Design and Delivery of Teaching-Learning Process

The department and program faculty continually collaborate in regards to effective teaching methods and the improvement of the quality of the program. Best teaching practices are shared with other departments at Southwest through professional development received during the Summer Institute and Faculty Development Day. Summer Institute is a multiple day event that provides a forum for faculty from different areas within and outside the College to present teaching methods and new classroom technologies. Faculty Development Day is held once a year, and all faculty members are encouraged to attend. As a result of a seminar presented at the Summer Institute earlier this year in 2009, a YouTube video was incorporated in CPET 1114 as part of an additional improved teaching method to reach the students.

Faculty within the Engineering Technologies department are constantly collaborating on teaching methods that have the most positive effect on student learning and student response. A faculty member in the TCEF program was one of the first in the department to convert a traditional course into a hybrid course (Engineering Technology Techniques - ENTC 1124). The enthusiasm from the students and the faculty using web assistance indicated a best practice method and was influential in converting other courses to web-assisted courses when appropriate for the content of the course material. ENTC 1114 was one such course that was converted to a web-assisted course after the positive response from the conversion of ENTC 1124. Faculty from TCCF, TCEF, and an adjunct collaborated on this process.

The use of clicker technology is another example of shared best practices. A faculty member in the department first used this technology, and after positive responses from students, introduced this method to other faculty.

Improvement Needs for Focal Area 3

Additional improved teaching methods need to be encouraged among faculty in order to foster active student learning.

Focal Area 4: Student Learning Assessment

4.1 Key Quality Indicators for Learning Objectives

The TAC/ABET accreditation criteria are the foundation for the continuous improvement plan including selecting quality indicators and assessing learning objectives. Grading rubrics or custom assessment forms are utilized to assess each learning objective. The program faculty members collaboratively develop and implement assessment of learning objectives on an annual basis. A Major Field Exit Exam is not utilized for the TCCF program, but four of the courses are shared with the Computer Engineering Technology program which does require an exit exam. This exit exam is divided into course sections and could easily be tied to individual learning
outcomes. Although the exit exam might be useful for the TCCF program, the emphasis of student learning assessment has been placed at the course level to reflect the current level of student learning.

The program has incorporated the use of a 4 column model for listing: (1) program objectives, (2) assessment methods tied to the individual objectives, (3) assessment results, and (4) use of the assessment results in closing the loop. Documentation of the continuous improvement process for the program has been both improved and simplified through the use of the 4 column model. In the fall semester of 2008, all programs at Southwest TN Community College began using this model and posting it in the college’s online planning system. This documentation effort helps to validate that program assessments are aligned with the learning objectives and that assessment results are used for enhancing student learning. A portion of the program’s 4 column assessment model for 2008-09 may be found in Appendix 6.

4.2 Best Practices for Assessing Student Learning

The program’s plan for assessing student learning incorporates guidelines given by TAC/ABET and the use of a four column model. The assessments are based on individual learning objectives and not on a student’s course grade. The program faculty members identify key indicators and develop rubrics/custom assessment forms that are completed for each student. The individual results are then compiled to capture an overall assessment of the learning objective. The faculty can then identify areas of deficiency and learn from the evaluated assessment data. The results are then applied to subsequent terms to affect improved student learning.

4.3 Continuous Assessment-Based Program Improvements

Faculty members are ultimately responsible for assessment in each course. Faculty collaborate closely on assessment design using traditional exams, lab assignments, and written reports. These methods are discussed with other faculty in the department and reviewed for needed changes.

As discussed in Section 4.1, student achievement of the learning outcomes is assessed and documented using the college’s online planning system and four column model. The fourth column lists “use of results” of assessments in making continuous improvements in the program. Assessment methods are periodically reviewed and changed as needed. Improvements are made at the course level when assessment results indicate the need for change. As courses within the program are improved, the overall program is improved. A partial copy of assessment-based program improvements that took place in the last cycle are recorded in Column 4 of the 2008-09 Student Learning Outcome Assessment Chart found in Appendix 6.

4.4 Multiple Measures in Assessing Learning and Program Effectiveness

The program uses multiple methods and instruments for assessing learning and ultimately program effectiveness. These include:
(a) Custom Assessment Forms  
(b) Samples of students’ work  
(c) Faculty surveys  
(d) Advisory Board surveys  
(e) Archival Records (grades)  
(f) Student Exit Survey  
(g) Questionnaire to Graduates  
(h) Questionnaire to Employers of Graduates  
(i) Career Services placement data

The Custom Assessment Forms include results from written tests, hands-on lab assignments, and written reports.

*Improvement Needs for Focal Area 4*

There is a need for streamlining the process among adjunct faculty in which assessments of student learning are submitted at the end of the semester.

