

UHCL Assessment Plan
FY06 (or academic year 2005-06)

School of Science and Computer Engineering

Computer System Engineering – BS Assessment Plan was selected to illustrate thorough and clear description of assessment results and specific actions (planned or taken) actions to improve student learning.

[See next page for plan]

Computer Systems Engineering - BS

Learning Outcomes Assessment

Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
<p>#1: Computer Systems Engineering graduates have an ability to apply mathematics (calculus through multivariate calculus, differential equations, numerical methods, probability theory and discrete math), physics and basic sciences in the design and analysis of engineering systems. (ABET Criterion3.(a), 3.(c), 3.(e))</p>	<p>a, h</p>	<p>1. Administer course objectives survey instrument for each CENG course and assess the results each semester. Courses that contribute to this objective are: 1. CENG 3133/3113, 2. CENG 3134/3114, 3. CENG 3135/3115, 4. CENG 3331/3311, 5. CENG 3531/3511, 6. CENG 4133/4113, 7. CENG 4331, 8. CENG 4625/4626, 2.* Faculty committee review senior project documentation and presentations at student assessment conference. 3.* An industrial advisory board comprised of three industry experts in computer science and three experts in computer system engineering review senior project documentation and presentations at student assessment conference.</p>	<p>1. Each course should have $\geq 70\%$ of the objectives rated as acceptable and each objective should have $\geq 70\%$ of respondents rating their command of the objective positively. 2. At least 80% of the projects must have at least 80% of the objectives rated meets or exceeds expectations. In addition each objective must receive at least 80% meets or exceeds expectations ratings when evaluated using the assessment rubric for senior projects. 3.* At least 80% of the projects must have at least 80% of the objectives rated meets or exceeds expectations. In addition each objective must receive at least 80% meets or exceeds expectations ratings when evaluated using the assessment rubric for senior projects.</p>	<p>1.CENG 3133/3113, outcomes 1-5 > 70% acceptable. outcome 6 59% acceptable CENG 3134/3114,all outcomes >70% acceptable CENG 3135/3115,all outcomes >70% acceptable CENG 3331/3311, all outcomes >70% acceptable CENG 3531/3511, all outcomes >70% acceptable CENG 4133/4113, all outcomes >70% acceptable CENG 4331, all outcomes >70% acceptable CENG 4625/4626, all outcomes >70% acceptable 2. Graduating Senior Survey: Question3 relating to the ability to apply mathematics. 100% rated this question either prepared or well prepared. 3. Exit Interview: Outcome 1 question a : The average rounded rating for all students interviewed (14) was 3.36 or Good.4. A faculty committee of three faculty reviewed the senior project material in 2005-2006. All senior projects received greater than 80% meets or exceeds expectations in all categories. Each category received greater than 80% meets or exceeds expectations. 5. Industrial advisors evaluated the senior projects at the Senior Projects Assessment Day seminars in 2005-2006. All senior projects received greater than 80% meets or exceeds expectations in all categories from the industrial evaluators. Each category received greater than 80% meets or exceeds expectations from the industrial advisors.</p>	<p>This outcome meets the requirements set forth by the faculty and approved by the advisory board. However, the faculty have noticed that many senior projects may not include rigorous mathematical calculations or specific applications of science. Additionally, based upon our attendance at Best Assessment Processes VIII, and our consultant's report and recommendations the faculty have decided to adopt an assessment method that directly assesses these items by assigning specific problems from courses within our curriculum that address this outcome. We have begun the investigation of how we will proceed by prototyping the process beginning with the final exams of two courses in the Spring semester 2006. The courses are CENG 3133 Linear Circuits and CENG 3134 Advanced Linear Circuits. We have chosen representative problems from each of the final exams that should more directly represent the ability of students in the applications of Mathematics. The results are as follows: CENG 3133 Problem 4 Circuit Analysis: The average score on this problem was 9.6 out of 20 CENG 3134 Problem 1: Circuit Analysis and Laplace Transforms: The average score for this problem was 5.3 out of 10. Problem 2: Circuit analysis and Laplace transforms. The average score for this item was 7.8 points out of 10. Faculty analysis of the problems determined that the underlying issue was not with mathematics, but with regard to the ability of students to write integro-differential equations from a circuit diagram. The faculty recommend more in depth coverage of the topic in CENG 3133 as well as a brief review of the concepts in CENG 3134.</p>

