Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Computer Systems Technology	225	CST 225 05/05/2018-PC Networking
Division	Department	Faculty Preparer
Business and Computer Technologies	Computer Instruction	William Reichert
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Identify and differentiate the main types of networks and network operating systems, including peer-to-peer and client/server implementations.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013
    - Course section(s)/other population: Cross-section of students in all sections of CST225 Note: likely will be the complete class, but will be representative of all skill levels.
    - Number students to be assessed: 10 ? 40
    - How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 ? PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
    - Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome?s part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be

considered appropriate to the particular objective and therefore the outcome associated with that objective.

- Who will score and analyze the data: Instructors in our department who are not directly associated with teaching the PC Networking course will be used to blind-score and tabulate the results. These will be reviewed with all instructors in our department, those directly teaching the courses, as well as those not teaching it. The above rubric will be used as the standard of measurement during the analysis period. However, the instructors teaching/developing the course will make necessary analysis/changes based on the results.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2018	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
33	16

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

The final enrollment of the day section of CST 225 was 16, and I assessed all of them. This was the total number of students that actually completed the day section of the class, as I did the assessment on the last day. There were withdrawals throughout the semester from both day and night sections. The actual student count that finished the course was 16 in the day section and 12 in the night section for a total of 28.

I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Again, as stated above, I assessed ALL the day section students that actually completed the course and got an actual grade for it - the excellent students as well as the "not so excellent" students - everyone.

Again, I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

I wrote a brand new 50-question test just for this course assessment. Each of the five outcomes had 10 questions devoted to the objectives in that outcome. The questions represented what I felt were the key concepts associated with each objective in that outcome and were questions that represented a general understanding of the concept. However, based on the results as you will see below, I should have made them not so general and possibly more specific and technical, as the results were much higher than I expected (particularly as I had included ALL day section students in the class).

The rubric used for the evaluating the success:

Overall test average for the whole test exceeded 70%.

70% of the students exceeded 70% or above score on the overall test.

Overall test average for each outcome exceeded 70%.

70% of the students exceeded 70% or above on each outcome.

Individual questions addressing objectives within the outcome will be answered correctly by more than 50% of the students.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Overall test average for the whole test was 44.8/50 = 89.6%.

16/16 of the students exceeded 70% for the overall test average.

Overall average score for this outcome was 149/160 = 93%.

16/16 of the students exceeded 70% on this outcome = 100%.

No single question from this outcome was missed by more than 50% of the class, in fact, no single question from this outcome was missed by more than 70% of the class.

Overall test average for this outcome was 93% and all students achieved this learning outcome (above 70%), and therefore the standard of success for this outcome was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Areas of strength are in both of the two main areas of this outcome - identifying the types of networks which we have physically, (LAN's, WAN's, etc.) as well as the types of logical networks (peer-to-peer and client server).

Particularly with peer-to-peer/client server types, they were surprisingly strong in differentiating the differences between them, and characteristics defining each (such as the types and multiple reasons for authentication).

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

There were no particularly weak areas here, either with the outcome or the objectives within the outcome. As far as continuous improvement, I plan on the following:

- Bringing the OSI model into the first week, where it can be used along with the physical types of networks where the types of networks will fit into each layer of the OSI model.

Also, I plan on consolidating peer-to-peer/client server into one section of the course - in the present format, client server is actually split up between Week 1 and 5, which hinders the ability of students to tie concepts together from the two parts as they are 4-5 weeks apart.

Outcome 2: Distinguish among the various types of networking topologies, kinds of networking media and network hardware devices.

- Assessment Plan

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1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

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2. Provide assessment sample size data in the table below.

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33	16

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

The final enrollment of the day section of CST 225 was 16, and I assessed all of them. This was the total number of students that actually completed the day section of the class, as I did the assessment on the last day. There were withdrawals throughout the semester from both day and night sections. The actual student count that finished the course was 16 in the day section and 12 in the night section for a total of 28.

I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Again, as stated above, I assessed ALL the day section students that actually completed the course and got an actual grade for it - the excellent students as well as the "not so excellent" students - everyone.

Again, I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

I wrote a brand new 50-question test just for this course assessment. Each of the five outcomes had 10 questions devoted to the objectives in that outcome. The questions represented what I felt were the key concepts associated with each objective in that outcome and were questions that represented a general understanding of the concept. However, based on the results as you will see below, I should have made them not so general and possibly more specific and technical, as the results were much higher than I expected (particularly as I had included ALL day section students in the class).

The rubric used for the evaluating the success:

Overall test average for the whole test exceeded 70%.

70% of the students exceeded 70% or higher on the overall test.

Overall test average for each outcome exceeded 70%.

70% of the students exceeded 70% or above on each outcome.

Individual questions addressing objectives within the outcome will be answered correctly by more than 50% of the students.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Overall test average for the whole test was 44.8/50 = 89.6%

16/16 of the students exceeded 70% for the overall test average.

Overall average score for this outcome was 146/160 = 91%.

16/16 of the students exceeded 70% on this outcome = 100%.

No single question from this outcome was missed by more than 50% of the class, in fact, no single question from this outcome was missed by more than 70% of the class.

Overall test average for this outcome was 91%, and all students achieved this learning outcome (above 70%), so therefore the standard of success for this outcome was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Again, students did extremely well in this outcome as well as the objectives within it. Looking at the objectives, in both areas, the defining of network topologies (bus, start, ring, etc.) as well as identifying the characteristics of the networking media that we use (cross-talking, crossover cables, switches versus hubs, etc.). Virtually all students were able to identify the characteristics of each, as well as the relationships between them.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Again, students have met the standard of success, however, continuous improvement applies here as well. Rather than separate sections of the course, I am combining topologies and physical networking devices (switches, hubs, network adapters) with media types since the devices connect together with the media!!! By combining them in lab and lecture, as they are combined physically in a network, students will gain a better "overall" concept of how data moves through a network.

Outcome 3: Identify various networking architectures, (including frame structure), and define the various levels of the OSI model, distinguishing between various protocols designed around it.

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    - How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 ? PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
    - Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome?s part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be considered appropriate to the particular objective and therefore the outcome associated with that objective.