**Focal Area 5: Systematic Quality Assurance**

**5.1 Commitment to Continuous Quality Improvements**

The TCCF program at Southwest is committed to continuous improvement. To keep up with technology and provide the students with the tools they need for industry, the program must make continuous improvement a top priority. The Engineering Technologies department is devoted to providing a quality education to its students. All members of the department collaborate to maintain high standards; these standards are apparent through the work completed to maintain TAC/ABET accreditation for all the programs in the department. Faculty members meet regularly with other faculty members in the department, the department chair, and the Director of Assessment to evaluate and improve the success of the program’s continuous improvement plan.

Feedback is given to the faculty as to how they are performing work related to the curriculum and other practices affecting students through the annual department chair’s evaluation and subsequent conference with chair. Faculty members receive additional valuable feedback through the results of the student evaluation of teaching surveys (SET) performed each fall semester. Quality assurance practices are periodically reviewed and improved as needed. In the 2008-09 year, both the Student Evaluation of Teaching instrument and Department Chair’s Evaluation for faculty instrument were developed or revised through formal processes which included regular input from faculty committees and ultimate approval by the Faculty Senate, Department Chairs, Deans, and the Provost. The administration at Southwest is committed to providing opportunities for professional growth and development for faculty members.
Numerous opportunities throughout each academic year related to enhancing teaching effectiveness are offered free of charge to faculty members through the Center for Faculty Development.

5.2 Systematic Quality Assurance

Efforts are being made to ensure that quality assurance will be a systematic and regular process on both the institutional and program level as discussed below.

Institutional Efforts:

The IE planning cycle is a formal internal process at Southwest used for systematic quality assurance. This process requires that all departments establish annual objectives, conduct assessments, and use assessment results to improve programs. Training in writing program outcomes for student learning was undertaken as a college-wide effort in the fall semester of 2008 with documentation of the student learning outcomes on the college’s online planning system continuing as an ongoing process at Southwest. Other forms of quality assurance regarding teaching effectiveness include the student evaluation of teaching (SET) for each faculty member and the follow-up department chair’s evaluation of faculty each spring semester.

The institution is committed to providing quality services to meet the distinct needs of its diverse student population. The Academic Support Center (ASC) provides free tutoring services and resources for students to provide support that may enable them to successfully reach their educational goals. Through the services of the Advising and Counseling Centers at Southwest, professional advisors along with assigned departmental advisors provide students with a high caliber of advising deemed essential for their academic success. As part of the commitment to systematic quality assurance, Southwest has purchased a program called “AdvisorTrac” to be used for tracking advisees and maintaining records of content in advising sessions. The Advising and Counseling Centers provide valuable assistance with articulation issues for students who plan to transfer to other colleges and universities. Many of the Southwest students are first generation college students and find the support of the Advising and Counseling Centers invaluable. The Career Services Department at Southwest serves all students who request assistance with job-search strategies, resume writing, interviewing techniques, and career counseling. Five libraries are available for student, faculty and staff use and an InfoNet Library provides additional valuable online services in assuring that all students have access to library services.

Southwest Tennessee Community College is accredited by the Southern Association of Colleges and Schools – Commission on Colleges. As part of the reaffirmation of accreditation process, Southwest has responsibility for documenting compliance with 72 standards of quality and effectiveness and the Commission has responsibility for reviewing the College in accordance
with those standards. In meeting the high standards required for accreditation, Southwest assures that quality education practices are in place.

Program Efforts:

The TCCF program has a plan in place to ensure that quality assurance is a systematic and regular process. First, the student learning objectives have been defined and conveyed to the instructors and students through the course syllabi. Secondly, a plan to measure and assess the student learning objectives is in place with each program objective assessed at the end of the fall and spring semesters. Finally, the results of the assessment are reported to the program faculty, adjunct faculty, and advisory committee and the results used to make improvements to the program. After changes have been made, the program objectives will be re-assessed to determine the success of the improvements. This process will be repeated each academic year not only for the TCCF program, but also for the Computer Engineering Technology associate degree program which is accredited by TAC/ABET. The college’s online planning system is being utilized to document the process.

The program maintains an Advisory Board (Appendix 4) that meets periodically to participate in the continuous improvement of the program. The committee offers input in areas of the needs of industry as related to computer technology (Appendix 5).

Each term, the College schedules a timeline for academic advising. The department ensures that faculty members are available from all academic areas to assist students. Furthermore, the faculty members are available throughout each term to offer academic advice to students.

*Improvement Needs for Focal Area 5*

The program needs to work towards expanding its Advisory Board membership. The program has a high caliber of membership, but the Board could be enhanced by additional members from the field to provide additional input.

**IV. POTENTIAL RECOMMENDATIONS AND ASSOCIATED INITIATIVES**

Having assessed the overall educational quality of the Industrial Computer Fundamentals program in the self-study, the purpose of this section will be to present some specific initiatives for improvement. The program’s faculty members are committed to working intensively on the following quality improvement initiatives:

**Initiative 1, Section 3:**

What needs to be accomplished:
Faculty need to be encouraged to improve teaching methods in order to foster active student learning. Students have various learning styles, and faculty need to appeal to those different styles.