Learning Outcomes Assessment					
Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
#2: Computer Systems Engineering graduates have an ability to apply core computer science and computer engineering fundamentals in the design and analysis of engineering systems. This capability includes the specification, implementation, and testing of systems that meet or exceed performance, cost, safety and quality criteria. (ABET Criterion3.(a), 3.(c), 3.(e), 3.(k))	a, h	'1. Administer course objectives survey instrument for each CENG course and assess the results each semester. Courses that contribute to this objective are: 1. CENG 3132/3112, 2. CENG 3133/3113, 3. CENG 3134/3114,4. CENG 3135/3115, 5. CENG 3331/3311, 6. CENG 3531/3511, 7. CENG 3624 8. CENG 4133/4113, 9. CENG 4331, 10. CENG 4534, 11. CENG 4625/4626 , 2.* Faculty committee review senior project documentation and presentations at student assessment conference. 3.* An industrial advisory board comprised of three industry experts in computer science and three experts in computer system engineering review senior project documentation and presentations at student assessment	1. Each course should have >= 70% of the objectives rated as acceptable and each objective should have >= 70% of respondents rating their command of the objective positively. 2. At least 80% of the projects must have at least 80% of the objectives rated meets or exceeds expectations. In addition each objective must receive at least 80% meets or exceeds expectations ratings when evaluated using the assessment rubric for senior projects. 3.* At least 80% of the projects must have at least 80% of the objectives rated meets or exceeds expectations. In addition each objective must receive at least 80% meets or exceeds expectations ratings when evaluated using the assessment rubric for senior	1. CENG 3132/3112, all outcomes >70% acceptable CENG 3133/3113, outcomes 1-5 > 70% acceptable. outcome 6 59% acceptable CENG 3134/3114, all outcomes >70% acceptable CENG 3135/3115, all outcomes >70% acceptable CENG 3331/3311, all outcomes >70% acceptable CENG 3531/3511, all outcomes >70% acceptable CENG 3624, all outcomes >70% acceptable CENG 4133/4113, all outcomes >70% acceptable CENG 4331, all outcomes >70% acceptable CENG 4534/4514, outcomes 1-6 >70% acceptable. outcome 7 57% acceptable CENG 4625/4626, all outcomes >70% acceptable .2. Graduating Senior Survey: Question 2 relating to the ability to develop software. 86% of respondents rated this question prepared or well prepared Question 3 relating to the ability to apply mathematics. 100% of respondents rated this question prepared or well prepared. Question 4 relating to the ability to apply engineering principals. 100% of respondents rated this question prepared or well prepared Question 5 relating to the ability to design and conduct experiments. 86% of respondents rated this question prepared or well prepared 3. Exit Interview: Outcome 2 question b: The average rounded rating for all students interviewed (14) was 3.54 or Excellent.4. A faculty committee of three faculty reviewed the senior project material in 2005-2006. All senior projects received greater than 80% meets or exceeds expectations in all categories.Each category received greater than 80% meets or exceeds expectations. 5. Industrial advisors evaluated the senior projects at the Senior	This outcome meets the requirements set forth by the faculty and approved by the advisory board. The faculty however have suggested that additional problems and lecture time be allocated to CENG 4534 regarding the topic of structural models in VHDL

Learning Outcomes Assessment					
Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
#3: Computer Systems Engineering graduates have an ability to design and implement individual and group computer systems engineering experiments, including the recording and interpretation of data using current engineering tools. (ABET Criterion 3.(b), 3.(c), 3.(d), 3.(k))	a, c, d, h	1. Administer course objectives survey instrument for each CENG course and assess the results each semester. Courses that contribute to this objective are: 1. CENG 3132/3112, 2. CENG 3133/3113, 3. CENG 3134/3114, 4. CENG 3135/3115, 5. CENG 3331/3311, 6. CENG 3531/3511, 7. CENG 3624 8. CENG 4133/4113, 9. CENG 4331, 10. CENG 4534, 11. CENG 4625/4626 , 2.* Faculty committee review senior project documentation and presentations at student assessment conference. 3.* An industrial advisory board comprised of three industry experts in computer science and three experts in computer system engineering review senior project documentation and presentations at student assessment	1. Each course should have >= 70% of the objectives rated as acceptable and each objective should have >= 70% of respondents rating their command of the objective positively. 2. At least 80% of the projects must have at least 80% of the objectives rated meets or exceeds expectations. In addition each objective must receive at least 80% meets or exceeds expectations ratings when evaluated using the assessment rubric for senior projects. 3.* At least 80% of the projects must have at least 80% of the objectives rated meets or exceeds expectations. In addition each objective must receive at least 80% meets or exceeds expectations ratings when evaluated using the assessment rubric for senior	1. CENG 3132/3112, all outcomes >70% acceptable CENG 3133/3113, outcomes 1-5 > 70% acceptable. outcome 6 59% acceptable CENG 3134/3114, all outcomes >70% acceptable CENG 3135/3115, all outcomes >70% acceptable CENG 3331/3311, all outcomes >70% acceptable CENG 3531/3511, all outcomes >70% acceptable CENG 3624, all outcomes >70% acceptable CENG 4133/4113, all outcomes >70% acceptable CENG 4331, all outcomes >70% acceptable CENG 4534/4514, outcomes 1-6 >70% acceptable. outcome 7 57% acceptable CENG 4625/4626, all outcomes >70% acceptable 2. Graduating Senior Survey: Question 5 relating to the ability to design and conduct experiments. 86% of respondents rated this question prepared or well prepared 3. Exit Interview: Outcome 2 question c: The average rounded rating for all students interviewed (14) was 3.46 or Good.4. A faculty committee of three faculty reviewed the senior project material in 2005-2006. All senior projects received greater than 80% meets or exceeds expectations in all categories. Each category received greater than 80% meets or exceeds expectations. 5. Industrial advisors evaluated the senior projects at the Senior Projects Assessment Day seminars in 2005-2006. All senior projects received greater than 80% meets or exceeds expectations in all categories form the industrial evaluators. Each category received greater than 80% meets or exceeds expectations from the industrial advisors.	This outcome meets the requirements set forth by the faculty and approved by the advisory board. The faculty however have suggested that additional problems and lecture time be allocated to CENG 4534 Digital Design regarding the topic of structural models in VHDL.

