Formal Evaluation and Subject Matter Expert Summary Report

CPT281

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

EMPORIA STATE UNIVERSITY
INFORMATION TECHNOLOGY

July 2017

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Developed by Anna J. Catterson, Ph.D., Emporia State University.

Course Review for: Maine is IT
Course: CMCC: CPT81 Penetration Testing
Reviewed by: Anna J. Catterson, Ph.D.
Date: June 29, 2017

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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	**0**
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	**1**
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	**7**	

Comments:

1.1: The syllabus does not include information to help students access the online course. Adding a direct link is recommended. It is also recommended that both online courses AND F2F courses include on the syllabus a "Getting started" information to help inform students about initial procedures and to introduce course and CMConnect components.

1.2: The purpose of the course is clearly stated. The syllabus includes percentage breakdowns of the time spent in various class settings and with various class activities.

1.3: There is nothing in the syllabus to indicate that course interactions will take place through the LMS, but electronic communication is ubiquitous, whether formally set up in the course or not. There is an "Open Discussion" board, probably for students to ask/answer each other's questions. Etiquette expectations (sometimes called "netiquette") for online discussions, email, and other forms of communication should be covered. *Examples include:*

- Be sensitive to the fact that there will be cultural and linguistic backgrounds, as well as different political and religious beliefs, plus other 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: Several policies, including participation, academic dishonesty, and late work are covered. If additional college-wide information is available, consider adding links to the campus policies.

1.5: No minimum hardware or software requirements to conduct course activities are listed in the syllabus. These may be deemed unnecessary if the course work will take place in a campus lab, but if students are expected to learn the software on their own, they may benefit from instructions on how to access software, how to install it, and what minimum technical requirements would be necessary for their personal computers.

1.6: Prerequisites have been identified as CPT235, 266, 271.

1.7: Minimal skills for students entering the course are not listed.

1.8: No introduction for the instructor or link to an online introduction is given.

1.9: Nothing in the syllabus indicates that students are asked to introduce themselves.

B. Learning Objectives & Competencies (15 points total)

2.1 The course learning objectives, or course/program competencies, describe outcomes that are measurable	3	**3**
2.2 The module/unit learning objectives or competencies describe outcomes that are measurable and consistent with the course-level objectives or competencies.	3	**3**
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	**14**	

Comments:

2.1: Some of the course learning outcomes are written in measurable terms. Others do not sufficiently identify what students will be doing with the course content in a measurable way. Outcome #2 is measurable, because it clearly states what students will do to demonstrate their understanding, and a rubric could be created to score the quality of the program students create. #1 is not measurable, because it is not clear how students will demonstrate their ***understanding*** of terminology. Outcomes should be revised with the guiding idea that they should give a clear picture of what students will be doing and how it will be measured.

2.2: Yes, learning outcomes are measurable – see note from 2.1.

2.3 : Objectives are written from the student perspective, so if it is unclear what they will be doing within each topic, students at least have an idea of their overall path through the course.

2.4: There is no link make between unit objectives and course objectives. If there was some alignment that pointed out to students that this unit could be contributing toward course objective #X, they will have a better understanding of what its purpose is.

2.5: Objectives are suited to the level of this introductory 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	**1**
3.4 The assessment instruments selected are sequenced, varied, and suited to the learner work being assessed.	2	**0**
3.5 The course provides learners with multiple opportunities to track their learning progress.	2	**0**
Total	**7**	

Comments:

3.1: Assessments will consist of in class projects (unclear what this is) and quizzes/exams. The reviewer found two major forms of assessment for this course.

3.2: Course grading policy is clear.

3.3: No grading criteria are provided for the assessments, so it is unclear how failure to meet any particular objectives might affect the overall grade. But the course grading policy explains the points and weighting of the various types of assessment. There is a description relating to class participation.

3.4: There are only two major forms of assessment, please consider alternative instructional methodologies to allow for more interactive learning experiences.

3.5: Not clear how students will track progress.

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: Yes, good.
4.2: Somewhat, needs improvement.
4.3: The textbook is sited by title, author, and ISBN.
4.4: Yes
4.5: Yes
4.6: Yes

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	**1**
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	**0**
Total	**4**	

Comments:

5.1: Learning activities, especially those that allow students to apply content, perhaps a virtual environment to allow for real-world application.

5.2: It is not evident that learners are interacting interpersonally with each other, but they will engage with the software applications available for hands-on active learning.

5.3: No plan is provided for classroom response time or assignment feedback.

5.4: No requirements are listed for learner interaction.

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	**0**
Total	**9**	

Comments:

6.1: Yes

6.2: Based on course activity descriptions, course tools do promote learner engagement and active learning.

6.3: Yes

6.4: Course technologies are current

6.5: No links are provided in the syllabus. A review of the agreement for each application required in the course will insure that student data required for the use of the software is secure. Linking to the agreements will allow students to easily access the policies.

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	**3**
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	**3**	

Comments:

7.1: No technical support information is provided in the syllabus. It is recommended that multiple channels of tech support communication be listed in the syllabus to ensure that no student is put behind due to technical difficulties.