The tasks required to accomplish the objective:

Faculty should take advantage of and seek opportunities to attend seminars and training that provide information on new teaching methods and new technology that will enhance student learning. Additionally, taking best practices from other faculty in the department that have attended such seminars will be beneficial.

How it will be determined whether the initiative is being implemented as planned:

When faculty attend seminars on improving teaching methods, some of those methods should be implemented on a trial basis to determine the effectiveness and practicality of those methods and technologies. In addition, faculty are required to complete an extensive and detailed faculty evaluation each spring. This evaluation is reviewed and approved by the department chairperson. One of the criteria or expectations is that faculty will use varying instructional methods and media to address different student learning styles.

Demonstration that the unit is capable of carrying out the initiative:

The program has already implemented improved teaching methods with the conversion of some traditional courses to hybrid and web-assisted courses. This indicates the program is willing to continue the process of improving teaching methods in order to foster active student learning.

**Initiative 2, Section 4:**

What needs to be accomplished:

There is a need for streamlining the process in which assessment of student learning is performed and collected from adjunct instructors.

The tasks required to accomplish the objective:

The Custom Assessment Form for the course taught will be given to the adjunct at the beginning of each semester. Adjuncts will be asked to keep a sampling of student work as well. At the end of the semester, when the adjunct submits grades to the College, the program coordinator will ask for the Custom Assessment Form and all collected student work to be submitted. If the adjunct fails to submit the Custom Assessment Form in a timely manner, the program coordinator will be forced to assess the student learning outcomes based on the collected student work.
How it will be determined whether the initiative is being implemented as planned:

If the Custom Assessment Form has been filled out and returned to the program coordinator, this initiative will be met.

Demonstration that the unit is capable of carrying out the initiative:

Involvement of adjunct faculty is considered essential for determining whether students are achieving the learning objectives. It is not unrealistic to ask adjunct faculty to assess student learning for the courses they teach. Adjunct faculty have demonstrated a willingness to cooperate with the department faculty and guidelines and with explicit instructions and the course assessment form, it is considered that the initiative can be accomplished.

**Initiative 3, Section 5:**

What needs to be accomplished:

The program needs to expand its Advisory Board membership in order to have additional input into the program provided by a wider constituency.

The tasks required to accomplish the objective:

Former graduates that are actively employed in the field prove to be a good source for finding Advisory Board members. Partnerships with other companies and vendors also provide a good source for the Advisory Board. Those relationships need to fostered and/or maintained.

How it will be determined whether the initiative is being implemented as planned:

If the Advisory Board is expanded, the initiative has been implemented.

Demonstration that the unit is capable of carrying out the initiative:

The program already has an Advisory Board in place. Expanding the Advisory Board is a reasonable expectation.
## V. MATRIX OF IMPROVEMENT INITIATIVES

<table>
<thead>
<tr>
<th>Recommended Improvement Action</th>
<th>Leadership</th>
<th>Timeline</th>
</tr>
</thead>
</table>
| **Project Name:** Teaching Methods | **Coordination:** Department Chair  
**Participants:** All faculty members | **Beginning:** Immediately  
**Ending:** Continual |
| **Description of Initiative:** Faculty need to be encouraged to improve teaching methods in order to foster active student learning. Students have various learning styles, and faculty need to appeal to those different styles.  
**Intended Result:** Improved student learning through more active learning methods and technologies. | |
| **Project Name:** Adjunct Assessment | **Coordination:** Program Coordinator  
**Participants:** Adjunct Faculty | **Beginning:** Fall 2009  
**Ending:** Continual |
| **Description of Initiative:** There is a need for streamlining the process in which assessment of student learning is performed and collected from adjunct instructors.  
**Intended Result:** All courses will be assessed in a timely manner, including those courses taught by adjunct faculty. | |
| **Project Name:** Advisory Board | **Coordination:** Program Coordinator  
**Participants:** Program Faculty | **Beginning:** 2010  
**Ending:** n/a |
| **Description of Initiative:** The program needs to expand its Advisory Board membership in order to have additional input into the program provided by a wider constituency.  
**Intended Result:** The program will have an enhanced Advisory Board that can offer meaningful input into the program. | |
**APPENDICES**

<table>
<thead>
<tr>
<th>Appendix 1</th>
<th>Program Description/Requirements</th>
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<td>Appendix 2</td>
<td>Course Descriptions</td>
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<td>Appendix 3</td>
<td>Enrollment Data</td>
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<td>Appendix 4</td>
<td>Faculty Credentials &amp; Advisory Board Members</td>
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<td>Appendix 5</td>
<td>Advisory Board Meeting Minutes</td>
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<td>Appendix 6</td>
<td>Student Learning Outcomes</td>
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</table>
INDUSTRIAL COMPUTER FUNDAMENTALS

Technical Certificate

The Industrial Computer Fundamentals Certificate program emphasizes the basic skills needed to begin a career in the computer engineering technology field. Designed for high school graduates or those entering industry for the first time, the program covers several essential areas. These areas include: introduction to engineering technology; computer systems installation, maintenance, and applications such as word processing and spreadsheets; introduction to electric circuits; digital circuits; introduction to C++ programming.

