Formal Evaluation and Subject Matter Expert
Summary Report

CIS226

Submitted to Maine is IT in fulfillment of the
TAACCCT grant requirements
By
Emporia State University

EMPORIA STATE
U N I V E R S I T Y
■ INFORMATION TECHNOLOGY

December 2016

Course Review for: Maine is IT
Course: CIS 226 Ethical Hacking
Reviewed by: Rob Gibson
Date: December 12, 2016

EMPORIA STATE
U N I V E R S I T Y
■ INFORMATION TECHNOLOGY

Part 1: Course Review

A. Course Review & Introduction (16 points total)		
1.1 Instructions made clear how to get started and where to find various course components.	3	**3**
1.2 Learners are introduced to the purpose and structure of the course.	3	**3**
1.3 Etiquette expectations (sometimes called "netiquette") for online discussions, email, and other forms of communication are clearly stated.	2	**0**
1.4 Course and or institutional policies with which the learner is expected to comply are clearly stated, or a link to current policies is provided.	2	**2**
1.5 Minimum technology requirements are clearly stated and instructions for use provided.	2	**2**
1.6 Prerequisite knowledge in the discipline and/or any required competencies are clearly stated.	1	**1**
1.7 Minimum technical skills expected of the learner are clearly stated.	1	**0**
1.8 The self-introduction by the instructor is appropriate and is available online.	1	**0**
1.9 Learners are asked to introduce themselves to the class.	1	**0**
Total		**11**

Comments:

1.1: This course appears to use a textbook in combination with a certificate guide. Directions for accessing the guide are clearly indicated.

1.2: A course description, outline, and instructional format are provided.

1.3: Etiquette expectations (sometimes called "netiquette") for the virtual environment should be covered. Some examples might include:
- Be sensitive to the fact that there will be cultural and linguistic backgrounds, as well as different political and religious beliefs, plus just differences in general.
- Use good taste when composing your responses in Discussion Forums. Swearing and profanity is also part of being sensitive to your classmates and should be avoided. Also consider that slang can be misunderstood or misinterpreted.
- Don't use all capital letters when composing your responses as this is considered "shouting" on the Internet and is regarded as impolite or aggressive. It can also be stressful on the eye when trying to read your message.
- Be respectful of your others' views and opinions. Avoid "flaming" (publicly attacking or insulting) them as this can cause hurt feelings and decrease the chances of getting all different types of points of view.
- Be careful when using acronyms. If you use an acronym it is best to spell out its meaning first, then put the acronym in parentheses afterward, for example: Frequently Asked Questions (FAQs). After that you can use the acronym freely throughout your message.
- Use good grammar and spelling, and avoid using text messaging shortcuts.

1.4: Course and institutional policies are clearly articulated. Within the syllabus was the attendance policy; grading policy; and the academic misconduct policy

1.5: Technology requirements were stated in the syllabus. Most, if not all of the requirements are provided.

1.6: Prerequisite knowledge and competencies are clearly indicated in the syllabus: PHI102; CIS220;

NET110.

1.7: Minimum skills were not covered in course materials/syllabus.

1.8: Even in a face-to-face course, it is desirable to have an instructor introduction/biography available for students to access online. A short introduction with some personal information will humanize the instructor in an online course and allow students to access the information at any time in a face-to-face course.

1.9: A link to a discussion thread is not provided for students to communicate, informally, with each other outside of the class meetings. It may be inside the course itself which the Reviewer could not access.

B. Learning Objectives & Competencies (15 points total)

2.1 The course learning objectives, or course/program competencies, describe outcomes that are measurable	3	**2**
2.2 The module/unit learning objectives or competencies describe outcomes that are measurable and consistent with the course-level objectives or competencies.	3	**0**
2.3 All learning objectives and competencies are stated clearly and written from the learner's perspective.	3	**3**
2.4 The relationship between learning objectives or competencies and course activities is clearly stated.	3	**2**
2.5 The learning objectives or competencies are suited to the level of the course.	3	**3**
Total		**10**

Comments:

2.1: The course learning objectives are enumerated, but a scoring rubric/competencies is not available. The instructor did, however, use measurable verbs that map to knowledge and comprehension on Bloom's Taxonomy.

2.2: The module/unit/week learning objectives were not available.

2.3: The course learning objectives state what the learner is to accomplish using measurable language. Well done.