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	2018	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
33	16

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

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I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

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5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

I wrote a brand new 50-question test just for this course assessment. Each of the five outcomes had 10 questions devoted to the objectives in that outcome. The questions represented what I felt were the key concepts associated with each objective in that outcome and were questions that represented a general understanding of the concept. However, based on the results as you will see below, I should have made them not so general, and possibly more specific and technical, as the results were much higher than I expected, particularly as I had included ALL day section students in the class.

The rubric used for the evaluating the success:

Overall test average for the whole test exceeded 70%.

70% of the students exceeded 70% or above score on the overall test.

Overall test average for each outcome exceeded 70%.

70% of the students exceeded 70% or above on each outcome.

Individual questions addressing objectives within the outcome will be answered correctly by more than 50% of the students.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Overall test average for the whole test was 44.8/50 = 89.6%.

16/16 of the students exceeded 70% for the overall test average.

Overall average score for this outcome was 141/160 = 88%.

14/16 of the students exceeded 70% on this outcome = 87.5%.

No single question from this outcome was missed by more than 50% of the class, in fact, no single question from this outcome was missed by more than 70% of the class.

The overall outcome test average was 88%, and 87% of the students achieved over 70% on this learning outcome. Therefore the standard of success for this outcome was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Again with both the outcome and objectives within the outcome, students once again meet the standard of success. Students were able to correctly identify and differentiate all characteristics associated with point-to-point data transmissions (within a network - frame structure - ethernet), and also identify correctly the various layers of the OSI model.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Again, all standards of success were met here, however I have plans for continuous improvement here as well.

Moving the OSI model to the first week, rather than later in the course, and then each week subsequent to the first week, will match up what we are doing with the particular OSI layer that it applies to. This will give real "physical" meaning to a networking "model."

Also, like the client server networking, point-to-point networking presently is described both in Week 4 (frame structure, ethernet) and Week 6 (802.3 and 802.2 standards). These will now be combined together which makes far more sense as basically they are covering the same thing, one being the physical transmission unit, and secondly, the standards on which the physical unit was based. This improvement in continuity should help student understanding significantly.

Outcome 4: Identify and distinguish between the parts of the TCP/IP protocol stack, including various applications and concepts behind IPv4 and IPv6 addressing.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013

- Course section(s)/other population: Cross-section of students in all sections of CST225
- Number students to be assessed: 10 ? 40
- How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 ? PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
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1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
	2018	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
33	16

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

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I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Again, as stated above, I assessed ALL the day section students that actually completed the course and got an actual grade for it - the excellent students as well as the "not so excellent" students - everyone.

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5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

I wrote a brand new 50-question test just for this course assessment. Each of the five outcomes had 10 questions devoted to the objectives in that outcome. The questions represented what I felt were the key concepts associated with each objective in that outcome and were questions that represented a general understanding of the concept. However, based on the results as you will see below, I should have made them not so general and possibly more specific and technical, as the results were much higher than I expected (particularly as I had included ALL day section students in the class).

The rubric used for the evaluating the success:

Overall test average for the whole test exceeded 70%.

70% of the students exceeded 70% or above on the overall test.

Overall test average for each outcome exceeded 70%.

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6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Overall test average for the whole test was 44.8/50 = 89.6%.

16/16 of the students exceeded 70% for the overall test average.

Overall average score for this outcome was 136/160 = 85%.

13/16 of the students exceeded 70% on this outcome = 81.3%.

No single question from this outcome was missed by more than 50% of the class. However, one question from this outcome was missed by more than 70% of the class - this will be discussed in the Course Summary and Action Plans.

The overall outcome test average was 85%, and 81% of the students achieved over 70% on this learning outcome. Therefore the standard of success for this outcome was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Again, with this outcome, students again achieved success both with the objectives associated with the protocols within our cross-networking stack, (TCP/IP, including SMTP, DNS, DHCP, etc.) as well as with the IPv4 addressing scheme (including differentiating the network IP, host IP's, broadcast IP, and the concept of subnet masks). It should be noted, however, the overall average of correct answers from the students was the lowest of the five outcomes which is not surprising, as technically, this area is probably the most challenging, particularly with the calculations associated with IP addressing.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

In this outcome, here was the only objective question in the whole test in which less than 70% of the class answered correctly, and that had to do with CIDR notation (identifying the network portion - bits - of the IP address with classless addressing). While students did seem to understand the use of a subnet mask in the network identification when used the old way with classful addressing, the transition to using the "/xx" notation for network bits gave some of the students problems on this test as well as during the semester. For improvement, I plan to institute additional comparisons specifically showing examples using both actually subnet masks and the CIDR representation of network bits.

Outcome 5: Define the various aspects of routing, network address translation, network printing, wireless networking and other applied networking concepts.

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I did not assess the night section and this was because of TIME!!! This section was held on Friday night which, earlier in the semester, had a snow day in which the school was closed. While we did hold an extra class to make up for the missed day, we were never able to totally synchronize back with the original schedule and I had to devote the last day to completing all the actual class material.

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Met Standard of Success: Yes

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16/16 of the students exceeded 70% for the overall test average.

Overall average score for this outcome was 145/160 = 90%.

16/16 of the students exceeded 70% on this outcome = 100%.

No single question from this outcome was missed by more than 50% of the class, in fact no single question from this outcome was missed by more than 70% of the class

The overall test average for this outcome was 90% and all students achieved this learning outcome (above 70%). Therefore the standard of success for this outcome was met.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students again were successful with this outcome and the objectives associated with this outcome, including network routing principles and protocols, wireless communication, including equipment, theory, collision control, security, and the ever-changing wireless communication standards, as well as types and variations in methods of printing (local, LAN network, and web printing).

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

While students have met all standards of success associated with this outcome, as part of continuous improvement, we are adding additional objectives, including new types of networking protocols, etc. for the fall semester. These include Bluetooth, NFC (Near Field Communication), and DSRC, the communication standards for the forthcoming autonomous vehicles.

II. Course Summary and Action Plans Based on Assessment Results

1. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

I feel this networking course does indeed meet the needs of beginning students in computer networking, as it covers at a basic and semi-advanced level both wired and wireless networking, including everything from the physical components such as media, topology, frame and packet structure. Also, it meets the needs from the software end as well, covering all the necessary protocols for both point-to-point as well as cross-network transmissions, including both Ethernet and TCP/IP. From the wireless end, considerable time is devoted to wireless components, wireless standards, and a whole section on wireless security. Based

on the results, the basics are getting through to the students and I believe they are generally prepared well to move on to the introductory Cisco course in the Cisco curriculum as well as Microsoft Network Operating System program.