Certificate candidates cannot already hold a degree in Computer Engineering Technology. Candidates must also meet the requirements of a first-time college student or transfer student (see the Admissions section of the current Southwest Catalog). Candidates must take at least 15 of the 18 hours at Southwest. Each student should assure that he or she has met the prerequisites before attempting to register for a course. The program is designed as a two-semester sequence.

Students who complete this certificate program will be qualified to enter the Cooperative Education (Co-op) program and/or entry-level positions in industry. The purpose of the Co-op program is to train students in the industrial world, combining classroom with industrial experience. Many employers participating in Co-op provide tuition for students who wish to continue their education.

Certificate holders may find employment as entry-level technicians with companies that design, manufacture, test, utilize, or maintain computer systems or computer peripherals. Graduates may work in areas such as software trouble-shooting, computer network equipment testing and maintenance, and computer hardware installation and maintenance.

Four of the courses in the certificate program (CPET 1114, ELET 1110, CPET 1124, and CPET 1144) transfer to the Computer Engineering Technology associate degree program.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Required Courses</th>
<th>Credit</th>
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<tbody>
<tr>
<td>ENTC 1114</td>
<td>Introduction to Electrical/Electronic Technology</td>
<td>3</td>
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<td>ENTC 1124</td>
<td>Engineering Technology Techniques</td>
<td>3</td>
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<tr>
<td>CPET 1114</td>
<td>Computer Systems Installation and Maintenance with Applications</td>
<td>3</td>
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<tr>
<td>ELET 1110</td>
<td>Electric Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>CPET 1124</td>
<td>Digital Circuits</td>
<td>3</td>
</tr>
<tr>
<td>CPET 1144</td>
<td>C++ for Technicians</td>
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<td><strong>Total</strong></td>
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</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ENTC 1114</td>
<td>Introduction to Electrical/Electronic Technology</td>
<td>This course introduces the student to the electrical and computer engineering technology fields. Emphasis is on electrical and electronic terminology, measurements, safety, and test equipment usage. Electronic unit analysis, conversion, and functions using the calculator are discussed along with use of the volt--ohm meter and oscilloscope. This course covers career opportunities, industrial safety, review of technical math, problem solving, and is suitable for fundamental applications of electricity and electronics in all disciplines. Prerequisite: ENTC 1124 or permission of program coordinator.</td>
</tr>
<tr>
<td>ENTC 1124</td>
<td>Engineering Technology Techniques</td>
<td>This course introduces the student to engineering technology and the techniques and methods of technical problem solving. It covers such topics as the field of engineering technology, career orientation, technical math, hand-held calculator usage, applied algebra, trigonometry applications, measurement systems, unit conversions, reading scales, measuring devices, geometry applications, constructing graphs, systematic problem solving and library usage. Prerequisite: Permission of program coordinator.</td>
</tr>
<tr>
<td>CPET 1114</td>
<td>Comp Systems Installation and Maintenance with Applications</td>
<td>This course provides hands-on experience in the building, installation, testing, and maintenance of microcomputer systems. Emphasis is given to developing the student's ability to install new systems and maintain existing systems This course also provides an introduction to various microcomputer application programs. Emphasis is given to developing the student's ability to use Microsoft Windows-based applications software including word processing, spreadsheet processing. This course also includes an introduction to the C++ programming language.</td>
</tr>
<tr>
<td>ELET 1110</td>
<td>Electric Circuits I &amp; Lab</td>
<td>Electric Circuits I introduces the student to the fundamental principles of DC circuits. Emphasis is placed on the solution of circuit problems using series and parallel circuit definitions, Ohm's law, Kirchhoff's laws, and equivalent circuits. Inductance and capacitance are introduced as time constants in transient circuits. The course concludes with network analysis techniques including loop equations, Thevenin's theorem, and superposition. Prerequisite: ENTC 1114 and ENTC 1124, or permission of program coordinator.</td>
</tr>
<tr>
<td>CPET 1124</td>
<td>Digital Circuits And Lab</td>
<td>This course presents procedures for analyzing and designing digital circuits. Topics included are number systems, Boolean algebra, Karnaugh mapping, combinational logic, arithmetic circuits, flip-flops, counters, and sequential circuits. In the laboratory, students verify digital principles by constructing and testing various digital circuits. Prerequisite: ELET 1110 or approval of program coordinator.</td>
</tr>
<tr>
<td>CPET 1144</td>
<td>C++ For Technicians &amp; Lab</td>
<td>This introductory course in the C++ programming language begins with an explanation of a general program development procedure using an Integrated Development Environment (IDE). Some specific C++ language elements covered include looping statements, functions, arrays, input/output operations, and classes. Emphasis is placed on effective program development practices, including flowcharting and debugging techniques. Prerequisite: CPET 1104 Corequisite: MATH 1740 or approval of program coordinator.</td>
</tr>
</tbody>
</table>
Appendix 3 – Enrollment Data
Industrial Computer Fundamentals Certificate Profile

Note: (1) Enrollment data is based on declared major as of 14th day of class. (2) Students awarded certificates in this program may include students who met graduation requirements for this program but had not declared the program as their major.