2.4: I was able to determine some alignment between the course objectives and the course outline activities. However, I recommend mapping the course objectives to each weekly activity by clearly stating the objective in writing. For example, Week 10: *Aligns with Course Objective 4*.

2.5: Objectives appear to be suited to the level of the course.

C. Assessment & Measurement (13 points total)

3.1 The assessments measure the stated learning objectives or competencies.	3	**3**
3.2 The course grading policy is stated clearly.	3	**3**
3.3 Specific and descriptive criteria are provided for the evaluation of learners' work and are tied to the course grading policy.	3	**2**
3.4 The assessment instruments selected are sequenced, varied, and suited to the learner work being assessed.	2	**2**
3.5 The course provides learners with multiple opportunities to track their learning progress.	2	**0**
Total		**10**

Comments:

3.1: The assessments align with the stated learning objectives. Multiple assessments were uploaded for review. However, consider assessing students using high order strategies, such as demonstration, teach-back, complex completion, etc. Standard T/F and MC are lower order assessment strategies that lead to shallow retention and recall.

3.2: The grading policy is stated in the syllabus. The instructor took care to map the points to the grading scale.

3.3: The criteria were somewhat clear. Quizzes, Tests, Projects, and Other Assignments was enumerated. However, the reviewer suggests providing additional descriptive criteria regarding how assignments, etc. map to the grading policy. Include these activities within the course outline so that the learner can draw an alignment between the assignment, project, or quiz; plus, the module/unit; plus, the learning objective; plus, the overall grading policy. When developing a syllabus, I like to include these activities within the course outline so that students can determine the alignment between my requirements and the course objectives.

3.4: Two sample assignments were provided. The assignments are varied and aligned with the objectives for each week.

3.5: The reviewer was not able to determine or locate any evidence regarding tracking learning progress. One strategy may be to maintain a 'leaderboard' or 'circle back' activities throughout**.**

D. Instructional Materials (13 points total)

4.1 The instructional materials contribute to the achievement of the stated course and module/unit learning objectives or competencies.	3	**3**
4.2 Both the purpose of instructional materials and how the materials are to be used for learning activities are clearly explained.	3	**3**
4.3 All instructional materials used in the course are appropriately cited.	2	**2**
4.4 The instructional materials are current.	2	**2**
4.5 A variety of instructional materials is used in the course.	2	**2**
4.6 The distinction between required and optional materials is clearly explained.	1	**1**
Total		**13**

Comments:

4.1: The instructional materials (eg, Netcraft, Shodan, dihe, etc) aligns with the course and unit objectives stated in the syllabus.

4.2: The purpose of the instructional materials (eg, Netcraft, Shodan, mxtoolbox, dihe, etc) and its use in the course is explained and aligns with each unit assignment.

4.3: The instructional materials were properly cited.

4.4: The instructional materials are current*.

4.5: The instructional materials vary by unit and assignment.

4.6: N/A. No optional materials are noted.

*The Reviewer assumes the instructional materials are current, up-to-date, and related to the desired competencies for the certification.

E. Course Activities and Learner Interaction (11 points total)

5.1 The learning activities promote the achievement of the stated learning objectives or competencies.	3	**3**
5.2 Learning activities provide opportunities for interaction that support active learning.	3	**3**
5.3 The instructor's plan for classroom response time and feedback on assignments is clearly stated.	3	**0**
5.4 The requirements for learner interaction are clearly stated.	2	**2**
Total		**8**

Comments:

5.1: The learning activities directly support the course/unit learning objectives.

5.2: There are opportunities for interactive learning through projects.

5.3: A plan for feedback is not specified.

5.4: Expectations for the learners are clearly specified in the syllabus.

The Reviewer assumes the content includes learning activities related to stated objectives

F. Course Technology (10 points total)

6.1 The tools used in the course support the learning objectives and competencies.	3	**3**
6.2 Course tools promote learner engagement and active learning.	3	**3**
6.3 Technologies required in the course are readily obtainable.	2	**2**
6.4 The course technologies are current.	1	**1**
6.5 Links are provided to privacy policies for all external tools required in the course.	1	**1**
	Total	**10**

Comments:

6.1: The tools in the course (eg, Netcraft, Shodan, dihe, etc) support the unit/weekly objectives. The assignments clearly state what tools/applications are needed to successfully complete the work.

6.2: The tools (eg, Netcraft, Shodan, dihe, etc) promote engagement and active learning. The assignments promote active student engagement by requiring interaction with the technology to build content for assignments.

