

**Student Learning Outcomes Assessment Summary  
Fall 2006 – Spring 2007**

**Department of Computer Science  
University of West Florida**

The Computer Science Academic Learning Compact (ALC) outlines the learning outcomes for our students organized in five main domains: content, critical thinking, communication, integrity/values, and project management. See the CS ALC document at <http://www.uwf.edu/cutla/ALC/compacts.html> for complete details.

**ALC Domains Addressed in 2006-07 and Corresponding Student Learning Outcomes**

**A. Project Management (PM)**

PM-1. Develop and employ effective management skills to enable project planning, communication, and delivery

PM-2. Work as part of a team in the development of software systems

**B. Critical Thinking (CT)**

CT-1. Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains

CT-2. Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills

CT-3. Develop applications based upon the computer science body of knowledge

**Assessment Measures**

The following table specifies the measures used to address each learning outcome. We included one direct measure of assessment and one indirect measure to assess each outcome.

<b>Assessment Measure</b>	<b>PM Outcomes Addressed</b>	<b>CT Outcomes Addressed</b>	<b>Use of Information</b>
In several upper-level courses (CIS4327 Systems Project, CEN4516 Networks, and COP 4601 Software Systems), students will work on assignments that meet departmental standards and integrate what they have learned. Students will work on assignments	PM-1 PM-2	CT-1 CT-2 CT-3	Each semester, the course instructors complete the Assessment Worksheet. Annually, the course coordinators report data to the department at a departmental curriculum meeting. The department takes any appropriate actions to improve

<p>collaboratively, and report the results of their work through written reports or presentations. The instructors use explicit criteria to evaluate student work.</p>			<p>student learning outcomes or resolve problems. The department reports on meeting outcomes to dean and accreditation committees. All data is reviewed as part of the program review every five years, starting with the one in 2005-06.</p>
<p>Exit surveys are distributed to all graduating seniors asking them how well they thought they learned project management and critical thinking skills.</p>	<p>PM-1 PM-2</p>	<p>CT-1 CT-2 CT-3</p>	<p>Annually, the undergraduate advisor reports survey data at a departmental curriculum meeting. The department takes any appropriate actions to improve student learning outcomes or update survey. The department reports on meeting outcomes to dean and accreditation committees. All data are reviewed as part of the program review every five years, starting with the one in 2005-06.</p>

**Summary of Assessment Results**

The completed assessment worksheets from CEN4516, CIS4327, and COP4601 for fall 2006 and spring 2007 are included in Appendix A. For CEN4516 Computer Networks in the fall of 2006, at least 13% of the students failed to meet the project management outcomes, with the exception that 25% of students failed to meet the Group Testing requirement of PM-2. With respect to the critical thinking outcomes, 25% of the students failed to meet them, with the exception that only 13% of students failed to meet the Protocol Design requirement of CT-2. There was a slight improvement in meeting the critical thinking outcomes in the spring 2007 semester, with only 21% of the students failing to meet them, and only 3% failing to meet the Protocol Design requirement of CT-2. At least 12% of students failed to meet the project management outcomes in the spring, with an even larger number (21%) of students failing to meet the Oral Demonstration and Group Testing sub-outcomes. To improve the learning outcomes, the instructor recommended comparison of original protocol with changes to the protocol once the project was completed.

For CIS4327 Systems Project, 100% of the students met both the project management and critical thinking learning outcomes in both the fall and spring. To improve the learning outcomes, the course instructor recommended that students post project presentations and reports to a departmental or faculty web site for review by faculty and students.

For COP4601 Software Systems in the fall, the course coordinator assessed CS students and CIS students collectively as well as separately. 43% of the students taking the class were CS students and 57% were CIS students. The combined results indicated that 20% of all students failed to meet the outcomes, with the exception that only 10% of students failed to meet CT-2, demonstrating proficiency in the software lifecycle. The individual results indicated that the CIS students met all the outcomes except that 12.5% of students didn't meet PM-2, working as part of a team. However, 33% of CS students didn't meet the critical thinking outcomes and PM-2, while 50% of CS students didn't meet PM-1. In the spring offering of COP4601, the students were assessed collectively. Both CS and CIS students met both project management outcomes and two of the three critical thinking outcomes, CT-1 and CT-2. 20% of the students failed to meet CT-3, developing applications based on the computer science body of knowledge.