Fall 2009 Enrollment Profile

<table>
<thead>
<tr>
<th>Headcount</th>
<th>FTE</th>
<th>Female</th>
<th>Male</th>
<th>Black</th>
<th>Hispanic</th>
<th>White</th>
<th>Other Race</th>
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<tr>
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<td>7</td>
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Certificates Awarded

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<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>9</td>
<td>17</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>22</td>
<td>26</td>
<td>18</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: 14th day Census files and graduation files
Appendix 4 – Faculty Credentials & Advisory Board Members

**Full Time Faculty**

Janet Sykes  
MSET degree, *Electronic Engineering Technology*, The University of Memphis  
BSET degree, *Computer Engineering Technology*, The University of Memphis  
AAS degrees, *Computer Engineering Technology* and *Biomedical Engineering Technology*, State Technical Institute at Memphis

Lisa Jones  
MSEE degree, *Electrical Engineering*, Georgia Institute of Technology  
BSEE degree, *Electrical Engineering*, Memphis State University

Lucas Nwaobi  
MSET degree, *Engineering Technology*, The University of Memphis  
BSET degree, *Electrical Engineering Technology*, The University of Memphis  
AAS degrees, *Computer Engineering Technology* and *Telecommunications Engineering Technology*, State Technical Institute at Memphis

Maxwell Cutler  
MSET degree, *Computer Engineering Technology*, The University of Memphis  
BS degree, *Electrical Engineering*, University of Glasgow, Scotland

**Part Time Faculty**

Stephen Browning  
MSE degree, *Computer Information & Control Engineering*, University of Michigan  
BSEE degree, *Electrical Engineering*, Purdue University

Hunter Purnell  
BSEE degree, *Electrical Engineering*, The University of Memphis

Jeffrey Stewart  
MS degree, *Mechanical Engineering*, The University of Memphis

James Northern  
MS degree, *Technology Education Electronics*, Memphis State University  
BSEE degree, *Electrical Engineering*, Memphis State University

Todd Canaday  
MSET degree, *Engineering Technology*, The University of Memphis  
BSET degree, *Computer Engineering Technology*, The University of Memphis

**Advisory Board Members**

<table>
<thead>
<tr>
<th>Member</th>
<th>Company</th>
<th>Job Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ross Mead</td>
<td>IBM</td>
<td>Accounts Principal</td>
</tr>
<tr>
<td>Lucas Nwaobi</td>
<td>Federal Express Corporation</td>
<td>Senior Technical Specialist (Network Operation Center)</td>
</tr>
<tr>
<td>Charlie Hale</td>
<td>Alcoa CSI</td>
<td>Engineer</td>
</tr>
<tr>
<td>David McAnally</td>
<td>Coca-Cola Enterprises</td>
<td>Engineer</td>
</tr>
<tr>
<td>James Trammell</td>
<td>Federal Express Corporation</td>
<td>Senior Technical Advisor</td>
</tr>
<tr>
<td>Nathan Sykes</td>
<td>Cargill, Inc.</td>
<td>AEI Project Lead</td>
</tr>
</tbody>
</table>
Appendix 5 – Advisory Board Meeting Minutes

Engineering Technologies
Industrial Advisory Meeting
January 5, 2009

General Session with all programs present (12:00 pm in Farris Room B)

Garry Spencer, Chair of Engineering Technologies, opened the meeting. Mike Stephens, Dean of Business, Career Studies, and Technologies, welcomed the advisory members and talked about change. Brenda Williams, Interim Director of Career Services, asked the members to fill out a new Career Services Employer Survey and handed out the Employer Survey Results for 2007-2008. She also briefly talked about an upcoming Career Fair. Shayla Guy, Coordinator of the Carl Perkins IV Grant, talked briefly about the grant. Lunch was provided, and then the Engineering Technologies programs broke up into individual advisory meetings.

Computer Engineering Technology Industrial Advisory Committee Meeting (1:00 pm in Fulton 110)

Attendees: Max Cutler (Southwest), Lucas Nwaobi (FedEx), Dewey Sykes (Southwest), Janet Sykes (Southwest), Nathan Sykes (Cargill, Inc.), James Warwick (Southwest), John Wortham (Southwest)

Johnny talked about the recent 2008 ABET visit and their findings regarding our program. Johnny passed out handouts, “ABET Four Accreditation Commissions,” that contained information on ABET’s concerns and weaknesses for the CPET program, our response to those findings, and information regarding the creation of a new replacement course CPET1114. A list of those findings is on page 2.