Also, I firmly believe that the hands-on component of this course (12 extensive lab projects) is a definite factor in student success in this course. Being able to actually build a network, both hardware and software-wise contributes significantly to student understanding and their grasp of networking concepts.

The only thing that surprised me was the high level of achievement on the assessment test. I had hoped for a mid-70's to low 80's average - I was surprised (and gratified) that the average was considerably higher.

2. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

This information will be shared during our regular department meetings held once per month. I intend to emphasize the importance of this course for students entering the networking field, and use the results to indicate how successful it has been.

3.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Objectives	During the "Analysis by Outcome" section, I mentioned a number of changes for "Continuous Improvement". All of these changes are part of my Action Plan for altering the objectives within each outcome. 1. Move the OSI layered model (basis for all networking) to the first section from the sixth section, and then from that	I listed the rationale for each when describing what I was going to do in the above section. I will repeat it below, however. 1. The OSI model is a layered structure of how communication flows through the network - this should be emphasized at the start of the class, rather than in the middle. It can then be built on	2018

	point relate everything else we do in the course to the appropriate layer in the model itself. 2. Combine two different sections of the course covering client/server networking (now in weeks 1 and 5 - all will be moved to week 5) in order to provide a consistent and thorough presentation of the materials in a well-formed structure, each part building on the last. Peer-to-peer networking will be moved from Week 1 to Week 5 to be able to effectively contrast the two networking models. 3. Topology, Media will be combined into one section, following the section on networking devices, which makes total sense, since the topology is made up of media, and the relationship between these two and the devices that connect them can be much better understood when	throughout the rest of the course by relating each thing covered to the appropriate layer. This type of match-up gives the student a much better view of how everyting fits together. 2. Provides a more consistent and thorough presentation of the materials in a well-formed structure, each part building on the last. Moving peer-to-peer networking from Week 1 also to Week 5 allows an effective contrast between the two networking models. 3. Combining topology, media and networking devices makes total sense, since the topology is made up of media, and the relationship between these two and the devices that connect them can be much better understood when they are presented together. 4. The three relatively new types	

	they and presented together. 4. Bluetooth, Near-Field Communication (NFC), and Dedicated Short Range Communication (DSRC) will be added to the course because of their importance in today's network communication, and in particular, the college's emphasis on Autonomous Vehicle communication.	of network communication mentioned have become extremely important in today's world, particularly with communication within vehicles, where Bluetooth allows direct connectivity with phones, NFC can be used to buy and make actual payments within (as well as without) a vehicle, eliminating the need for credit/debit cards (and even cash). DSRC presently is the main means of autonomous vehicle communication, both for actual vehicle movement (safety), as well as communication with the outside (roadside devices).	

4. Is there anything that you would like to mention that was not already captured?

Attachments include the following: 1. Actual 50 question assessment test, with 10 questions for each of the five Outcomes - questions based on the Objectives for that Outcome. 2. Scantron result summary for the first 25 questions 3. Scantron result summary for the 2nd 25 questions.

III. Attached Files

Test Results 2
Assessment Test - CST225 Fall 2018
Test_Results_1

Faculty/Preparer:	William Reichert	**Date:** 05/07/2018
Department Chair:	Philip Geyer	**Date:** 06/01/2018
Dean:	Eva Samulski	**Date:** 06/28/2018
Assessment Committee Chair:	Shawn Deron	**Date:** 08/27/2018

Course Assessment Report
Washtenaw Community College

Discipline	Course Number	Title
Computer Systems Technology	225	CST 225 01/03/2014-PC Networking
Division	Department	Faculty Preparer
Business and Computer Technologies	Computer Instruction	William Reichert
Date of Last Filed Assessment Report		

I. Assessment Results per Student Learning Outcome

Outcome 1: Identify and differentiate the main types of networks and network operating systems, including peer-to-peer and client/server implementations.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013
    - Course section(s)/other population: Cross-section of students in all sections of CST225 Note: likely will be the complete class, but will be representative of all skill levels.
    - Number students to be assessed: 10 - 40
    - How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
    - Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome's part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be considered appropriate to the particular objective and therefore the outcome

associated with that objective.

- Who will score and analyze the data: Instructors in our department who are not directly associated with teaching the PC Networking course will be used to blind-score and tabulate the results. These will be reviewed with all instructors in our department, those directly teaching the courses, as well as those not teaching it. The above rubric will be used as the standard of measurement during the analysis period. However, the instructors teaching/developing the course will make necessary analysis/changes based on the results.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2013		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
36	29

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students were absent, some were withdrawals, and some did not take the assessment test.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Assessment included students from both sections of CST225 that attended class on the day that the test was given.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Ten questions out of a 50 question test were used to assess this outcome. The test was a multiple choice test - students had as much time to take it as they desired. It was a "closed book" test - students were not to use any notes, etc. The purpose of the test was to basically determine how much of the information they retained at the end of the course.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this

learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
Out of a total of 290 possible right answers, 203 were answered correctly. The percentage therefore was 203/290 =70%. The standard of success was therefore met for this outcome and this tool. Two of the ten questions were missed by more than 50% of the class. The concepts associated with these questions, as well as the questions themselves, will be reviewed and corrections made.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

All areas of this outcome were relatively strong - students' differentiation of Peer-to-Peer Network and Client Server networking was excellent.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

The two questions which more than 50% of the class missed were associated with Microsoft's Active Directory - the advantages of that directory service, and the main major grouping used for controlling users. My plan for improvement is to emphasize to a greater extent the concepts associated with Active Directory, however in this course, there is supposed to be only an overview presented - three advanced Server courses go into it to a much greater extent. Therefore, I will also analyze the questions themselves as to their relevance to this course - they may be better positioned in one of the advanced courses.

Outcome 2: Distinguish among the various types of networking topologies, kinds of networking media and network hardware devices.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013
    - Course section(s)/other population: Cross-section of students in all sections of CST225
    - Number students to be assessed: 10 ? 40
    - How the assessment will be scored: The departmental exam will be a

multiple choice exam made up by all instructors teaching the sections of CNT 225 PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.

- Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome's part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be considered appropriate to the particular objective and therefore the outcome associated with that objective.
- Who will score and analyze the data: Instructors in our department who are not directly associated with teaching the PC Networking course will be used to blind-score and tabulate the results. These will be reviewed with all instructors in our department, those directly teaching the courses, as well as those not teaching it. The above rubric will be used as the standard of measurement during the analysis period. However, the instructors teaching/developing the course will make necessary analysis/changes based on the results.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2013		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
36	29

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students were absent, some were withdrawals, and some did not take assessment test.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your

selection criteria.

Assessment included students from both sections of CST225 that attended class on the day that the test was given.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Ten questions out of a 50 question test were used to assess this outcome. The test was a multiple choice test - students had as much time to take it as they desired. It was a "closed book" test - students were not to use any notes, etc. The purpose of the test was to basically determine how much of the information they retained at the end of the course. It was scored automatically with the Scantron machine.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
Out of a total of 290 possible right answers, 227 were answered correctly. The percentage therefore was 227/290 = 78.2%. The standard of success was therefore met for this outcome and this tool. There were no questions missed by more than 50% of the class.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

All areas of this outcome were areas of strength. This outcome dealt more with networking hardware, topologies, and media - something I felt the students grasped very well during the actual classes. This was particularly evident in the lab projects.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

There really were no weak areas in this outcome to address.

Outcome 3: Identify various networking architectures, (including frame structure), and define the various levels of the OSI model, distinguishing between various protocols designed around it.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013
    - Course section(s)/other population: Cross-section of students in all sections of CST225

- Number students to be assessed: 10 ? 40
- How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
- Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome's part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be considered appropriate to the particular objective and therefore the outcome associated with that objective.
- Who will score and analyze the data: Instructors in our department who are not directly associated with teaching the PC Networking course will be used to blind-score and tabulate the results. These will be reviewed with all instructors in our department, those directly teaching the courses, as well as those not teaching it. The above rubric will be used as the standard of measurement during the analysis period. However, the instructors teaching/developing the course will make necessary analysis/changes based on the results.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2013		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
36	29

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students were absent, some were withdrawals, and some did not take the assessment test.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Assessment included students from both sections of CST225 that attended class on the day that the test was given.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Ten questions out of a 50 question test were used to assess this outcome. The test was a multiple choice test - students had as much time to take it as they desired. It was a "closed book" test - students were not to use any notes, etc. The purpose of the test was to basically determine how much of the information they retained at the end of the course. It was scored automatically with the Scantron machine.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes
Out of a total of 290 possible right answers, 204 were answered correctly. The percentage therefore was 204/290 = 70.3%. The standard of success was therefore met for this outcome and this tool. There were no questions missed by more than 50% of the class.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

This was another strong area for students dealing with Ethernet (lower layer) architecture and the OSI Model (network model describing each layer of networking activities). The concept of the OSI Model is extremely important to grasp in a beginning networking course, as the understanding of this gives a great foundation for the more advanced concepts to come. Ethernet Architecture (Point-to-Point transmission protocols) is also very important to grasp. Students did well in both of these areas.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

With this outcome, there were really no significantly weak areas, and I am very satisfied with the results.

Outcome 4: Identify and distinguish between the parts of the TCP/IP protocol stack, including various applications and concepts behind IPv4 and IPv6 addressing.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013
    - Course section(s)/other population: Cross-section of students in all sections of CST225
    - Number students to be assessed: 10 ? 40
    - How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
    - Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome's part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be considered appropriate to the particular objective and therefore the outcome associated with that objective.
    - Who will score and analyze the data: Instructors in our department who are not directly associated with teaching the PC Networking course will be used to blind-score and tabulate the results. These will be reviewed with all instructors in our department, those directly teaching the courses, as well as those not teaching it. The above rubric will be used as the standard of measurement during the analysis period. However, the instructors teaching/developing the course will make necessary analysis/changes based on the results.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2013		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
36	29

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students were absent, some were withdrawals, and some did not take the assessment test.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Assessment included students from both sections of CST225 that attended class on the day that the test was given.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Ten questions out of a 50 question test were used to assess this outcome. The test was a multiple choice test - students had as much time to take it as they desired. It was a "closed book" test - students were not to use any notes, etc. The purpose of the test was to basically determine how much of the information they retained at the end of the course. It was scored automatically with the Scantron machine.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: No

Out of a total of 290 possible right answers, 187 were answered correctly. The percentage therefore was 187/290 = 64.4%. The standard of success was therefore not met for this outcome and this tool.

Three of the ten questions were missed by more than 50% of the class. Two of the three were missed by almost 2/3 of the class. These two questions alone drove the average down for this outcome below 70%. The two questions dealt with identifying a network as classless/classful, one of the more difficult concepts in the course. The concepts associated with these questions, the method of presenting them in class, as well as the questions themselves as presented on the test, will be reviewed and corrections made.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

This area covered the TCP/IP Protocol Stack and IP Addressing. The student strengths here were definitely in recognizing the different upper layer protocols of the stack and other areas associated with the interaction of these protocols together.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

IP addressing was not as well understood, particularly the differentiation between classful and classless addressing. Two of the 10 questions were missed by over 2/3 of the class and they both dealt with this concept. In fact just these two questions themselves brought the overall average down below the desired 70% mark. For improvement, I plan to emphasize to a greater extent the differences between classful and classless, spending more time on this concept. I am also going to review these two questions themselves, as they require basically a very COMPLETE understanding of the concepts in order to be answered correctly. The third question, which slightly more than 50% of the class missed, also dealt with IP addressing, identifying a Broadcast network. This concept of identifying a network ID, hosts on the network, and the Broadcast address - I will also reinforce in my lectures and lab projects.

Outcome 5: Define the various aspects of routing, network address translation, network printing, wireless networking and other applied networking concepts.