### **Use of Results to Improve Program(s)**

Overall, the majority of both CS and CIS students were able to meet or exceed expectations for the project management and critical thinking learning outcomes assessed. For the project management outcomes, students were more likely to fail to meet PM-2, indicating that more opportunities should be created earlier in the curriculum for students to work as part of a team in the development of software systems. Out of the three critical thinking outcomes, students were more likely to meet CT-1 than CT-2 or CT-3. This also indicates that more assignments and projects should be incorporated into the curriculum to help students develop applications that *integrate* computer science knowledge and software development skills.

### **Evaluation of 2006-07 Assessment Plan**

The 2006-07 assessment plan fulfilled its intended goal, namely to evaluate student achievement of our department's project management and critical thinking learning outcomes. By identifying key courses which emphasize those outcomes, we were able to evaluate how well our students met the desired learning objectives. The undergraduate curricula are currently being revised and the new programs are expected to take effect starting fall 2008. In light of the curricular revisions, minimal changes will be made to the assessment plan for the 2007-08 academic year, since this will be the last year that the current program is offered.

Feedback received from the faculty involved in this year's assessment plan was helpful in improving achievement of our program outcomes, and also in tweaking the assessment process. At the annual assessment review meeting, several modifications to the assessment plan and worksheet were recommended. An annual survey will be developed and distributed to all students instead of an exit survey intended only for graduating students. This will enable us to get feedback from more students, including those who are graduating. The assessment worksheet will be revised to differentiate between a course's initial enrollment, and the number of students who actually completed it. Faculty will be encouraged to include recommendations on the assessment worksheet that can be used to improve or update student learning outcomes or assessment measures, as well as to improve the assessment worksheet and process.

## **Appendix A: Completed Assessment Worksheets for Fall 2006 and Spring 2007 Courses**

### **Student Learning Outcomes Assessment Data Fall 2006 – Spring 2007**

**Department of Computer Science  
University of West Florida**

This appendix includes assessment data collected from the following courses:

#### **Fall 2006:**

CEN4516 – Computer Networks

CIS4327 – Systems Project

COP4601 – Software Systems (Total data collected, as well as separate data for CS and CIS students enrolled)

#### **Spring 2007:**

CEN4516 – Computer Networks

CIS4327 – Systems Project

COP4601 – Software Systems

In accordance with our departmental assessment plan, our assessment summary will be compiled and submitted annually at the end of the spring semester.

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: CEN4516 Semester: Fall 2006
2. Instructor(s): Sharon Simmons
3. Total course enrollment: 8 (1 of the 8 withdrew from the course)
4. Number of sections of the course: 1
5. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	Time estimates and time sheets	2/8	5/8	1/8
	Oral demonstration	2/8	5/8	1/8
PM-2: Work as part of a team in the development of software systems	Protocol Development	2/8	5/8	1/8
	Group Testing	2/8	4/8	2/8
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Software written	2/8	4/8	2/8
CT-2: Demonstrate	Protocol Design	2/8	5/8	1/8

proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills	Independent software development and programming	2/8	4/8	2/8
	Independent testing	2/8	4/8	2/8
	System testing	2/8	4/8	2/8
CT-3: Develop applications based upon the computer science body of knowledge	Final project	2/8	4/8	2/8

6. Recommendations to improve or update student learning outcomes or assessment measures, if any:

Further develop time estimate and timesheet templates for the students.

