

**Department of Electrical and Computer Engineering**  
**Annual Assessment Report**  
**2004-2005**

**I. MISSION**

The mission of the Department of Electrical and Computer Engineering is:

To prepare the individual for professional work or for graduate study in the fields of electrical and computer engineering and to provide as many of the elements of a broad education as can be included in a program of professional study leading to the degree of Bachelor of Science in Electrical Engineering.

This is accomplished within a disciplined learning environment under the direction of full-time faculty and within the guidelines of an ABET accredited program of professional study leading to the degree of Bachelor of Science in Electrical Engineering.

The mission is supported by a curriculum that places emphasis on a broad liberal education base, a strong background in mathematics and basic sciences. A logical sequence of electrical and computer engineering courses provides the breadth and depth necessary for continuous professional growth in today's technological society. In the junior year the electrical engineering student normally selects an area of professional emphasis -- such as computer engineering, control systems, communication systems, electronics, or power systems -- and chooses his professional electives accordingly. An integral part of the program is the design component that develops the student's ability to address practical engineering problems. This is accomplished by the inclusion of engineering design problems and concepts throughout the curriculum and capped by a mandatory two-semester senior design course in which the students undertake significant design projects.

Convinced of the great value of practical experience, the department encourages its majors to obtain gainful employment in electrical engineering or a related field for at least one summer, preferably between the junior and senior years.

**II. PROGRAM OBJECTIVES**

The Department of Electrical and Computer Engineering's program of study is designed to:

- Provide a quality engineering education by offering a cohesive set of sequenced courses designed around a strong core curriculum that provides the breadth and depth required to practice engineering within the electrical and computer engineering disciplines in a technological society.
- Provide a solid foundation in basic sciences, mathematics, and engineering topics, and in the application of these disciplines to the solution of practical engineering problems.
- Provide a program that stresses oral and written communication skills as well as those computer skills required of engineers in a technological society.
- Attract and retain qualified electrical and computer engineering students.

- Provide up-to-date laboratory equipment so our graduates are familiar with the capabilities, application and operation of the equipment currently used in engineering analysis, design and research environments.
- Provide an environment that encourages creativity, fosters the need and desire for lifelong learning, and promotes the awareness of contemporary issues facing society.
- Provide a program that emphasizes strong leadership and teaming skills.

These objectives are wholly consistent with the mission of the Department and the College as reflected in the mission statements below.

### **III. EXPECTED RESULTS**

1. Maintain national accreditation by the Engineering Accreditation Commission of the Accrediting Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700. Accreditation Board for Engineering and Technology (ABET). The ABET review and evaluation of our engineering program provides an independent assessment based on national recognized standards.

The electrical engineering curriculum is prerequisite structured with upper division courses requiring a strong knowledge base of preceding course work. Success in follow-on courses serves as an inherent assessment of acquired knowledge in prior mathematics, science and engineering course work. Therefore, the following expected results are used as assessment criteria since successful progression through the curriculum is an excellent measure of the mastery of engineering knowledge and the ability to apply the knowledge to solve engineering problems in the areas of analysis and design.

2. Enroll a minimum of 50 incoming electrical engineering students with an average SAT approaching 1150 and with SAT math scores approaching 650. Retain at least 50% of the students that meet the expected SAT math score.
3. It is expected that at least 75% of the enrolled sophomore electrical engineering students will meet or exceed the minimum grade requirement of a "C" in ELEC 201 and ELEC 202. Demonstrated proficiency in ELEC 201 and ELEC 202 (Electric Circuits I & II) is necessary for students to advance in the electrical engineering program.
4. It is expected that at least 75% of the enrolled sophomore electrical engineering students will have successfully completed MATH 131, 132, 231, 234, and PHYS 221, 222, 271, and 272 prior to the start of their fifth semester. The successful completion of these courses provides an adequate foundation for the student to enroll in junior level electrical and computer engineering courses.

Note: Paragraphs 3 and 4 assume that paragraph 2 has been achieved. The ECE Department has little influence over whether or not paragraph 2 actually occurs, though it is clearly of vital importance.

5. It is expected that at least 80% of the students entering the junior electrical engineering curriculum will complete the two-semester sequence successfully.
6. Students who transfer into The Citadel's College of Graduate and Professional Studies under the '2+2' program with area Technical Colleges will enter in the junior year of the electrical

engineering major. Attrition in this program should be minimal, and it is expected that 80% of these students will complete degree requirements within four years of transferring to The Citadel.