6.3: The tools (eg, Netcraft, Shodan, dihe, etc) will likely be provided by the college.

6.4: The course technologies (eg, Netcraft, Shodan, dihe, etc) are current and up-to-date for the required work.

6.5: Privacy policies are available.

The Reviewer assumes the course technology requirement is current, up-to-date, and relates to the desired competencies for the certification.

G. Learner Support (9 points total)

7.1 The course instructions articulate or link to a clear description of the technical support offered and how to obtain it.	3	**0**
7.2 Course instructions articulate or link to the institution's accessibility policies and services.	3	**2**
7.3 Course instructions articulate or link to an explanation of how the institution's **academic** support services and resources can help learners succeed in the course and how learners can obtain them.	2	**0**
7.4 Course instructions articulate or link to an explanation of how the institution's **student** support services and resources can help learners succeed in the course and how learners can obtain them.	1	**0**
Total		**2**

Comments:

7.1: Consider providing instructions/links for students to access the technology help services available to them.

7.2: The syllabus contains an excerpt from the institution website pertaining to accessibility. Consider providing a link to the site or instructions for students to access the services.

7.3: Consider providing instructions/links to tutoring and other academic support services.

7.4: Consider providing instructions/links to the institutional student support services.

H. Accessibility and Usability (12 points total)		
8.1 Course navigation facilitates ease of use.	3	**3**
8.2 Information is provided about the accessibility of all technologies required in the course.	3	**2**
8.3 The course provides alternative means of access to course materials in formats that meet the needs of diverse learners.	2	**2**
8.4 The course design facilitates readability.	2	**2**
8.5 Course multimedia facilitate ease of use.	2	**2**
Total		**11**

Comments:

8**.1:** Make sure navigation is easy and intuitive (minimum clicks to reach destination). The Reviewer assumes this has been considered.

8.2: If students must download/install technology, make sure clear instructions are provided. The Reviewer assumes this has been considered.

8.3: Text files, audio files, video files. Consider multiple delivery systems for course materials. The Americans with Disabilities Act requires institutions to make accommodations for student who identify as having a disability. Work closely with your institution's office for disability services to identify resources to assist in making your course ADA compliant. The rater assumes this has been considered. Microsoft software includes an Accessibility Checker.

8.4: The Reviewer assumes this has been considered.

8.5: The Reviewer assumes this has been considered. (If required.)

Part II: Employment Data

Stakeholder Involvement and Employment Opportunities
Items Reviewed include: • Internships, Job Shadowing Opportunities that exist with the outcomes and objectives with this course. • Employment opportunities for these skills. • Outcomes/Objectives are current and relate to job market.
Findings include: • See Subject Matter Expert review for specific feedback.

Part III: Creative Commons

Items Reviewed include:
    • All course materials presented in Creative Commons?
    • Creative Common license (including graphic) is represented on course materials.

Findings include:
 	
    • This material is licensed under the Creative Commons Attribution 4.0 International License.
    • Creative Commons graphic is included on the footer.

Course: CIS226
Course Name: Ethical Hacking
Reviewed by: Robert Gibson, EdD
Date: December 13th, 2016

Background
Funded by a $13 million grant from the U.S. Department of Labor, ***Maine is IT!*** is building new educational and career pathways in information technology at all seven of Maine's community colleges. The programs funded by the grant are designed to support Maine workers eligible for the Trade Adjustment Assistance (TAA) program, un/underemployed adults, and workforce needs in Maine's growing IT sector. They have been built to serve individuals with a range of experience, from those interested in gaining basic IT skills to IT professionals looking to advance their careers through new industry certifications.

Overall Remarks and Reviewer Summary
In reviewing CIS226 several processes and data collections tools were noted and identified. This reviewer took in account the Dynamic Skills Audit conducted in 2014-2015. Both qualitative and quantitative data was identified in the report that provides the key elements:

1. Career opportunities do exist in York County for graduates from an AAS in Information Technology or those completing a certificate program. It was also found by this Reviewer that the skills mastered in CIS226 relate to specific job openings.
2. Current job openings list specific duties that relate the Ethical Hacking course CIS226.
3. The current Advisory Board indicates it contributes to the labor market data.