Learning Outcomes Assessment

Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
<p>#4: Computer Systems Engineering graduates have an understanding of professional and ethical responsibility (ABET Criterion 3.(f).</p>	<p>e, h</p>	<p>'1.* Students will produce a self-analysis paper to critically analyze their senior projects with regard to ten criteria: 1) functional requirements, 2) constraints, 3) economic, 4) environmental, 5) social, political and global, 6) ethical, 7) health and safety, 8) manufacturability, 9) maintainability, and 10) development. Faculty will evaluate each project based on how well each criteria is addressed. 2. Degree audits showing completion of CENG 3624, 4625, 4626, 3. Students will complete an online ethics module with a required score of 100% during their senior project course sequence. 4. Advisory Board exit interview, questions Q3A and Q3B.</p>	<p>1. A rating of Meets or Exceeds expectations on the ethics section of the self analysis paper. 2.100% of students have successfully completed the required courses. 3. !00% of the students complete the online module. 4. Average ratings by the Advisory board interviewers of >= 2.5</p>	<p>1. Question 12 relating to the ability to conduct work activities in an ethical manner. 86% of respondents rated this question prepared or well prepared. 2. Section 6 of the Senior Project Analysis paper met the 80%; meet or exceed criterion. 3. Questions Q3A and Q3B: A scenario is provided and Q3A asks the students to identify and ethical dilemma. Q3B asks students to identify possible solutions and potential ramifications of suggested actions. The average rounded ratings were 3.14 and 3.21 respectively. Outcome 4 question d: The average rounded rating for all students interviewed (14) was 3.71 or Excellent.</p>	<p>This outcome meets the requirements set forth by the faculty and approved by the advisory board. While no changes or actions are indicated at time the faculty are designing an online ethics module to be use in conjunction with lectures and case studies in CENG 3624 Introduction to Engineering.</p>

Learning Outcomes Assessment

Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
<p>#5: Computer Systems Engineering graduates have an ability to clearly convey technical material through both formal written papers and oral presentations. (ABET Criterion 3.(g))</p>	<p>b, c, h</p>	<p>1. Students in Senior Projects course will make a 30-minute presentation per group about their design project. Faculty and an industry advisory board comprised of three industry experts in computer science and three experts in computer systems engineering will evaluate team presentation, and review the Senior Project documentation. Faculty and board members will evaluate student presentations using an assessment rubric for oral communication (per student).2.* Faculty committee review senior project documentation and presentations.</p>	<p>1. Scores per student ≥ 21 on the CSEN Oral Communication Grading Rubric as well as all rubric items > 2. 2. A rating of meets or exceeds expectations on question 4 on the Senior Project assessment rubric faculty version.</p>	<p>1. Question 1.a relating to written communication skills and b related to oral communication skills. 86% of respondents rated these questions prepared or well prepared.2. For FY 2005-2005 1 student out of 19 did not meet the required score of 15 (12.66).3. FY 2005-2005 1 team out of 6 did not meet the required score of 15 (13.5). 4. Question Q5 : The average rounded rating for all students interviewed (14) was 3.57 or Excellent Outcome 5 question e: The average rounded rating for all students interviewed (14) was 3.86 or Excellent. 5. Question 4 relating to the documentation being well written. 96% of respondents rated this question prepared or well prepared.</p>	<p>This outcome meets the requirements set forth by the faculty and approved by the advisory board.</p>