- Assessment Plan
    - Assessment Tool: Departmental final exam
    - Assessment Date: Fall 2013
    - Course section(s)/other population: Cross-section of students in all sections of CST225
    - Number students to be assessed: 10 ? 40
    - How the assessment will be scored: The departmental exam will be a multiple choice exam made up by all instructors teaching the sections of CNT 225 PC Networking. Questions/answers chosen for assessment will be chosen by the department as a whole from portions of the section tests given throughout the semester, and will be based on key concepts of the course objectives which make up each of the outcomes listed above. Tests will be blind-scored using a Scantron machine and results (right/wrong) for each question asked will be tabulated. A rubric will be used as a standard of the level of success in meeting those objectives.
    - Standard of success to be used for this assessment: A Rubric will be used here to measure the standard of success. The Rubric Course Success: Average of students should equal or exceed 70% correct answers for all questions used for assessment as a whole. Outcome Success: Average of all student scores for that outcome's part of the test is equal to or exceeds 70% Objective Success: Individual questions answered correctly by more than 50% of the class (looking at all the questions used for assessment) will be considered appropriate to the particular objective and therefore the outcome associated with that objective.

- Who will score and analyze the data: Instructors in our department who are not directly associated with teaching the PC Networking course will be used to blind-score and tabulate the results. These will be reviewed with all instructors in our department, those directly teaching the courses, as well as those not teaching it. The above rubric will be used as the standard of measurement during the analysis period. However, the instructors teaching/developing the course will make necessary analysis/changes based on the results.

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2013		

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
36	29

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Some students were absent, some were withdrawals, and some did not take the assessment test.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

Assessment included students from both sections of CST225 that attended class on the day that the test was given.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Ten questions out of a 50 question test were used to assess this outcome. The test was a multiple choice test - students had as much time to take it as they desired. It was a "closed book" test - students were not to use any notes, etc. The purpose of the test was to basically determine how much of the information they retained at the end of the course. It was scored automatically with the Scantron machine.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

Out of a total of 290 possible right answers, 203 were answered correctly. The percentage therefore was 203/290 = 70%. The standard of success was therefore met for this outcome and this tool. None of the questions were missed by more than half (50%) of the class.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Students were strong once again in areas of routing, Network Address Translation, wireless networking, and printing. I was very pleased with these results, as all three of these areas are relatively extensive, and to be strong in all three, which are all important in the practical application of networking in today's business environment, is a real bonus!!!!!

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Like Outcomes 1, 2, and 3, this outcome really has no significant weak areas to address. I will be focusing more time in the areas of Outcome 4, which need the greatest improvement.

II. Course Summary and Action Plans Based on Assessment Results

1. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

The overall average of the testing, which included all five outcomes, was above 70% overall which was my main goal. I was quite surprised in a good way particularly with Outcome 5, which was an extensive coverage of very important practical concepts associated with networking in today's world. Meeting the standard of success in four of the five outcomes was very satisfying as well. In the one outcome which result was below 70% (~ 65%) it was solely due to IP addressing - the concepts of the TCP/IP protocol stack were well understood based on the test results. Therefore, my overall impression is that the needs of the students - a foundation in networking - was accomplished.

2. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

The results of this assessment will be shared within the department during department meetings where curriculum and assessment are often discussed. While I am the only instructor teaching this course at present, it still is extremely important that I point out to the instructors that teach more advanced courses that the students will be moving into, the students strengths and weaknesses, so that they can be better prepared when receiving them into their classes.

3. Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Objectives	I plan to better address IPv4 addressing in	In today's networking world, IPv4 addressing	2014

	general, putting less emphasis on classful addressing and more emphasis on classless. Classful to some extent, is still very important, as much of our addressing today still "follows" the form started with classful, even though the rules no longer apply. However, spending too much time on contrasting the two types might have confused the students, and I will be developing a better plan to "flow one into the other" so that the similarities as well as the differences can be better understood without confusion. Also, I am only giving an "overview" of IPv6 in this course, covering more in detail in my advanced courses. The shift to IPv6 has started, and I also plan to "shift" more emphasis to it in this beginning network course.	is now soley based on classless addressing. I need to spend much less time on classful addressing, and only use that as a foundation building block to classless addressing. Presently, it's about 70% classful and 30% classless. Those percentages need to be reversed to reflect what is really being used in today's networks. We are still a few years away from IPv6 being a significant player down at the user level for IP addressing, however rather than just an overview of IPv6, I am now going to have to start the shift from IPv4 in total (no matter if it's classless or classful) over to IPv6, giving it much more emphasis.	

4. Is there anything that you would like to mention that was not already captured?

Again, the Overall average for the Assessment was 70% as were four of the five outcomes. I am very satisfied with the results and honestly feel that the students largely received the foundation in network concepts that I originally desired.

III. Attached Files

Scantron Results
Assessment_Test
Rubric_Used

Faculty/Preparer:	William Reichert	**Date:**	01/03/2014
Department Chair:	John Trame	**Date:**	01/06/2014
Dean:	Rosemary Wilson	**Date:**	02/19/2014
Assessment Committee Chair:	Michelle Garey	**Date:**	03/21/2014

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
   Course Discipline Code and Number: CST225
   Course Title: PC Networking
   Division/Department Codes: BCT/CISD

2. Semester assessment was conducted (check one):
   - ☒ Fall 2010
   - ☐ Winter 20__
   - ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   - ☐ Portfolio
   - ☐ Standardized test
   - ☐ Other external certification/licensure exam (specify):
   - ☐ Survey
   - ☐ Prompt
   - ☒ Departmental exam
   - ☐ Capstone experience (specify):
   - ☐ Other (specify):

4. Have these tools been used before?
   - ☒ Yes
   - ☐ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made.

   Assessment test (as well as the course itself) has been altered in the last four years to reflect the considerable changes that have occurred in the networking area. The biggest change, of course, is the increase in the use of and the advances in, wireless technology. Certainly this is not the only change – others include increase in speeds with wired technology, more sophisticated equipment used in all phases of networking, additional capabilities with peer to peer as well as client/server networks, and the various changes necessary for using different operating systems. In that period, we have gone from using Windows 98 to XP to Vista to Windows7.

5. Indicate the number of students assessed/total number of students enrolled in the course.

   20 students were enrolled at the time of the assessment, and all 20 took the assessment test.

6. Describe how students were selected for the assessment.

   No selection process was used – all enrolled students took the assessment test.

II. Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.

   In the previous assessment, one outcome required improvements, that one being network architecture. As described below, greater emphasis was placed on the relationship between segments, packets and frames, plus two diagrams were created, in color, one showing the frame structure in relation to the OSI model and showing each part – data, segment, packet and frame. The other diagram showed the OSI model itself also relating frame structure to each layer. The other outcome that did not meet the expectation in the previous assessment had to do with assessing material (printing concepts) that had not been covered thoroughly or tested due to class cancellation (water main break). This material is now thoroughly covered and tested.