“Finding 5 (Concern): Use of Advisory Committee Not Continual” (pg. 3), ABET stated that the format of our 2007 Industrial Advisory Committee meeting was not beneficial. Johnny read our program’s response on page 4 and said Finding 5 would go away when our response is implemented.

“Finding 4 (Concern): Prerequisites Not Enforced” (pg. 5), Johnny explained the mishap that resulted in Concern 4. The response to Finding 4 (pg. 6) explains that the prerequisite permit action has been eliminated. Nathan suggested changing the flowchart to be more lenient, indicating a corequisite instead of a prerequisite. Dewey said CPET1124 could be a corequisite for CPET2314. Johnny said we could not have students sign a waiver because that is unacceptable to ABET. Nathan suggested a pretest in order to be permitted to take a prerequisite as a corequisite or a post-requisite. Everyone liked this idea. Johnny changed the response to ABET on page 6. This test can serve as documentation to ABET and will be done on a discretionary basis. Dewey suggested that a practical exercise might also suffice as a type of pretest. This idea was rejected by the group as too difficult to implement in a timely manner.

“Finding 3 (Weakness): Need to Follow Through on Continuous Improvement Activities” (pg. 7) was discussed with Johnny telling the group that we did close the loop for years 2005 and 2006. However, when ABET visited in Fall 2008, those course assessments had not been completed. In the response to Finding 3 on page 8, Johnny explained that Max and Dewey have submitted assessments for CPET1124, CPET2114, and CPET2314 and that this should correct Weakness 3.

Regarding Findings 1 and 2, Johnny explained to the group that they were related and correcting Finding 1 would consequently correct Finding 2. “Finding 2 (Weakness): Build, Test, Operate, and Maintain Systems” (pg. 9) and “Finding 1 (Weakness)” (pg. 10) states that ABET determined our program is not preparing graduates for employment as specialists. Johnny explained to the group that this is not our stated goal since the title of specialist generally takes many years to accomplish. The “Response to Findings 1 and 2” (pg. 11) was discussed. Johnny explained that our program was going to replace CPET1104 Microcomputer Applications with a new course CPET1114 Microcomputer Installation and Maintenance with Applications since about 50% of the course material will change.

The new CPET1114 course was discussed along with a discussion about the catalog requirements and discrepancies of taking the new CPET1114 course versus the old CPET1104 course. Nathan said he was concerned there was too much content for in the new course. Johnny’s reply was that we may have to only cover one/two exercises each of
Appendix 5 – Advisory Board Meeting Minutes, Continued

Word, Excel, C++, etc. Lucas asked if CPET1114 would be available on the Union Avenue campus. Johnny answered affirmatively. Max asked about the problems of concurrent sections with only one lab room containing the workbenches. Johnny’s response was to schedule the sections for different days.

Room F350 will be reconfigured with new worktables and new PCs. Johnny wants to use the old Dell PCs currently in F350 for students to work on. Students will work in teams of two. Each section will have their own PCs for a total of 21 PCs (we can offer three sections of seven teams each). Janet asked about the availability of technical support to aid the instructor in assisting all students in a timely manner. Johnny’s response was that we would see what we needed as we taught the course.

The flowchart for the new CPET1114 course was discussed by the group. See page 12. The credit hours will change from three to four since more intensive learning is involved. The curriculum committee will have to approve this change and a catalog addendum for Summer 2009 will have to be requested. New lab exercises must be written. Old exercises must be rewritten.

The syllabus for CPET1114 was discussed by the group. See pages 13-14. There is no prerequisite. The Course Description was discussed. Moving MultiSim from CPET1114 to CPET1124 Digital Circuits was discussed. James said that we should include the name Microsoft in front of Windows. Janet asked about CPET1114 and INET1004 (from the Mechanical program) being interchangeable as in the past. Johnny said it would no longer be interchangeable.

The Course Objectives were discussed. The group discussed removing and installing the OS. Nathan said deleting a partition and starting over is good practical experience. Lucas explained what he has his CRC students do and asked how in-depth the class was going to get. Max asked what maintaining we were going to do. Nathan and Lucas talked about antivirus software and Dell diagnostics. Symantec (site license), AVG (free), and MS Defender (standard with service pack) was mentioned. Janet asked about removing the wording “testing” in Objective 7. Johnny explained it is in ABET’s description. Johnny changed “diagnostic” wording on Week 3 in the syllabus. James asked to add “CLI” wording to Week 1. Janet said we were working with students that do not know anything about scopes and meters. Johnny’s response was that we would briefly have to show them how to use the equipment. Nathan asked about dropping Week 3 because he agreed looking at signals would be too intensive for beginners. He said he would like to see more emphasis placed on the POST. Johnny made changes in the syllabus. Lucas talked about the beep codes and introducing problems. Lucas wanted to keep Week 3 with scope signals. Week 3 was left with minimal changes made. Nathan and Lucas discussed combining Weeks 4 and 5. It was suggested that boxes and anti static bags were needed. Lucas said to emphasize the use of anti static straps. Nathan and James indicated that Weeks 6 and 7’s items should be rearranged. Johnny made the appropriate changes. Nathan, Lucas, and James discussed doing a fresh install versus using an image. Johnny wants to do a fresh install. Lucas asked why Visio had been removed from the syllabus and wanted it added back. Johnny made the changes to include it. MultiSim was removed from the syllabus.