Learning Outcomes Assessment

Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
<p>#6: Computer Systems Engineering graduates have a breadth of education in the social sciences and humanities as well as an understanding of contemporary issues that shall enable them to consider the significance of their Computer Systems Engineering solutions in the societal and global contexts. (ABET Criterion 3.(h), 3.(j))</p>	<p>b, c, h</p>	<p>1.* Students will produce a self-analysis paper to critically analyze their senior projects with regard to ten criteria: 1) functional requirements, 2) constraints, 3) economic, 4) environmental, 5) social, political and global, 6) ethical, 7) health and safety, 8) manufacturability, 9) maintainability, and 10) development. A faculty committee will evaluate each analysis paper section using a scoring rubric. 2. Degree audits showing completion of the state mandatory core curriculum and CENG 3624, 4625, and 4626. 3. Degree audits showing the completion of the statutory core curriculum. 4. Advisory Board exit interview, questions Q2A and Q2B</p>	<p>1. A rating of Meets or Exceeds expectations on the ethics and social, political and global sections of the self analysis paper. 2. 100% of all graduates have successfully completed the courses. 3. 100% of all graduates have successfully completed the core curriculum. 4. Average ratings by the Advisory board interviewers of >= 2.5</p>	<p>1. Question 10 relating to the ability to consider global and societal impacts of designs . 43% of respondents rated this question prepared or well prepared. 2. For FY 2005-2006: Both section 4 and 5 of the Senior Project Analysis paper met the 80%; meet or exceed criterion. 3. Questions Q2A and Q2B: Q2A addresses contemporary issues and Q2b addresses impact on society. The average rounded ratings were 2.64 and 3.29 respectively. Outcome 6 question f: The average rounded rating for all students interviewed (14) was 3.21 or good. 4. For FY 2005-2006, 100% of the graduates completed the t core curriculum</p>	<p>This outcome meets the requirements set forth by the faculty and approved by the advisory board. The faculty have decided to address the results regarding knowledge of contemporary issues by adding more in depth coverage of this topic in the Senior Project sequence (CENG 3624/4625/4626).</p>

Learning Outcomes Assessment					
Learning Outcomes	ULO ¹	Assessment Methods	Criteria for Success	Assessment Results	Use of Results
#7: Computer Systems Engineering graduates have a recognition of the need for, and the ability to engage in, life long learning achieved by participating in individual and group projects in which they have little or no prior experience and must develop the knowledge themselves. (ABET Criterion 3.(I))	c, g, h	1. Students will produce a self-analysis paper to critically analyze their senior projects with regard to ten criteria: 1) functional requirements, 2) constraints, 3) economic, 4) environmental, 5) social, political and global, 6) ethical, 7) health and safety, 8) manufacturability, 9) maintainability, and 10) development. Faculty will evaluate each project based on how well each criteria is addressed. 2. Advisory Board exit interview, questions Q1A and Q1B	1.A rating of Meets or Exceeds expectations on the development section of the self analysis paper. 2. Average ratings by the Advisory board interviewers of >= 2.5	1. Question 15 a relating to the ability to learn independently. 100% of respondents rated this question prepared or well prepared. 2. For FY 2005-2006: Section 10 of the Senior Project Analysis paper met the 80%; meet or exceed criterion3. For FY 2005-2006: Section 10 of the Senior Project Analysis paper met the 80% meet or exceed criterion Questions Q1A and Q1B: Q1A addresses the recognition of the need for further education and Q1B addresses the student's plan for keeping up with new developments in the industry. The average rounded ratings were 3.86 and 3.50 respectively. Outcome 7 question g: The average rounded rating for all students interviewed (14) was 3.57 or Excellent.	This outcome meets the requirements set forth by the faculty and approved by the advisory board.

¹University Learning Outcomes (ULO)

In developing student learning outcomes, select from the list below the university level learning outcome(s) that match most closely to the learning outcomes.

- a. Critical Thinking - The mastery of higher order thinking skills including quantitative and qualifying analysis, synthesis, and evaluation of information, argumentation, problem solving, and creativity.

- b.** Communication - Effective written and oral expression including the use of such media as audio, video, text, and graphics.
- c.** Information Technology - The application of information technology to search for, access, retrieve, organize, interpret, and transfer information.
- d.** Interpersonal Competence - The capacity to understand many points of view and to work responsibly with others in a variety of settings.
- e.** Ethical Citizenship - The ability to make ethical decisions in person and professional societal contexts
- f.** Global Perspective - The capability to demonstrate awareness of local and global diversity, within the students chosen discipline, the international economy, and the interrelated worldwide environment.
- g.** Self-directed Learning - The ability to identify, assess, revise, and monitor learning to achieve personal and professional goals.
- h.** Other: Professional accreditation standards