The Dynamic Skills Audit outlined the following process, which this reviewer took into consideration when compiling this the formal SME report:

1. Local industry needs were assessed through the program Advisory Board. Minutes from those Advisory Board meetings were reviewed and suggestions from the partnerships were adopted into this summary.
2. Burning Glass data was reviewed to identify themes and trends in the current job market. The Burning Glass report helped identify skills demanded by employers to curriculum outcomes and learning objectives.

A formal SME was conducted with the above reports and compiled in the next section of this report.

A. Program and Course Overview and Objectives

Items Reviewed include:
- Dynamic Skills Audit Summary Report (Academic Years 2014-2015)
- Burning Glass Labor Market Data reports (Compilation)
- Advisory Board Minutes

Findings include:

The CIS226 course learning outcomes and objectives align with the program mission and goals. This reviewer found that the CIS226 course has listed measurable outcomes which can be stacked and latticed. The industry sector for CIS226 has been categorized as: *541519 Other computer related services*. (See: https://www.census.gov/svsd/www/services/sas/sas_summary/54summary.htm#sectordescription) The reviewer finds that this classification is correct. *(Note that the census web site was partially down at the time of this review, so the Reviewer was not able to ascertain the validity of this classification.)*

Those completing this course would enter the Bureau of Labor Statistics occupation classification of *SOC:15-1122 Information Security Analysts.* (See: http://www.bls.gov/soc/2010/soc151122.htm)

The NCES CIP (Classification of Instructional Programs) is referenced as: *11: Computer and Information Systems Security/Information Assurance.* (See:http://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cip=11) This is also an accurate classification.

This course was designed for 1st year community college level students or equivalent. This reviewer found that there are no prerequisites for this course.

Course objectives include:
1. Describe the scope and limitations of an ethical hacker. (I)
2. Describe when network penetration testing can be ethically conducted. (I)
3. Describe the steps in a network penetration test. (II-IV)
4. Classify the countermeasures used to deter common network attacks. (III)
5. Describe how password crackers work and how to limit their success. (IV)
6. Perform a vulnerability assessment on a network. (II-V)
7. Document the findings using best practices for computer-based evidence. (V)
8. Conduct ethical hacking in a controlled environment. (II-V)

These course objectives have been aligned to the course outline and referenced in specific assignments; the reviewer finds this extremely helpful and to be a direct correlation to the Dynamic Skills Audit and Burning Glass baseline skills as listed in the labor market data. Specific review standards are listed in the table referenced below:

Table: Standard Reviewed Standards for Course Outcomes

Standard Reviewed	N/A	Satisfactory	Not Satisfactory
A.1 The learning outcomes are clearly stated and mapped to specific objectives and/or assignments.		X	
A.2 Prerequisites and/or any required competencies are clearly stated.		X	
A.3 Learning objectives for each course describe outcomes that are measurable.		X	
A.4 Learning objectives are appropriately designed for the level of each of the course.		X	
A.5 Instruction, activities, and assignments in courses are scaffolded from course to course, and throughout the program.		X	

A.1 : CIS226 articulates specific, measurable learning outcomes.
A.2 : This course has stated prerequisites: PHI102, CIS220, NET110.
A.3 : Course objectives are measurable.
A.4 : Learning objectives are aligned to the industry standards.
A.5 : It is assumed activities listed in CIS226 scaffold and align to other courses in the program.

**Reviewer Note: While the course outcomes are clearly stated and contain very specific measurable measures, it would also be recommended to include the program mission or goals in the course syllabus for clear assessment measuring. A deeper assessment could possibly be conducted that would match the course learning outcomes to specific program outcomes (or certificate). This would illustrate a direct impact on student learning.

B. Relevancy

Items Reviewed include:
- Dynamic Skills Audit Summary Report (Academic Years 2014-2015)
- Burning Glass Labor Market Data reports (Compilation)
- Advisory Board Minutes

Findings include:

Course competencies are relevant to students, industry, and employers. Strong evidence was found in the Dynamic Skills Audit Summary Report. Direct ties were found through interviews with stakeholders and in Advisory Board minutes.

The table that follows is a clear matrix of how the course outcomes are relevant to students, industry, and employers:

Table: Matrix of evidence-based skills mapped to students, industry, and employers

Standard Reviewed	N/A	Satisfactory	Not Satisfactory
B.1 Course competencies represent industry's expectation of the overarching knowledge, skills, and abilities that 1st year college students should possess.		X	
B.2 Core course competencies are relevant to **industry and employer**s.		X	
B.3 Instruction, activities, and assignment in individual courses are relevant and engaging to **students**.		X	

B.1 Yes. The specific course objectives clearly represent industry expectations and also are current and relevant.