7. For those students who graduate in a given academic year (December, May, July, or August), the Department expects that at least 80% will have taken the Fundamentals of Engineering/Engineer-in-Training Examination and that, of those who take this exam, at least 70% will pass. Senior students' performance on the Fundamentals of Engineering exam is evaluated annually. These exam results are analyzed to aid in identifying areas in the engineering program requiring attention, and to verify strengths of the program. For assessment purposes, we are interested in pass rates of individuals who graduate in a given academic year. The passing percentages are expected to be equal to or above the national averages for electrical engineering seniors.
8. The Department expects that at least 90% of its graduates, other than those receiving commissions in the Armed Forces or entering graduate school, will be employed as professional engineers within six months of their graduation date.
9. At least once every six years an Electrical Engineering Graduate Questionnaire is mailed to the electrical engineering graduates of the past ten years. The Department uses this instrument to assess our graduates' professional status and growth, the progress toward an advanced degree of those graduates who have chosen to attend graduate school, and the advancement of those graduates who are commissioned officers in the Armed Forces. The survey results are used to aid in identifying program deficiencies.
10. In assessing teaching effectiveness, the Department expects the mean score on the twenty core items addressed by the college's evaluation of instruction to exceed 4.25 on at least 85% of the core items and that no item score be will be less than 3.9. The Department also requests that each graduating electrical engineering student fill out a student review of each electrical and computer engineering faculty member he had at The Citadel. Senior students are encouraged to discuss this assessment of faculty, the electrical engineering program and The Citadel in general with the Department Head. Results are shared with the faculty after graduation.

#### **IV. ASSESSMENT TOOLS**

The following methods, surveys, and data are used to assess the expected results of the Electrical Engineering program.

- Results and comments from previous ABET visit.
- Analysis of SAT scores of freshman enrolled in the Electrical Engineering program.
- Analysis of basic Science, Mathematics and Electrical Engineering Grades.
- Analysis of the academic performance of electrical engineering juniors.
- Analysis of academic progress of '2+2' students.
- Percentage of electrical engineering students passing the Fundamentals of Engineering Exam.
- Electrical Engineering Senior exit surveys.
- Alumni surveys of Electrical Engineering graduates.
- Student Evaluation of Teaching results.

- Comprehensive Final Exam Averages of courses offered in electrical and computer engineering.
- Videotapes and Proceedings of CEEDS Symposium.
- Survey of Employers of Electrical Engineering graduates.
- Employment record of Electrical Engineering graduates.
- Graduate school admission of Electrical Engineering graduates.
- Mathematics Department Exit Exam Averages of electrical engineering students.
- Cadet and CGSP Student Leadership Profiles and Teamwork Assessment.

## V. ASSESSMENT RESULTS

1. In September 2002, the Engineering Accreditation Commission (EAC) of the Accrediting Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 - telephone: (410) 347-7700, reviewed and evaluated our engineering program and provided an independent assessment based on national recognized standards. This was the first time the program was reviewed and evaluated using Engineering Criteria 2000. The philosophy of Engineering Criteria 2000 is centered on the program's mission and objectives defined by the Institution to meet the needs of our constituencies. Assessment of program outcomes is linked to program objectives through processes designed to ensure continuous improvement. The Department has developed and implemented procedures that the faculty uses to identify and assess the objectives/outcomes of each course. These techniques are: comprehensive finals with focus questions addressing course objectives, required term papers for senior level courses, oral presentations, and comprehensive written/practical lab exams. Three years of data were collected using Engineering Criteria 2000. Processes are installed and outcomes are being used to continually improve our program. Refinement to our processes will be implemented as necessary. In addition, the Department is collecting data from our constituencies - students, graduates, employers and an advisory board to aid in the process of ensuring continuing improvement and relevance of our program.

The 2002 visiting ABET team identified ECE program concerns relating to the professional component of the ECE senior design sequence, a continuing concern with respect to faculty workload, a concern specific to ECE laboratory facilities, and an institutional weakness in the area of faculty salaries. A formal response to these findings was forwarded to the visiting team in May 2003. Each finding was reviewed in depth and corrective action planned. All corrective actions have been executed, and final and full ABET accreditation was bestowed during fall 2003.