7.2: A section of the syllabus addresses students requiring disability services, referring them to the CMCC Disabilities Coordinator. A location and contact information are provided. A link to their website would be helpful as well.

7.3: No academic resources are listed in the syllabus. If tutoring, advising, or other student services are available to support academic success, these should be listed along with links or contact information.

7.4: No student support services or resources are listed. If there are services to support student life resources, such as counseling or student wellness, these should be listed along with links or contact information. Courses usually include a statement in their syllabus regarding how students can seek help if they feel discriminated against, but there was not such a statement in this course.

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	**1**
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	**10**	

Comments:

8.1: The CMConnect course shell allows easy access to instructional materials, providing downloads to presentation files in just one click from a "Handouts" section.
8.2: Information regarding the accessibility of technology used is not included. This would include instructions on how to obtain and install any programs used, as well as whether software is compatible with screen readers for the visually impaired.
8.3: Assumed, well-organized.
8.4: Yes
8.5: Multimedia included are easily downloadable. When possible, embedding multimedia within the course LMS, rather than requiring downloads, ensures ease of access and limits student issues that may arise when leaving the LMS to access outside resources.

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.
• 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: All course content provided for review includes Creative Commons license information and the corresponding CC graphic.

Part IV: Subject Matter Expert (SME) Findings & Review

Course: CMCC: CPT281
Course Name: Penetration Testing
Reviewed by: Anna J. Catterson, Ph.D.
Date: June 29, 2017

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 CPT281 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. Entry-level career opportunities were found within 5-30 miles of CMCC for graduates from an AAS in Computer Technology.
2. Current job openings list specific duties that relate to Penetration Testing.

Jobs include:

Security Engineer
The Alexander Technology Group is looking for a Security Engineer/Architect for a client located in the Portland, ME area. This is a permanent opportunity. Qualifications and Experience Must have experience Cisco Router\Switches, ASA and firepower (IPS\URL filtering) Windows 2008R2 and 2012 Active Directory Token authentication • 6+ years of experience with information assurance and Cybersecurity • Experience with Cybersecurity risk analysis, including selection of Cybersecurity controls based on threats and mission needs • A bachelor's degree (master's degree a plus) in computer science, information systems or related field • Experience managing solutions in various environments such as end-user, server/network, DMZ, and public cloud • Working knowledge of protecting operating systems and networks using malware protection, firewalls and other security tools If interested, please send resume to Jpolombo@alexandertg.com

IS Security Engineer
• * Position Summary • The IS Security Engineer role is the second level of a three level career path. Under general supervision, the IT Security Engineer is responsible for the implementation and maintenance of information security systems and processes. This work could also include: conducting, or working with others to conduct, risk based technical security and compliance audits or assessments. This position requires a tactical focus, with both technical and compliance specific knowledge, including knowledge in several of the following technical corridors; network, platform, and/or application security technologies. This role must possess a working knowledge of HIPAA privacy laws, Security/Privacy standards, Business Continuity/Disaster Recovery concepts, NIST based security and risk management standards, and industry best practice security standards. Other activities include maintaining and ensuring compliance with security policies, procedures and standards related to the performance of technical activities in support of the security program service levels. • Required Minimum Knowledge, Skills, and Abilities (KSAs) • Associates degree in a related field of study or equivalent work experience. • 3 years IT experience in complex environments and a working knowledge of computer networking and platforms, including (but not limited

to) network operating systems; firewalls; intrusion detection/prevention systems; wireless security including wireless intrusion prevention systems; web proxies; vulnerability scanning technologies; VPN's; Windows and Unix-based platforms; identity management; IT incident response; and network architecture. • Professional certification in either technical security or within a relevant networking or platform technology • Knowledge of application security concepts from a secure coding, secure design, and ongoing change management and monitoring perspective. • A high level of demonstrated organizational skill supporting business and process analysis and process implementation in moderately complex environments. • Strong prioritization skills and able to handle multiple tasks effectively. • Facilitation skills. • Active problem solver, working across multiple IS and business teams for solutions. • Strong business knowledge / acumen. • Ability to partner with others to overcome obstacles. • Articulate appropriately both in written and oral form, and collaborate with multiple teams regarding security and privacy obligations and duties