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**Course Coordinator's Signature**

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**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: Systems Project CIS4327 Semester: 200608
2. Instructor(s): Ed Rodgers
3. Total course enrollment: 7 Number of sections of the course: 1
4. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	Students submit a project proposal, including requirements, expected deliverables, estimated timeline, and expected work assignments of team members. Teams assess and report progress on a bi-weekly basis.		100%	
PM-2: Work as part of a team in the development of software systems	Students are organized into teams of up three members, however, an individual project is allowed due to individual circumstances.		100%	
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Depending on the nature of their project, students apply skills and principles learned in previous courses: programming, database design, network design, Website development, and/or other appropriate topics.		100%	

CT-2: Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills	Depending on the nature of their project, students apply principles learned in their previous software engineering courses in planning, implementing and managing one or more phases of the systems development life cycle: feasibility, requirements definition, design, programming, testing, implementation, and maintenance.		100%	
CT-3: Develop applications based upon the computer science body of knowledge	Projects proposals are reviewed by the professor to ensure that the experience will draw upon appropriate elements of the computer science body of knowledge and will enhance the background of the students.		100%	

5. Recommendations to improve or update student learning outcomes or assessment measures, if any:

Students could post project PowerPoint presentations to a departmental or faculty Website for review by faculty and students.

Project reports could be made available for review by faculty and students.

Edward G. Rodgers, Ph.D.  
**Course Coordinator's Signature**

17 January 2007  
**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: Software Systems cop4601 (all students) Semester: \_\_Fall 06\_\_
2. Instructor(s): \_Anthony Pinto
3. Total course enrollment: \_\_14\_\_(all students) Number of sections of the course: \_\_1\_\_
4. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	1. Build a staged delivery plan. 2. Write a paper on their work through the SE process. 3. Delivery of each stage of the project on time	30%	50%	20%
PM-2: Work as part of a team in the development of software systems	1. Peer evaluations 2. Team discussion forums participation. 3. Team meeting with instructor. (online) 4. Assessment of artifacts related to role of the team.	60%	20%	20%
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Development of a complex application. The problem involved GUI, file processing, Networking and complex Program Control logic.	60%	20%	20%

<p>CT-2: Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills</p>	<p>Develop artifacts related to the project in CT1.  Artifacts include:</p> <ol style="list-style-type: none"> <li>1. Use cases</li> <li>2. Architectural design</li> <li>3. Staged delivery plan</li> <li>4. Code and design reviews</li> <li>5. Detailed design</li> <li>6. Test cases</li> <li>7. Bug reports</li> <li>8. Source code</li> </ol> <p>Complete exam on project management</p>	<p>60%</p>	<p>30%</p>	<p>10%</p>
<p>CT-3: Develop applications based upon the computer science body of knowledge</p>	<p>The final application and all its artifacts</p>	<p>60%</p>	<p>20%</p>	<p>20%</p>

5. Recommendations to improve or update student learning outcomes or assessment measures, if any:

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**Course Coordinator's Signature**

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**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: Software Systems cop4601 (CS students) Semester: \_\_Fall 06\_\_
2. Instructor(s): \_Anthony Pinto
3. Total course enrollment: \_\_6\_\_(CS students) Number of sections of the course: \_\_1\_\_
4. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	1. Build a staged delivery plan. 2. Write a paper on their work through the SE process. 3. Delivery of each stage of the project on time	33%	17%	50%
PM-2: Work as part of a team in the development of software systems	1. Peer evaluations 2. Team discussion forums participation. 3. Team meeting with instructor. (online) 4. Assessment of artifacts related to role of the team.	33.3%	33.3%	33.3%
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Development of a complex application. The problem involved GUI, file processing, Networking and complex Program Control logic.	33.3%	33.3%	33.3%

<p>CT-2: Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills</p>	<p>Develop artifacts related to the project in CT1.          Artifacts include:</p> <ul style="list-style-type: none"> <li>9. Use cases</li> <li>10. Architectural design</li> <li>11. Staged delivery plan</li> <li>12. Code and design reviews</li> <li>13. Detailed design</li> <li>14. Test cases</li> <li>15. Bug reports</li> <li>16. Source code</li> </ul> <p>Complete exam on project management</p>	<p>33.3%</p>	<p>33.3%</p>	<p>33.3%</p>
<p>CT-3: Develop applications based upon the computer science body of knowledge</p>	<p>The final application and all its artifacts</p>	<p>33.3%</p>	<p>33.3%</p>	<p>33.3%</p>