It is, however, appropriate to assess these areas of concern and weakness continuously during this period in preparation for the AY 2008/9 ABET review. AY 2004/5 progress reports for these four areas follow:

### Item 4: PROFESSIONAL COMPONENT

ELEC 421 and 422, the ECE Senior Design sequence, have been expanded to specifically include a majority of the constraints listed in the ABET Professional Component Criteria. Adjustments to the syllabus and curriculum were approved by the ABET visitor.

Subsequently, during AY 2004/5, the wording of ABET's assessment plan has been modified to simplify assessment of the Professional Component. Under the new wording, no concern would have been noted during the 2002 visit. Regardless, it is interesting to report that the attention applied to this ABET component prompted one of our ELEC 421/422 instructors to apply to become an ABET evaluator. His application has been accepted. This is closed-loop-corrective-action at its best!

#### Item 5. FACULTY

Teaching overloads were the norm during AY 2003/4 due to understaffing resulting from a faculty retirement at the end of AY 2002/3. The situation was largely relieved in fall 2004 when Dr. Steven Horner joined the faculty to fill the open slot. Unfortunately, as noted by ABET and CHE visits, six faculty are inadequate to properly teach the department curriculum, particularly in light of the two-component nature of the program (SCCC and CGPS classes). In recognition of this, the Provost and Dean of the College granted an additional faculty slot to the department, effective January 1, 2005. A search was completed and a seventh member is scheduled to join the faculty for the fall 2005 term. Accreditation boards will view this much-needed enhancement positively.

#### Item 6. FACILITIES

The department laboratory plan, as detailed to ABET visitors in fall 2002, projected approximately \$144K in need over AYs 2002/3, 2003/4 and 2004/5. Institution support for this plan has been excellent, resulting in complete funding for the detailed years (fall 2002 through spring 2005). Funding for out years is projected to occur as well due, in part, to efforts by the Dean of Engineering to endow portions of the school's equipment needs. Specifically during AY 2004/5 the digital logic and circuits class was completely upgraded with 60 sets of hardware that allow students to experience the latest in field-programmable gate array (FPGA) technology, and the linear systems laboratory was upgraded with eight sets of new hardware from Feedback, Inc. that enables application of important control theory concepts being taught in the classroom. Other AY 2004/5 enhancements were general purpose in nature. Eight new computers were added to the ECE computer laboratory and electronic locks were installed on all laboratory doors to allow 7/24 access to authorized students. The department is on-plan in the facilities area.

#### Item 7. INSTITUTIONAL SUPPORT AND FINANCIAL RESOURCES

Faculty salaries have been noted as a problem in ABET reports issued in 1996 and again in 2002. An institution-wide study was conducted during AY 2003/4 that resulted in improvement in faculty salaries. All ECE faculty members benefited from this adjustment. This is a clear and proper response to a documented weakness. Furthermore, the Provost and Dean of the College has committed to periodic review/adjustment of faculty salaries going forward.

2. The tables below represent statistics regarding the Corps of Cadets. 2004 enrollment fell short of the goal of 50, even including 5 active duty US Navy personnel enrolled as part of the Seaman to Admiral program. However, retention of this freshman as rising sophomore EE majors significantly exceeded the 50% goal for the third year in a row, not including the

unknown Seaman to Admiral component that could begin in fall 2005. While the SAT averages for entering electrical engineering students consistently exceed those of the entering freshman class as a whole, we continue to fall short against our objectives of 1150 overall and 650 in Math. **Electrical engineering students entering in 2004 had an average SAT score of 1114 average SAT Math score of 577. This is down slightly from the fall 2003 averages of 1125 and 583.**

The Department remains concerned by the quantity and quality of entering students choosing to major in electrical engineering, and continues to work with the Dean of the School of Engineering to develop programs to target and attract outstanding engineering students.

TABLE I. Retention Statistics.

Fall Term	Number of Entering Electrical Engineering Freshmen	Number Returning as Electrical Engineering Sophomores the following Fall	Retention Rate (%)
1999	45	14	31%
2000	51	37	73%
2001	45	21	47%
2002	37	30*	81%
2003	50*	28**	56%
2004	43**	31***	72%

\*Include 8 Seaman-to-Admiral (STA) students taking both ELEC104 and ELEC201.

\*\*Includes 5 STAs taking both ELEC104 and ELEC201.