   The changes have resulted in success. As will be shown below, the overall assessment test average exceeded 70%, the number of students achieving that level also exceeded 70%, and the assessment results for each individual outcome, again, exceeded 70%.

Below are the changes which have been implemented as they were described in the previous assessment.

Outcome #5 - Networking Architecture – the theoretical part of the course, describing Frame structure including Segments, Packets, Frames and the OSI Model concepts is normally the hardest part of the course for students to grasp and retain which lead to a failure to achieve 70% for this outcome. More visual aids will be used in presenting the various concepts associated with Network Architecture. Also greater emphasis will be placed on the *relationship* of the individual parts to each other, rather than on each individual item making up, for example, the Ethernet frame. Understanding the relationships between the various elements making up the architecture will also enhance the understanding of the individual components.

Outcome #2 - Failure to achieve 70% for this outcome was due largely to the network printing section which was never actually tested in class. This was the last section of the course, and due to a water main break at the school, one section of the networking class never finished the work on this subject. Therefore, I didn't test either class and they did not have to prepare for a test, as they did in the other parts of this outcome. The material was still included in the assessment test however. In the future, students will be fully tested on all areas which will be included in the assessment exam. Assessing student performance in areas which were not thoroughly covered in the class, not surprisingly, resulted in lower scores.

2. List each outcome that was assessed for this report exactly as it is stated on the course master syllabus.

Outcome #1: Identify and configure the main types of networks and network operating systems, including peer to peer and client/client server implementations.

Outcome #2: Distinguish between the various types of networking topologies kinds of networking media and network hardware devices.

Outcome #3: Identify various networking architectures (including frame structure), and define the various levels of the OSI model, distinguishing between various protocols designed around it.

Outcome #4: Identify and distinguish between the parts of the TCP/IP protocol stack, including various applications and concepts behind IPv4 and IPv6 addressing.

Outcome #5: Define the various aspects of routing, network address translation, network printing, wireless networking and other applied networking concepts.

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. ***Please attach a summary of the data collected.***

Overall Results: Average Score: **38.6 out of 50 questions for a 77.2 Average.** *This meets and exceeds my expectation of having a 70% overall average for the class.* The testing results included every student in the class from the best all the way to the worst and therefore is very representative. As far as the test results go, the same students that did poorly on the course tests also did poorly on the assessment test. This high an average reflects a fairly high level of comprehension and retention by the students. Also, the students were given an extra five points on their semester total for just taking the assessment test, which was the only effect this test had on their grade, so they had little *personal* incentive to try really hard. Also they were told NOT to study for this test as the purpose of it was to give an indication of retention for the overall course. ***Also, note that 15 of the 20 students taking the test achieved 70% or better on the test. This 75% mark also exceeds the goal of having 70% of the students make a 70% grade or better on the test.***

Attached are the results and a breakdown by outcome is shown below in the next section.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. ***Please attach the rubric/scoring guide used for the assessment.***

Breakdown by Outcome:

Outcome #1: Question 1 through 10 represented Outcome #1: Total Questions 10

163 correct answers out of 200 answers for an **81.5% Average.** This was above the expected 70% average for the students achieving this outcome. 17 of the 20 students met or exceeded the 70% mark for this outcome.

Outcome #2: Question 11 through 20 represented Outcome #2: Total Questions 10

160 correct answers out of a possible 200 answers for an **80.0% Average**. This was above the expected 70% average for students achieving this outcome. 15 of the 20 students met or exceeded the 70% mark for this outcome.

Outcome #3 Question 21 through 30 represented Outcome #3: Total Questions 10

157 correct answers out of a possible 200 answers for a **78.5% Average**. This was above the expected 70% average for students achieving this outcome. Again, 15 of the 20 students met or exceeded the 70% mark for this outcome.

Outcome #4 Questions 31 through 40 represented Outcome #4: Total Questions 10

152 correct answers out of a possible 200 answers for a 76**% Average.** This was above the expected 70% average for students achieving this outcome. Again, like outcome #1, 17 of the 20 students met or exceeded the 70% mark for this outcome.

Outcome #5 Questions 40 through 50 represent Outcome #5: Total Questions 10

141 correct answers out of a possible 200 answers for a **70.5 Average**. This was above the expected 70% average for students achieving this outcome. This time only 10 of the 20 students met or exceeded the 70% mark for this outcome.

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

Strengths: In all areas/outcomes with the exception of the routing and wireless networking sections of outcome #5, all students met or exceeded expectations.

Weaknesses:

Outcome #5:

The two weak areas were in outcome #5, which is the only area where less than 70% of the students achieved 70% or better on the assessment test. Three areas were covered, routing, wireless, and printing. All twenty were strong on the printing, (which they were also tested on the same day as the assessment test), however in the other two areas, the results were less than desired. Routing concepts, particularly when integrated with NAT (Network Address Translation) are quite complex and confusing for students. Also, with wireless, concepts learned from wired technology are considerably different, and combined with the fact that there are numerous different wireless standards, speeds and uses, this material is difficult to wholly grasp in one week's time.

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

   Outcome #5

   Concerning routing and wireless, I plan to:

   a. Simplify the contrasting of switches and routers which was designed to clarify, however contrasting so many differences, I think, confuses the students.

   b. Keep the routing/router protocol explanation at a simple level in this beginning course. I plan on eliminating expansive explanations of dynamic routing protocols, such as the various types, etc. I plan on just giving a basic explanation and example of a simple routing protocol.

   c. Separate out routing and network translation into separate lectures – now they are all part of the same lecture which is a lot of material for students just entering the networking field.

   d. Reduce the amount of discussion concerning the various types of collision detection used with wireless technology. All this occurs "behind the scenes" anyway, with configuration done automatically 99% of the time. This detailed information is not really needed at an introductory level.

   e. Simply the various phases/standards that wireless has gone through in the last five years, spending less time on the older standards (and maybe grouping them together) and more time on present and future standards.

   f. Increase the amount of time spent talking about wireless security and separate this out from the rest of the wireless lecture. This information is the most valuable to students who often have wireless networks in their homes, and is also great preparation for those going into our security program.