Program Outcomes were discussed. The group thought PO-13 should be added to the Program Outcomes. Nathan said PO-3 will have to be changed to add Visio and include CPET1124. All places that CPET1104 are listed will have to be replaced with CPET1114. The Exit Exam will have to be changed to include the new CPET1114 content. CPET1114 will have to be added to PO-9.

Johnny asked Janet to work on rewriting the lab exercises for Word, Excel, Visio, and C++. Dewey, Max, and James will work on the PC installation/maintenance portion of the course per Johnny. These lab exercises should be completed by February 28. Johnny said that he did not want any self-paced exercises. All material will have a lecture, including Word. There will be no Word or Excel books required.

Johnny said that he would email the corrected version of the CPET1114 Syllabus to Nathan and Lucas. They are to return their thoughts to Johnny.

The meeting concluded at approximately 3:30.
Minutes recorded by J. Sykes.
## Appendix 6 – Student Learning Outcomes

<table>
<thead>
<tr>
<th>Unit/Program Intended Outcomes</th>
<th>Intended Method of Measurement and Level of Performance</th>
<th>Assessment/Evaluation Results</th>
<th>Use of Results Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLO-1:</strong> Students will demonstrate the ability to author quality technical reports that follow the guidelines established by the program.</td>
<td>Assessment (measurement) is made through written laboratory reports in the courses CPET 1114, CPET 1124, and CPET 1144. Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Intended Level of Performance: Minimum 85%</td>
<td>Spring 2009: CPET 1124 students achieved 90% performance level. CPET 1144 students achieved 92% performance level. Assessment data from CPET 1124 and CPET 1144 for Spring 2009 indicate performance levels above 85% for this SLO. Summer 2009: CPET 1114 students achieved 96%. CPET 1124 students achieved 89%. Assessment data from CPET 1114 and CPET 1124 for Summer 2009 indicate performance levels above 85% for this SLO.</td>
</tr>
<tr>
<td><strong>SLO-2:</strong> Students will demonstrate the ability to deliver oral presentations that follow the guidelines established by the program.</td>
<td>Assessment is made through graded oral presentations in the course CPET 1114.</td>
<td>Intended Level of Performance: Minimum 85%</td>
<td>Summer 2009: CPET 1114 students achieved 96% performance level. Assessment data from CPET 1114 for Summer 2009 indicate performance levels above 85% for this SLO.</td>
</tr>
<tr>
<td><strong>SLO-3:</strong> Students will demonstrate a working knowledge of the Windows operating system and application programs; including Word, Excel, Visio, and software development tools.</td>
<td>Assessment is made through the appropriate sections of the Exit Exam and through graded laboratory assignments, laboratory reports, homework, and tests in the courses CPET 1114 and CPET 1144.</td>
<td>Intended Level of Performance: Minimum 85%</td>
<td>Spring 2009: CPET 1144 students performed overall at a 95% level. Assessment data from CPET 1144 for Spring 2009 indicate performance levels above 85% for this SLO. Summer 2009: CPET 1114 students performed above 85% performance level on all assessments except Excel, which are below the minimum level of 85% (7/9 students performed at a 74% level). The 2007-2008 exit exam showed a 44.2% performance level for this SLO.</td>
</tr>
<tr>
<td>Unit/Program Intended Outcomes</td>
<td>Intended Method of Measurement and Level of Performance</td>
<td>Assessment/Evaluation Results</td>
<td>Use of Results Improvement</td>
</tr>
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<td>-------------------------------</td>
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</tr>
<tr>
<td><strong>SLO-4:</strong></td>
<td>Assessment is made through the appropriate sections of the Exit Exam and through graded exams and graded laboratory assignments in the courses CPET 1114 and CPET 1144. Intended Level of Performance: Minimum 85% Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Spring 2009: CPET 1144 students performed overall at a 95% level. Assessment data from CPET 1144 for Spring 2009 indicate performance levels above 85% for this SLO. Summer 2009: CPET 1114 students performed at an 87% performance level. Assessment data from CPET 1114 for Summer 2009 indicate performance levels above 85% for this SLO. The 2007-2008 exit exam showed a 41.7% performance level for this SLO.</td>
<td>No corrective actions are needed in CPET 1114 or CPET 1144 at this time. Something CPET 1114 instructors have to be aware of is that most students have never programmed before. Plenty of class time has to be devoted to this section of the class. CPET 1144 students are at an advantage for having been exposed to C++ in CPET 1114. Faculty have reviewed and revised the Exit Exam by performing an item analysis and checking the content validity of the exam. A review has been put online using the PAWS/D2L system to help students properly prepare for the exam.</td>
</tr>
<tr>
<td><strong>SLO-5:</strong></td>