5. Recommendations to improve or update student learning outcomes or assessment measures, if any:

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**Course Coordinator's Signature**

\_\_\_\_\_  
**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: Software Systems cop4601 (CIS students) Semester: Fall 06
2. Instructor(s): Anthony Pinto
3. Total course enrollment: 8 (CIS students) Number of sections of the course: 1
4. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	1. Build a staged delivery plan. 2. Write a paper on their work through the SE process. 3. Delivery of each stage of the project on time	62%	38%	
PM-2: Work as part of a team in the development of software systems	1. Peer evaluations 2. Team discussion forums participation. 3. Team meeting with instructor. (online) 4. Assessment of artifact related to role of the team.	62%	25.5%	12.5%
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Development of a complex application. The problem involved GUI, file processing, Networking and complex Program Control logic.	62%	38%	

<p>CT-2: Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills</p>	<p>Develop artifacts related to the project in CT1.  Artifacts include:  17. Use cases  18. Architectural design  19. Staged delivery plan  20. Code and design reviews  21. Detailed design  22. Test cases  23. Bug reports  24. Source code  Complete exam on project management</p>	<p>62%</p>	<p>38%</p>	
<p>CT-3: Develop applications based upon the computer science body of knowledge</p>	<p>The final application and all its artifacts</p>	<p>62%</p>	<p>38%</p>	

5. Recommendations to improve or update student learning outcomes or assessment measures, if any:

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**Course Coordinator's Signature**

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**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: CEN4516 Semester: Spring 2007
2. Instructor(s): Sharon Simmons
3. Total course enrollment: 33 (3 of the 33 withdrew from the course)
4. Number of sections of the course: 2
5. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	Time estimates and time sheets	3/33	24/33	6/33
	Oral demonstration	4/33	22/33	7/33
PM-2: Work as part of a team in the development of software systems	Protocol Development	4/33	25/33	4/33
	Group Testing	4/33	22/33	7/33
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Software written	4/33	22/33	7/33
CT-2: Demonstrate	Protocol Design	4/33	25/33	4/33

proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills	Independent software development and programming	4/33	22/33	7/33
	Independent testing	0/33	26/33	7/33
	System testing	4/33	22/33	7/33
CT-3: Develop applications based upon the computer science body of knowledge	Final project	4/33	22/33	7/33

6. Recommendations to improve or update student learning outcomes or assessment measures, if any:

Comparison of original protocol with changes to the protocol once project was completed.

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**Course Coordinator's Signature**

\_\_\_\_\_  
**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: Systems Project CIS4327 Semester: 200701
2. Instructor(s): Ed Rodgers
3. Total course enrollment: 10 Number of sections of the course: 1
4. For each student learning outcome, describe how that outcome was assessed (assessment measure), and indicate percentage of students who exceeded, met, or failed to meet expectations.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	Students submit a project proposal, including requirements, expected deliverables, estimated timeline, and expected work assignments of team members. Teams assess and report progress on a bi-weekly basis.		100%	
PM-2: Work as part of a team in the development of software systems	Students are organized into teams of up three members, however, an individual project is allowed due to individual circumstances.		100%	
CT-1: Critically analyze and apply a range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains	Depending on the nature of their project, students apply skills and principles learned in previous courses: programming, database design, network design, Website development, and/or other appropriate topics..		100%	

CT-2: Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills	Depending on the nature of their project, students apply principles learned in their previous software engineering courses in planning, implementing and managing one or more phases of the systems development life cycle: feasibility, requirements definition, design, programming, testing, implementation, and maintenance.		100%	
CT-3: Develop applications based upon the computer science body of knowledge	Projects proposals are reviewed by the professor to ensure that the experience will draw upon appropriate elements of the computer science body of knowledge and will enhance the background of the students.		100%	

5. Recommendations to improve or update student learning outcomes or assessment measures, if any:

Students could post project PowerPoint presentations to a departmental or faculty Website for review by faculty and students.