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

   a. ☐ Outcomes/Assessments on the Master Syllabus
   Change/rationale:

   b. ☐ Objectives/Evaluation on the Master Syllabus
   Change/rationale:

   c. ☐ Course pre-requisites on the Master Syllabus
   Change/rationale:

   d. ☐ 1st Day Handouts
   Change/rationale:

   e. ☐ Course assignments
   Change/rationale:

   f. ☒ Course materials (check all that apply)
   - ☐ Textbook
   - ☒ Handouts
   - ☐ Other:

   g. ☒ Instructional methods
   Change/rationale:
   Lecture handouts will reflect the changes listed in Section 1 above, as will my lectures.

h. ☒ Individual lessons & activities
Change/rationale:
Again, Lecture handouts will reflect the changes listed in Section 1 above, as will my lectures

3. What is the timeline for implementing these actions?

Winter semester of 2011.

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.

   I feel my assessment tool and method of applying it, was very effective in measuring whether the students had grasped and retained what I believe are the key concepts of the course expressed in my course outcomes. In particular, the instructions I gave to NOT study for the assessment, and that taking the test would only affect their grade positively, whether or not they did well on it, gave me an excellent indication of how much they had actually learned. Again, they had no reason to personally care about the results of this test, yet overall they did outstanding and certainly exceeded my expectations. **None of the students "rushed through" this assessment test – they all took as much time with it as they took on their actual final exam, giving me the indication that they did care and what they had answered is actually what they had *retained* from the course.** Since the test was designed and written around the concepts expressed in the course outcomes, I feel that using this type of assessment tool was successful.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.
   Not Applicable

3. Which outcomes from the master syllabus have been addressed in this report?
   All ___XXXXXX Selected _____

   If "All", provide the report date for the next full review: Every three years, which would be Fall, 2013.

   If "Selected", provide the report date for remaining outcomes: _____.

Submitted by:

Print: William Reichert **Signature** William Reichert **Date:** 12/23/2010
Faculty/Preparer

Print: Clarence Hasselbach **Signature** Clarence Hasselbach **Date:** 1/3/2011
Department Chair

Print: Rosemary Wilson **Signature** Rosemary Wilson **Date:** 1/3/11
Dean/Administrator

Indone logged 1/11/11 sfv

COURSE ASSESSMENT REPORT

I. Background Information

1. Course assessed:
   Course Discipline Code and Number: CST225
   Course Title: PC Networking
   Division/Department Codes: 14300

2. Semester assessment was conducted (check one):
   - ☒ Fall 2006__
   - ☐ Winter 20__
   - ☐ Spring/Summer 20__

3. Assessment tool(s) used: check all that apply.
   - ☐ Portfolio
   - ☐ Standardized test
   - ☐ Other external certification/licensure exam (specify):
   - ☐ Survey
   - ☐ Prompt
   - ☒ Departmental exam
   - ☐ Capstone experience (specify):
   - ☐ Other (specify):

4. Have these tools been used before?
   - ☐ Yes
   - ☒ No

   If yes, have the tools been altered since its last administration? If so, briefly describe changes made.

5. Indicate the number of students assessed/total number of students enrolled in the course.
   33 Enrolled, 33 Tested.

6. Describe how students were selected for the assessment.
   All Students taking the Last Exam Took the Assessment Exam as well.

II. Results

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.
   This is the first Assessment done using the Departmental Exam.

2. State each outcome (verbatim) from the master syllabus for the course that was assessed.

   1. Identify and Implement both a Peer to Peer Network and Client/Server Networks including installing and configuring Client Software as part of a Client/Server System.
   2. Install, Configure, Test and Troubleshoot Networking Devices, including Wired and Wireless Network Cards, Routers, Switches, Hubs, Wireless Access Points, Network Printers, and Analog Modems.
   3. Identify and configure various Networking Topologies and Transmission Media, including building cables, wiring up a working LAN Network, plus installing and configuring a wireless network.
   4. Define the OSI Model and identify, install, and configure the TCP/IP Protocol Stack, including IP Addressing techniques, (subnetting, methods of representation, etc.), and establish the relationship of each Protocol to the appropriate layer of the OSI Model.
   5. Identify various Network Architectures, explaining encapsulation, and identifying the various parts, including Frames, Packets, Segments, and detail out the relationships of each to each other, to various protocols, and to the OSI Model.

3. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. ***Please attach a summary of the data collected.***

Overall Results: Average Score 43.3 out of 60 questions for a 72.17 Average. This meets my expectation of having a 70%overall average for the class.

Actually I am extremely happy with these results. The students were getting 5 extra points just to take the assessment test – they had actually NO INCENTIVE to do well on the test outside of my urging them to try their best since it would result in improvements to the course!! I even told them NOT to study for it, as the test addressed the key concepts which I hoped they would retain without memorization, etc.

Breakdown by Outcome.

Outcome #1
Questions 1 - 8 and 25 - 29 represented Outcome #1. Total Questions **13.**
332 correct answers out of 429 questions total for a **77% average.** This meets my expectation of 70% of the students achieving this outcome.
Questions not achieving a 50% success rate – Question #27

Outcome #2
Questions 43 -46, 51 – 53, and 54 -60 represented Outcome #2 Total Questions **14**
315 correct answers out of 462 questions total, for a **68% average.** This is slightly below my expectation of 70% of the students achieving this outcome.
Questions not achieving a 50% success rate – Questions #59 and #44

Outcome #3
Questions 42 – 50, 9 – 15, represented Outcome #3 Total Questions **11.**
271 correct answers out of 363 questions total, for a **74% average.** This meets my expectation of 70% of the students achieving this outcome.
Questions not achieving a 50% success rate. Question #49

Outcome #4
Questions 33 – 42 represented Outcome #4 Total Questions **10**
230 correct answers out of 330 questions total, for a **70% average.** This meets my expectation of 70% of the students achieving this outcome.
No questions were missed by more than 50% of the class.