\*\*\*Projection based on pre-registration for Fall 2005, STA projection unavailable.

Expectations in the mathematics area will be that the average SAT MATH score will be higher for entering freshman electrical engineering majors than for the entering class as a whole and that the average SAT MATH score for majors will approach 650. Entering freshman electrical engineering majors whose SAT MATH is below 600 are monitored carefully, and if performance in the initial mathematics courses is not satisfactory, a change of major is advised. Weak math backgrounds forced 13 (30%) of the entering electrical engineering freshman to take a remedial College Algebra and Trig course prior to beginning the required Calculus series. **Successful completion (C or better) of first semester math courses by electrical engineering freshman was a disappointing 55% (8 of 13 in MATH 119 plus 9 of 18 in MATH 131). The chemistry pass rate was better at 83% (30 of 36).** Weak academic backgrounds in math and, to a lesser degree in chemistry remain critical to freshman and sophomore performance.

TABLE II. SAT Score Statistics.

Academic Year	Average SAT Score for Entering Freshman Class	Average SAT Score for Entering Electrical Engineering Freshmen
1999-2000	1063	1113
2000-2001	1067	1132
2001-2002	1074	1149
2002-2003	1072	1150
2003-2004	1107	1124
2004-2005	1077	1114

3. Ninety-two percent of the enrolled electrical engineering sophomore students met at least the minimum grade requirement of a "C" in ELEC 201, as did 96% in ELEC 202.
4. **Seventy-nine percent of the enrolled electrical engineering sophomore students completed the first four semesters of the required Math (22 of 28) and Physics (24 of 28) courses by the end of their fourth semester at The Citadel.** Seventy-one percent of the enrolled sophomores pre-registered for the fifth semester of the electrical engineering curriculum.
5. One hundred percent of electrical engineering cadet juniors completed their junior year successfully and have the necessary background to undertake a major design project along with senior elective courses in their areas of interest.
6. Sixteen members of the South Carolina Corps of Cadets received Electrical Engineering degrees at the May 2005 graduation ceremony. **Fourteen of these (87.5%) completed their degrees within four years of beginning the program at The Citadel.**
7. Eight '2+2' students graduated in May 2005 from The Citadel's College of Graduate and Professional Studies earning the Bachelor of Science in Electrical Engineering degree. **All completed degree requirements within four years of transferring to The Citadel.**
8. The Fundamentals of Engineering Exam overall academic pass rates for the previous five years are provided in TABLE III.

TABLE III.

Academic Year	Electrical Engineering		National Average	
	Fall	Spring	Fall	Spring
2000-2001	66.7%	0% <sup>**</sup>	76%	79%
2001-2002	67%	75%	77%	80%
2002-2003	83%	75%	79%	84%
2003-2004	61%	N/A	73%	N/A
2004-2005	70%	33%	75%	75%

\* - One student; \*\* - Two Students

Students are encouraged to take the Fundamentals of Engineering exam; however, students who are planning careers in the Armed Forces, foreign students and students planning to attend graduate school tend not to take the exam. Reasons given for not taking the exam are

cost, time, and the feeling that it will have little or no impact on their careers since electronic, semiconductor and computer industries do not emphasize professional registration. Performance on the Fall FE exam was below the overall national average by 5 percentage points and 3 percentage points below the average of Carnegie Masters Comprehensive (CMC) institutions. Seven of the ten students taking the exam in fall 2004 passed, as did only one of the three students taking the exam in the spring 2005 sitting.

As shown in TABLE IV of the 2004/2005 test results, Citadel electrical engineering students exceeded the CMC average by more than 10% in chemistry (spring), engineering economics (fall), material science (spring) and thermodynamics (spring), but were similarly deficient in engineering economics (spring), ethics (spring), and statics (spring). These results are discussed in the department's kick-off faculty meeting and curriculum responses are considered. **No clear trend or weakness is apparent, and the spread in results is in part a function of the small sample size, particularly in the spring sitting.**

TABLE IV

Subject Area	Citadel ECE		Carnegie Masters		Difference	
	Fall	Spring	Fall	Spring	Fall	Spring
Chemistry	62	67	59	55	+3	+12
Computers	79	71	74	68	+5	+3
Dynamics	59	22	53	49	+6	-27
Circuits	67	53	72	60	-5	-7
Economics	74	40	61	53	+13	-13
Ethics	56	47	57	58	-1	-11
Fluids	33	38	37	34	-6	+4
Materials	46	71	47	53	-1	+18
Mathematics	57	60	61	64	-4	-4
Mechanics	30	38	33	46	-3	-8
Statics	42	33	46	46	-4	-13
Thermodynamics	37	55	37	41	0	+14