B.2 Yes. Core competencies are relevant to industry and employers and evidence of this was verified using the Burning Glass labor market data (http://burning-glass.com/research/coding-skills/) and the Dynamic Skills Audit Summary. This reviewer took the interview summaries from Advisory Board members, current job openings and descriptions and matched them directly to all ten of the listed course objectives. According to BurningGlass.com "Some 84% of cybersecurity postings specify at least a bachelor's degree, and 83% require at least three years of experience. Because of the high education and experience requirements for these roles, skills gaps cannot easily be resolved though short-term solutions. Employers and training providers must work together to cultivate a talent pipeline for these critical roles." Cybersecurity represents 91% growth in job postings v. 28% for all other IT. See: http://burning-glass.com/wp-content/uploads/Cybersecurity_Jobs_Report_2015.pdf

B.3 Yes. Activities and instruction defined in the course outline offer real-world application in programming and coding languages that are required of any person seeking employment in this field.

C. Resources & Materials

Items Reviewed include:
- Dynamic Skills Audit Summary Report (Academic Years 2014-2015)
- Burning Glass Labor Market Data reports (Compilation)
- Advisory Board Minutes

Findings include:

Instructional materials being delivered achieve stated course objectives and learning outcomes (*note: all program/course materials are deliverable under Microsoft licensing*). A formal course review was conducted that address more specifically course content and instructional design processes. However, in this SME report, specific findings in this section relate specifically to the overall instructional materials which contribute to the ten specific course outcomes.

Table: Instructional materials and their direct link to course outcomes

Standard Reviewed	N/A	Satisfactory	Not Satisfactory
C.1 The instructional materials contribute to the achievement of the stated course learning objectives.		X	
C.2 The purpose of the instructional materials is clearly explained.			X
C.3 The instructional materials present a variety of perspectives and approaches on the course content.		X	
C.4 The instructional materials are appropriately designed for the level of the course.		X	

C.1 Yes. The course outline for CIS226 highlights weekly activity that maps directly to the eight course objectives.
C.2 No. The syllabus lists the materials required, but does not articulate the purpose of the instructional material
C.3 Yes. A variety of projects were identified. The reviewer recommends small group projects to satisfy particular learning outcomes.
C.4 Yes. The rigor matches 1st year college entry students. Reviewer also noted the rigor would be acceptable for all students from all demographics.

There were not specific points indicated for activities. This reviewer recommends defining those activities and activity points.

D. Assessment & Measurement

Items Reviewed include:
- Dynamic Skills Audit Summary Report (Academic Years 2014-2015)
- Burning Glass Labor Market Data reports (Compilation)
- Advisory Board Minutes

Findings include:

Assessment strategies use established ways to measure effective learning, evaluate student progress by reference to stated learning objectives, and are designed to be integral to the learning process. The reviewer compared and contrasted the eight learning outcomes listed for CIS226 to effect, best practices in assessing student learning. Those items have been identified and listed in the table below.

Table: Measurement of effective learning

Standard Reviewed	N/A	Satisfactory	Not Satisfactory
D.1 The course evaluation/criteria/course grading policy is stated clearly on each syllabus.		X	
D.2 Course-level assessments (those that can be delivered) measure the stated learning objectives and are consistent with course activities and resources.		X	
D.3 Specific and descriptive criteria are provided for the evaluation of students' work and participation and are tied to the course grading policy.			X
D.4 The assessment instruments (that can be delivered) are sequenced, varied, and appropriate to the content being assessed.		X	

D.1 Yes. Grading criteria is clearly expressed and a scale is provided.

D.2 Yes. The course assessments appear to measure the stated objectives. However, this Reviewer recommends high-order assessment strategies. eg, something approximating authentic assessment and fewer lower order T/F and MC.

D.3 The reviewer did not find any specific or descriptive criteria that was provided for the evaluation of student work and no visual representation of how the course work ties into the grading policy. As mentioned previously, this could be solved with a simple outline listing each assignment, the due date, total points possible, and alignment to the learning outcomes. In order to encourage students, especially in this particular field, it would be best practice to encourage them by listing assignments and due dates early so students are prepared for their learning.

D.4 The Reviewer found that the assessment strategies eg projects, quizzes, assignment et. al. were adequately sequenced and varied.