Project reports could be made available for review by faculty and students.

Collaboration software needs to be made available to students and faculty to coordinate team activities from remote locations. This is especially important since we are moving to more online delivery. In addition, the faculty member teaching this course needs to facilitate the makeup of "virtual teams" to ensure that the team aspect of this course is continued.

Edward G. Rodgers, Ph.D.  
**Course Coordinator's Signature**

1 May 2007  
**Date**

## Student Learning Outcomes Assessment Worksheet

Department of Computer Science  
University of West Florida

1. Course name and number: COP4601 Software Systems Semester: \_\_\_Spring/07
2. Instructor(s): \_Norman Wilde\_
3. Total course enrollment: \_\_10\_ Number of sections of the course: \_\_1\_\_
4. For each student learning outcome, describe how that outcome was assessed, and rate average student performance in terms of exceeding, meeting, or failing to meet expectations<sup>1</sup>.

Student Learning Outcome	Assessment of Outcome	Exceeds Expectations	Meets Expectations	Fails to Meet Expectations
PM-1: Develop and employ effective management skills to enable project planning, communication, and delivery	Number of students whose team successfully completed a Software Development Plan review, and then presented weekly status briefs showing how they were carrying out the plan.	0	10	0
PM-2: Work as part of a team in the development of software systems	Number of students whose team successfully completed the required software application and prepared a Project History document	7	3	0
CT-1: Critically analyze and apply a	N/A. This outcome is not assessed for this course	N/A	N/A	N/A

<sup>1</sup> The course this semester simulated a software development team working in industry, and included two phases:

1. An individual work phase, requiring most students to write a significant package of Java code, while three designated *team leaders* developed a detailed Software Development Plan for use in the second phase. The team leaders were chosen as the students with the highest GPA at the beginning of the course, and thus are judged to be those most likely to perform the code writing task.
2. A team work phase, in which teams of students reviewed and confirmed the SDP, and then followed it to create an application that built upon the Java code written in the first phase. Weekly status briefs were presented by each team.

Final products of the work were the deployed application and a Project History document summarizing team experience and lessons learned.

range of computer science concepts, principles, and practices in the context of solving problems across a range of problem domains				
CT-2: Demonstrate proficiency in software lifecycle principles, using a range of problem solving, programming, and software engineering skills	Number of students whose team successfully completed the required software application and prepared a Project History document	7	3	0
CT-3: Develop applications based upon the computer science body of knowledge	Number of students who developed the Java package required in the individual work phase. Not applicable for the three "team leaders"	0	5	2

5. Recommendations to improve or update student learning outcomes or assessment measures, if any:

The coding task this year (writing the Java package) was quite ambitious, and included reading from a socket large volumes of data representing the instantaneous locations of cell phones, tracking phones to see if they were on major Pensacola highways, deducing traffic congestion conditions on those highways from the speed of movement of the cell phones, and serving the resulting congestion data to remote clients in real time. The programming required using sockets, threads, and efficient data structures.

Two students were not able to do this coding task. One of these suffered from major health problems requiring him to take strong painkillers throughout the semester; he should probably be congratulated for finishing the course at all. There is no particular excuse for the other, but I don't think we are doing badly if all but one of our students can program at this level.

In the team phase, two of the three teams completed very impressive versions of the total application; I rate them as exceeding expectations. The third team was hampered by losing two team members, one of whom dropped and the other being the student with health problems mentioned above. They could have done a better job of re-planning when they lost expected resources, but their final project history shows that they have absorbed that lesson. I rate them as meeting expectations.

Overall, from this experience I would say that our program is meeting its goals.

\_\_Norman Wilde\_\_\_\_\_  
**Instructor's Signature**

\_\_\_\_April 28, 2007\_\_\_\_\_  
**Date**