9. Eleven 2004-2005 electrical engineering graduates entered the US armed forces, and four are employed in engineering positions with the Department of Defense or Department of Defense support contractors. Five accepted engineering jobs in the private sector and two chose to pursue fulltime graduate study. Two graduates had no job plans at the time of graduation.
10. The Electrical Engineering Graduate Questionnaire was deployed during AY 2000/2001 in preparation for the 2002 ABET self-study and visit. The results of this survey are reported in the 2002-2003 ECE assessment report. The next such survey will be conducted no later than AY 2006/2007.
11. The department's mean scores on the college's evaluation of instruction exceeded 4.00 (agree) of a possible 5 points (strongly agree) for all core questions on CGPS student responses and for twelve of the twenty core questions on SCCC student responses. The lowest average of 4.29 from evening students and 3.83 from cadets, were associated with the

statement "*Tests accurately assess what I have learned in this course*". This statement earned, as it usually does, the lowest response across the institution.

The department's survey of graduating electrical engineering students on teaching effectiveness of the electrical engineering faculty indicated a similarly strong approval rating. The survey also indicated that the electrical engineering faculty members are readily accessible to the students. After graduation each faculty member is provided with the overall department survey results and with the student's assessment of his teaching.

Eight graduating electrical engineering students responded to the Office of Institutional Research's 2005 Citadel Experience Survey. The department fairs well against the institutional averages on this survey, as shown below for both 2005 and 2004.

The Citadel Experience Survey  Question concerning the following:	% Very Satisfied or Satisfied			
	2005		2004	
	ECE	Institution	ECE	Institution
Major program of study	<b>100</b>	88.85	<b>100</b>	91.95
Instruction in Major program	<b>100</b>	85.13	<b>100</b>	89.26
Academic advising, course selection/ requirements	<b>87.5</b>	65.43	<b>90</b>	69.13
Academic advising – understanding policies	<b>100</b>	69.52	<b>100</b>	77.18
Availability of advisors	<b>100</b>	80.95	<b>100</b>	80.95
Curriculum prepared me for my discipline	87.5	<b>88.85</b>	<b>100</b>	90.60
Professors were interested in my progress	<b>87.5</b>	75.84	<b>100</b>	85.23
Professors were accessible	<b>100</b>	89.22	<b>100</b>	91.95
Professors had enthusiasm for the subjects	<b>100</b>	89.59	<b>100</b>	91.95

## VI. MAJOR ACTIONS AND ISSUES

1. Dr. Harold Askins completed a year-long sabbatical earned by 15 years of service as department head.
2. Dr. Steven Horner joined as a tenure-track associate professor effective August 15, 2005.
3. Temporary professors, Mr. Harry Weatherford and Dr. Stuart Yuill were employed to address fall and spring semester loading, due to an earned sabbatical granted to a senior faculty member (see item 1 above).
4. Dr. Thomas Jerse accepted the role as ABET facilitator and was given one-course teaching relief during fall 2004. Dr. Jerse organized and ran formal end-of-term reviews to formally capture course effectiveness teaching observations while fresh in the faculty's minds.

5. The department provided specific evidence requested by the office of the associate provost, in support of 2004 SACS response. This evidence in large part related to program assessment, feedback and improvement.
6. The ECE Industrial Advisory Board met twice during AY 2004/2005. The Board is composed of representatives from industry, government, academe, and Alumni. Board members provided valuable input to mission and program objectives. They volunteer to engage fund-raising efforts, sponsor equipment donations, recruit outstanding students and to provide jobs for students and graduates. Minutes of the two AY 2004/2005 meetings are appended to this report.
7. Laboratories were significantly upgraded during this period. The first three years of the lab plan provided as part of the ABET visit response have been completely executed as the cost of \$144,000.
8. Engineering-specific recruiting remains an issue in need of action. The Citadel does not have a discipline specific admission policy. Any student that is admitted can select engineering as a major. Table II summarizes the freshmen entrance data shows that the average Math SAT score is well below the goal for students entering the electrical engineering program. Also, 30% of the freshmen entering the electrical engineering program in fall 2004 had weak math preparation forcing them to take pre-Calculus in preparation for their first Calculus course. Further indications that weakness existed in the fall 2004 entering class are apparent in the summary of freshman year data. In the first semester, 45% of the electrical engineering freshman failed and/or withdrew from one or more math and/or chemistry courses. Weak academic backgrounds in math and chemistry and lack of motivation are factors that contribute to attrition in the freshman and sophomore years and need to be addressed.