Senior Network Security Engineer

Please note: This position is physically located in Portland, ME. No remote work. Must be local or planning to relocate. Based in beautiful Portland, Maine, Stone Coast Fund Services is searching to fill our Senior Network Security Engineer role. This position will be responsible for oversight of design, build, and deployment to ensure that Cybersecurity principles and practices are employed to balance requirements with the existing threat environment and mission needs. The Senior Network Security Engineer will serve as primary Information Sharing Coordinator and Designated Incident Handler for the Stone Coast Incident Response Plan. The Senior Network Security Engineer will be responsible for defining, implementing and maintaining corporate security policies, testing security solutions using industry standard analysis criteria and collaborating with colleagues on authentication, authorization and encryption solutions. This person will provide meaningful Information Security metrics which include identifying historical trends, areas of risks/gaps, violations and/or improvements as well as keeping abreast of current global security risks and communicating findings to Senior Management. The Senior Network Security Engineer will participate in root cause analysis of critical events for improving preventative and reactive processes and create new ways to solve existing production security issues. Requirements At Stone Coast, you must enjoy working as part of an ever-growing team of professionals who take pleasure in work done well and in working well together. The ideal candidate will have: • 6+ years of experience with information assurance and Cybersecurity • Experience with Cybersecurity risk analysis, including selection of Cybersecurity controls based on threats and mission needs • Experience managing solutions in various environments such as end-user, server/network, DMZ and public cloud • Working knowledge of protecting operating systems and networks using malware protection, firewalls and other security tools • Security specific industry certification; preference for GIAC (any certification) or CISSP Education • A bachelor’s degree, (master’s degree a plus), in computer science, information systems or related field Stone Coast Fund Services, ranked as the overall highest rated hedge fund administrator for 2016 by Global Custodian, the leading magazine of the international securities services industry, seeks high aptitude, intellectually curious candidates committed to superior service, long-term relationships and investor confidence

INTERNSHIP OPPORTUNITY

This internship program is in line with Company's commitment to support Maine education system to encourage more students to enroll in programs that prepare students and develop necessary skills and talent pool for innovative technologies to support growing needs of local businesses for hard to find skills. The Cyber Security Intern assists in our security initiatives covering requirements from Payment Card Industry Data Security Standard PCI DSS and other security frameworks. The intern may be required to perform a wide variety of duties in support of technical and/or administrative assignments within information security department under general supervision. The interns will participate in activities supporting multiple security projects and must be able to work in a team environment and independently also if required as assigned by the security team members. Some examples of projects include vulnerability management, intrusion detection & prevention IDSIPS, incident response forensics, identity & access management IAM, web application firewall WAF, anti malware solutions, secure software development, technical research and documentation. The intern will interact primarily with the information security team, other departments in technical operations, but may also need to work with architecture, sw development, and business lines as internal customers. MINIMUM REQUIRED QUALIFICATION FOR CONSIDERATION: * Minimum of a 3.0 GPA in Computer Science, or other related subjects will be considered. * Strong research skills, communications ability, technical computing and information security knowledge and some basic computing experience is preferred. * Strict

adherence to Company policies e.g. network acceptable use policy, background check, confidentiality, and information security professional code of conduct and procedures is required. Employer's Job# 160000DX Please visit job URL for more information about this opening and to view EOE statement

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This is a fast growing occupation in the state of Maine and has increased 15% over the past year according to Wage and Labor 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 CPT281 course learning outcomes and objectives align with the program mission and goals. This reviewer found that the CPT281 course has listed measurable outcomes which can be stacked with other coursework. The industry sector for CPT281 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.

Those completing this course would enter the Bureau of Labor Statistics occupation classification of *SOC:15-1130 Software Developers and Programmers.*. (See: http://www.bls.gov/soc/2010/soc150000.htm#15-1100)

The NCES CIP (Classification of Instructional Programs) is referenced as: *11: Computer and Information Sciences and Support Services*. (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 students or equivalent. There are no course prerequisites listed.

The content of these course objectives aligns with the topics listed in the course syllabus and the required textbook. This alignment also correlates to items found within the Dynamic Skills Audit and Burning Glass baseline skills as listed in the labor market data.

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– Good work with developing student outcomes.
A.2 – Yes
A.3 - Yes
A.4 - Learning objectives are appropriate for an introductory course.
A.5 – Activities appear to be scaffolded through the course, as more content and skills are learned. The course's objectives fill an industry need within the program.

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 - Course objectives align with industry expectations at the appropriate skill level, based on employee responsibilities found in current job postings.
B.2- Core competencies are relevant to industry and employers, as verified using the Burning Glass labor market data http://burning-glass.com/five-careers-where-coding-skills-will-help-you-get-ahead/) and the Dynamic Skills Audit Summary. Student learning objectives align with the competencies expected of employees in network support fields and those listed by the Advisory Board.
B.3 - Activities and instruction defined in the course outline offer real-world application in computer penetration testing that are beneficial to students 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:

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 – The topics covered with the course materials clearly align with course learning objectives.
C.2 – The syllabus clearly explains how students will use the course materials, primarily, the required textbook.
C.3 – The materials are presented in a variety of modalities for students, and both content-focused and hands-on activities are used.
C.4 – As the materials align with appropriate course outcomes, they are a good fit for the level of course.

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:

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 – The grading policy is clearly stated.
D.2 – The assessments are consistent with the types of activities carried out in the course and align with the objectives.
D.3 – Criteria were not shared for review, so it is unclear how any particular assignment would be graded and what exactly the students much achieve for each one. Participation guidelines are included, but no grade is tied to participation.
D.4 – The sequence of the assignments is clear, as they follow the progression of the course to build toward its outcomes. The variety of assessments is adequate, as assignments provided for review cover a range of content-focused activities, each in unique ways appropriate for the knowledge and skills being assessed.