Outcome #5
Questions 16 – 24, and 30 – 32 represented Outcome #5 Total Questions **12**
193 correct answers out of 306 questions total, for a **63% average.** This is below my expectation of 70% of the students achieving this outcome.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. ***Please attach the rubric/scoring guide used for the assessment.***

This is outlined in (3) above. The standard of success used was 70% of the questions addressing each of the outcomes would be answered correctly. In three of the five outcomes outcomes this was achieved. One outcome outcome was slightly below this mark. Outcome #5 was significantly below this mark, however this outcome addressed largely the theoretical part of the course, and lower scores were expected here. *Overall, the success rate of 72% exceeded slightly the desired goal of a 70% success rate.*

Also, any question missed by more than 50% of the class is investigated, both from the viewpoint of the question itself as well as the content from which this question is derived. Seven out of 60 questions fell into this category – these are addressed below.

5. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

Strengths:

Strong in Client Server Networking concepts and implementation of a Client Server networking infrastructure. Also strong in identification and implementation of Network Topologies, and Media as well as TCP/IP addressing – a most important part of the course.

Weaknesses:

Students were weakest in Outcome #5 - Networking Architecture – the theoretical part of the course, describing Frame structure including Segments, Packets, Frames and the OSI Model concepts. This is normally the hardest part of the course for students to grasp and retain.

Also, Outcome #2 was slightly below anticipated average. This was due largely to the network printing section which was never actually tested on in class. This was the last section of the course, and due to a water main break at the school, one section of the networking class never finished the work on this subject. Therefore I didn't test either class and therefore they did not have to prepare for a test, as they did in the other parts of this outcome. The material was still included in the assessment test however.

It should be noted also, that five of the seven questions missed by more than 50% of the class were in these two Outcome areas.

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

Outcome #5 - More visual aids will be used in presenting the various concepts associated with Network Architecture. Also greater emphasis will be placed on the *relationship* of the individual parts to each other, rather than on each individual item making up, for example, the Ethernet frame. Understanding the relationships between the various elements making up the architecture will enhance at the same time, the understanding of the individual components as well.

Outcome #2 – Insure that that students are fully tested on all areas which will be included in the assessment exam. Assessing student performance in areas which were not thoroughly covered in the class not surprisingly resulted in lower scores.

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

a. ☐ Outcomes/Assessments on the Master Syllabus
Change/rationale:

b. ☐ Objectives/Evaluation on the Master Syllabus
Change/rationale:

c. ☐ Course pre-requisites on the Master Syllabus
Change/rationale:

d. ☐ 1st Day Handouts
Change/rationale:

e. ☒ Course assignments
Change/rationale:
Lab projects on Ethernet Architecture and OSI Model will be more thoroughly explained prior to implementation, and more time will be allotted to these lab projects. Besides the concepts behind Networking Architecture being more complex, the lab projects in themselves are possibly too complex for intro students into the networking field, and simplification is needed.

f. ☒ Course materials (check all that apply)
☐ Textbook

☒ Handouts
Diagrams for Networking Architecture will be enhanced with better description of the elements and the relationship between each.

☒ Other:
Review of Most Missed Questions:

17. "Logical Bus and Physical Star" - Important concept – Question/Answers ares good – Relationship of Ethernet 10BaseT to the type of physical layout needs to be reviewed more thoroughly in class.

24. "Collisions and Collision Domains" - While concept is important and will be reemphasized in class, question and answers to it are extremely confusing and convoluted. Question and Answers will be revised.

27, "Key Features of Directory Services" – Another very important concept. I thought I had emphasized to the two key features, particularly pointing them out in relationship to Microsoft's Active Directory. The results of the assessment test however, show that I need to revisit my presentation of this again.

30. "Redirector and Requestor and the OSI Model". This question was missed a lot in the regular testing and although I went over the concept in class, it is obvious that I need to tie these terms more directly to the layers of the OSI model. Actually, the test question is probably out of place. The actual section covering the OSI model comes up ***after*** Client Server networking, and although I continually bring up OSI model in all sections of the class, the testing on it should only be done in the specific section covering the OSI model or after it, not before it.

44. "Routers and the OSI Model" - another example of where students have trouble relating networking devices and/or software to the parts of the OSI model. It is obvious that I need to cover these relationships in more detail when covering both the OSI model itself, and when covering the specific device/software component itself.

49. "Wireless and the OSI Model" - again, a third example of exactly what was mentioned in the previous two questions. The students have a real problem relating actual physical devices and protocols to the layers of the OSI model. This relationship is essential for staged, step by step troubleshooting of network problems, and must be emphasized to a much larger extent, when covering each element of networking.

59. "UNC path and Logical Ports" - Again, not actually testing on Printing in the class, as mentioned above, resulted in less student preparation for this section. Also, the question introduced two rather complex elements in it at the same time, making it a semi-"trick" question, which required considerable thought. I feel the question is a good one however, and the example that this question formulates was actually brought up and explained in class. I feel that if I would have actually had time to test the students on Network Printing concepts in class, the results would have been better.

g. ☒ Instructional methods
Change/rationale:
The changes here are highlighted in all the answers given (e) and (f) above. Changes will be made to improve the method of presenting the relationships between networking devices and the OSI Model layers.

h. ☐ Individual lessons & activities
Change/rationale:

3. What is the timeline for implementing these actions?

These will be implemented immediately for next semester.

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.

   I feel my assessment tool and my method of applying it was very effective in measuring student learning of the subject. In particular, my instructions not to study, and that taking the test would only affect their grade positively gave me ***a real idea on how much they actually learned. They had no reason to personally care about the results of this test, yet on the whole they all did very well and exceeded my expectations. What they answered is what they actually RETAINED from the course, and I was very happy that they retained so much.*** When I went through the questions, answering them as they did, I actually felt that many of the questions were actually beyond the basic concepts that I expected, which made the results even more pleasing to me.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

   There were a number of typo's and a single repeat question that will be changed in the test. Also, the question on "collisions" mentioned above will be changed as well.

3. Which outcomes from the master syllabus have been addressed in this report?

   All _XXXXX All of the Outcomes have been addressed.____ Selected _____

   If "All", provide the report date for the next full review:
While this is not required for another three years, I will probably repeat this next semester. This course will be probably changing Operating Systems for next fall, although the Outcomes/Objectives will remain the same. I will definitely test again in the fall if I am teaching at that point in time.

   If "Selected", provide the report date for remaining outcomes: _____.

Submitted by:

Name: W.R. Reichert _____ Date: 12/27/06
Print/Signature

Department Chair: GARY DOWNEN _____ Date: 1/4/07
Print/Signature

Dean: _____ Date: 1/5/07
Print/Signature