The Citadel's School of Engineering must attract students that are qualified and prepared to major in engineering. **Two important accomplishments are that school-specific recruiting materials is now available for use in our admissions process, and the academic introduction of prospective students during their spring visits has been changed to broaden the exposure of all departments to the undecided prospects. This "academic job-fair" format has served to significantly increase the number of rising freshmen that visit the Electrical and Computer Engineering department.**

9. One hundred nine cadets and thirteen active duty students were enrolled in the day (SCCC) component of the electrical engineering program and thirty students were enrolled in the evening (CGPS) component of the electrical engineering program. More than 75% of the CGPS students pursue a full academic load of 12 or more semester hours. Sixteen cadets and eight CGPS students graduated in May 2005.
10. The Electrical and Computer Engineering faculty remains professionally active. All are members or senior members of the IEEE and most are members of ASEE and other societies. Professor Peeples represents the department at meetings of the Southeastern Association of Electrical Engineering Department Heads (SAEEDH), and the National Electrical Engineering Department Heads Association (NEEDHA). At the Fall 2004 SAEEDH meeting, Dr. Peeples will be elected as a director of the Southeastern Center for Electrical Engineering Education (SCEEE).

- Professor Askins took the academic year off in earned sabbatical. He remained close to the department, attending meetings of the advisory board and serving on the faculty search committee.
- Professor Barsanti published in the proceedings of and presented a paper at the Southeastern Symposium on Systems and Technology 2005 at Tuskegee, AL, on the subject of “Removal of Colored Noise from Non-Stationary Signals Using Wavelet Packet and Cosine Packet Decompositions”. He also co-authored a paper titled “Electrophoresis 2D Gel Residual Encoding using Adaptive Wavelet for Image Segmentation” that was presented at and published in the proceedings of the IEEE Southeastern Conference 2005 in Ft. Lauderdale, FL. In cooperation with the NROTC department, Professor Barsanti saw the second class of five Seaman to Admiral students through its first year, and continued as primary advisor to the original class of 8 STAs, which will graduate in May 2006. Dr. Barsanti continues to serve as a member of the Charleston County Pre-Engineering Advisory Board.
- Professor Jerse published in the proceedings of and presented at the 2004 IEEE International Symposium on Electromagnetic Compatibility in Santa Clara, CA. His paper was entitled “Modeling Resonance Effects and the Radiated Emission from a Nonlinear System”. As a distinguished lecturer for the IEEE EMC Society, Dr. Jerse On “The Role of Symmetry in the Excitation of Common-Mode Emissions” at meetings at Ecole Polytechnique, Montreal, Canada, the Seattle, Oregon and Southwest Washington chapters of the EMC Society of the IEEE, and on “Control of Interference on Multi-Emitter Platforms” at a joint meeting of the Baltimore chapters of the IEEE Communications Society and the EMC Society, and on “Decoupling and the Role of Symmetry in Printed Circuit Board Layout” at the Ottawa IEEE EMC Chapter. Dr. Jerse continues as the department’s ABET facilitator for the 2008/2009 accreditation visit.
- Professor McKinney continues as faculty advisor for the student branch of IEEE. Branch activity remains high with enthusiastic participation in events on and off-campus. Professor McKinney is also the department’s National Engineering Week coordinator. Lego Baseball was the showcased electrical and computer engineering event at the February 2004 celebration. Dr. McKinney developed rules for the event, in which freshmen ECE students competed in robot baseball with local middle and high school teams, using Lego® Mindstorm kits provided to all the teams by the department. The senior design poster session continued as a popular component of Engineering Week. In recognition of his enthusiasm for Engineer’s Week, Dr. McKinney has accepted the role of The Citadel’s designate to the Charleston Joint Engineering Council. Dr. McKinney served as faculty consultant to a senior design team that competed under his supervision in the 2005 IEEE Southeastcon student competition. His team finished a very respectable 7<sup>th</sup> place of 37 competing teams.
- Dr. Peebles performed in three significant invited roles during this period. As part of their summer lecture series, he presented to the faculty and staff of the Georgia Tech Microelectronics Center on the subject of “Refrigerated Methods of High-Performance Electronics Cooling”. He also served as keynote speaker and all-day moderator at a faculty advance for Norfolk State University on the subject of “Engineering Education in the 21<sup>st</sup> Century”, and continues in a twice-yearly role as