<td>Assessment is made through graded laboratory assignments as well as observations by the instructor in the course CPET 1124. Intended Level of Performance: Minimum 85% Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Spring 2009: CPET 1124 students performed at a 91% level. Assessment data from CPET 1124 for Spring 2009 indicate performance levels above 85% for this SLO. Summer 2009: CPET 1124 students performed at an 82% level. Assessment data from CPET 1124 for Summer 2009 indicate performance levels below 85% for this SLO.</td>
<td>Students always have difficulty using test equipment and troubleshooting. The instructor will spend class time instructing the students how to measure signals and spend time showing students how to use logic probes in order to troubleshoot. In the spring semester, the students did okay. Perhaps the abbreviated summer semester does not allow enough time for continually showing the students how to troubleshoot. This needs to be a focus for the summer term.</td>
</tr>
<tr>
<td>Unit/Program Intended Outcomes</td>
<td>Intended Method of Measurement and Level of Performance</td>
<td>Assessment/Evaluation Results</td>
<td>Use of Results Improvement</td>
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<tr>
<td><strong>SLO-6:</strong> Students will demonstrate an understanding of the basic concepts of a variety of digital circuits and number systems.</td>
<td>Assessment is made through the appropriate sections of the Exit Exam and through graded laboratory assignments, laboratory reports, and tests in the course CPET 1124. Intended Level of Performance: Minimum 85% Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Spring 2009 and Summer 2009: CPET 1124 students performed at a 91% level. Assessment data from CPET 1124 for Spring and Summer 2009 indicate performance levels above 85% for this SLO. The 2007-2008 exit exam showed a 31.3% performance level for this SLO.</td>
<td>No corrective actions are needed in CPET 1124 at this time. Faculty have reviewed and revised the Exit Exam by performing an item analysis and checking the content validity of the exam. A review has been put online using the PAWS/D2L system to help students properly prepare for the exam.</td>
</tr>
<tr>
<td><strong>SLO-7:</strong> Students will demonstrate the ability to build a computer system component-by-component, install the operating system and application software, and test and maintain an existing computer system.</td>
<td>Assessment is made through graded laboratory assignments in the course CPET 1114. Intended Level of Performance: Minimum 85% Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Summer 2009: CPET 1114 students performed at a 98% level. Assessment data from CPET 1114 for Summer 2009 indicate performance levels above 85% for this SLO.</td>
<td>Even though the students performed well on this SLO, there needs to be more lecture given about PC hardware and software. There should be more direct quiz or homework questions taken from the lecture.</td>
</tr>
<tr>
<td><strong>SLO-8:</strong> Students will demonstrate an understanding of basic mathematical principles and their use in solving realistic technical problems. These principles include arithmetic, algebra, geometry, and trigonometry.</td>
<td>Assessment is made through homework assignments and tests in the course ENTC 1124. Intended Level of Performance: Minimum 85% Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Spring 2009: ENTC 1124 students performed at an 87% level. Assessment data from ENTC 1124 for Spring 2009 indicate performance levels above 85% for this SLO.</td>
<td>No corrective actions are needed in ENTC 1124 at this time. However since the performance level is marginal, the faculty developed an online pilot project that will provide students with immediate feedback on homework problems and an effective way for the teacher to track homework assignments.</td>
</tr>
</tbody>
</table>
### Appendix 6 – Student Learning Outcomes

<table>
<thead>
<tr>
<th>Unit/Program Intended Outcomes</th>
<th>Intended Method of Measurement and Level of Performance</th>
<th>Assessment/Evaluation Results</th>
<th>Use of Results Improvement</th>
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<tbody>
<tr>
<td><strong>SLO-9:</strong> Students will demonstrate an understanding of basic electric circuit theory and methods for performing circuit measurements.</td>
<td>Assessment is made through graded laboratory assignments and by instructor observations in the course ELET 1110. Intended Level of Performance: Minimum 85% Additional methods: 1. Faculty Feedback Form. 2. Advisory Board surveys. 3. Questionnaire to Graduates. 4. Questionnaire to Employers of Graduates. 5. Placement data.</td>
<td>Spring 2009: ELET 1110 students performed at a 67% level. Assessment data from ELET 1110 for Spring 2009 indicate performance levels below 85% for this SLO.</td>
<td>The faculty changed the text. The new text more clearly distinguishes between theory and practice. The emphasis on practice makes the hands-on lab exercises more understandable. The text was reviewed and endorsed by faculty and by two of the ELET industrial advisors.</td>
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