guest faculty for a Kauffman Foundation sponsored short course in entrepreneurship. His scholarly work included participation in a published panel presentation at the IEEE sponsored 2004 ITherm conference in Las Vegas, NV. The panel discussed the “Thermal Challenges for Next Generation Military, Telecommunications and Computer Equipment”. He is also a conference organizer and session chairman at the 2004 International Microelectronics and Packaging Society’s Advance Technology Workshop on Thermal Issues, held in Palo Alto, CA. Professor Peoples continues to serve as the secretary to the ECE Advisory Board and as an advisor to The Citadel’s chapter of Tau Beta Pi.

## **VII. 2005-2006 ANNUAL PLAN**

During the 2005-2005 academic year The Citadel’s Department of Electrical and Computer Engineering will take the following actions to improve the program:

- a. Accreditation Board of Engineering and Technology
  - Inculcate enhancements to the existing process, including integration and automation of the end-of-term review and the course portfolios.
  - Perform an internal Self Study to assess the department’s process level of maturity, with concentration on assessment, feedback and improvement.
  - Send at least two faculty members to ABET sponsored workshops.
- b. Personnel Issues:
  - Fully engage Dr. Siripong Potisuk as the 7<sup>th</sup> and newest member of the faculty.
  - Search for and identify a replacement for Dr. Askins, due to retire at the end of 2005.
  - Assist Dr. Steven Horner’s transition into his role as a tenure-track associate professor.
- c. Enrollment Issues
  - The third class of “Seamen to Admiral” enlisted Navy personnel will enter the ECE program in August 2005. While mainstreaming these high performing Navy students maximizes their impact to the overall program, it is clear from past years’ experiences that nearly all of the ELEC 104/CIT 101 content is beneath these mature and accomplished students. The department curriculum committee will recommend changes to ELEC 104, and perhaps ELEC 105 to more properly challenge these students.
  - Recruitment
    - The ECE department head will continue work with the dean to develop recruiting methods specific to the School of Engineering.
    - The School of Engineering will involve local guidance councilors in our program, perhaps by way of a school-sponsored luncheon.
    - The ECE department head will engage the Charleston County’s Pre-Engineering Advisory Board on the topic of targeted recruitment.
    - The School of Engineering will cultivate its close tie with Trident Technical College to optimize recruiting of ‘2+2’ engineering students into the College of Graduate and Professional Studies.

- Retention of freshmen and sophomore engineering students will continue as a priority. Specific activities are in place to enhance the retention of qualified students.
  - ELEC 104 students will be required to meet individually with their instructor for informal, “how are things going” sessions.
  - The IEEE student chapter has grown remarkably over the last few years and will take a more specific role in student retention by promoting the following:
    - Upper class participation in ELEC 104
    - Sponsored IEEE participation of freshmen and sophomores

d. Program Issues

- Continue enhancement of the computer-engineering track by offering an Advanced Digital Systems elective.
- Take steps to engage our faculty in the University of South Carolina, College of Engineering Masters of Engineering program at the Low Country Graduate Center.
- Review and revise, if needed the CGPS 2+2 EE articulation agreement with Trident Technical College.
- Alert incoming cadets and CGPS students of the fall Fundamentals of Engineering exam. Make the application process easy and encourage participation in the refresher courses.
- Conduct two meetings (fall and spring) of the electrical and computer engineering advisory board (ECEAB) and close the loop of the ECE continuous improvement process by rewriting the ECE program objectives to incorporate worthy suggestions provided by the board.

e. Equipment Issues

- Fully deploy and integrate into the teaching curriculum the equipment procured during AY 2004/2005.
- Assist Dr. Barsanti in the deployment of newly acquired control system hardware.
- Install wireless Internet access on the third floor of Grimsley Hall.
- Maintain existing equipment in operation condition and continuously refresh aged and obsolete equipment.