COLORADO STATE UNIVERSITY GLOBAL

ISM545: INFORMATION TECHNOLOGY AUDITING AND ASSURANCE

Credit Hours: 3

Contact Hours: This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

Faculty Information: Faculty contact information and office hours can be found on the faculty profile page.

COURSE DESCRIPTION AND OUTCOMES

Course Description:

This course provides students with a foundation and understanding of IT auditing services used in midsized to large organizations. Students will focus on security, integrity, and availability of information systems while integrating financial, performance, and operational auditing and assurance services.

Course Overview:

This course features a comprehensive, consistent treatment of the most current thinking and trends in the IT auditing subject area. The concepts of the course deliver fundamental information security principles packed with real-world applications and examples. This course identifies and explains different compliance laws and what each of these laws require in regard to safeguarding business and consumer privacy data elements and the design and implementation of proper security controls.

This course also presents how to audit an IT infrastructure for compliance based on the compliance laws themselves, on the need to protect and secure business and consumer privacy data, and on the need to have properly documented and implemented security controls within the organization. Auditing standards and frameworks are also presented, along with what must be audited within the seven domains of a typical IT infrastructure. In addition to discussing how to plan and conduct an audit, the course also reviews how to document what was identified during the audit and how to determine whether compliance requirements are being met throughout the IT infrastructure. Specific security controls and countermeasures are presented for each of the domains of a typical IT infrastructure.

Lastly, this course provides a resource for students who desire more information on becoming skilled at IT auditing and IT compliance auditing. This final module will provide additional content on ethics, education, professional certifications, and IT auditing certifying organizations.

This course not only addresses the tools and techniques for auditing IT infrastructure for compliance, it also examines the need. While much of the content is related to information security, the coursework considers the broader and higher-level principles around information governance and risk management. It brings together the fields of auditing, which has traditionally been seen as a function of accounting, and information technology.

Course Learning Outcomes:

1. Identify the parts of the IT Audit Process.
2. Analyze which areas of the business processes to audit.
3. Differentiate what data is critical and what should be omitted.
4. Examine auditing infrastructure hardware and operating systems.
5. Apply the tools and technology used in the audit process.
6. Analyze the unique attention mobile devices will require.
7. Explain the risks inherent with Cloud Computing and Outsourcing.
8. Examine Virtualized environments and the challenges they can present to the audit process.
9. Recognize and utilize basic standards and regulations of the industry.
10. Identify the benefits of a risk management analysis.
11. Understand the different IT Auditor careers.

Participation & Attendance

Prompt and consistent attendance in your online courses is essential for your success at CSU-Global Campus. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

Course Materials

Required:

Weiss, M., & Solomon, M. G. (2016). *Auditing IT infrastructures for compliance* (2nd ed.). Burlington, MA: Jones & Bartlett Learning. ISBN: 9781284090703 (print); 9781284104387 (etext)

Suggested:

None.

NOTE: *All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.*

COURSE SCHEDULE

Due Dates

The Academic Week at CSU-Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday at 11:59 p.m. MT. Late posts may not be awarded points.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.

WEEKLY READING AND ASSIGNMENT DETAILS

Module 1

Readings

- Chapters 1, 2, & 3 in *Auditing IT Infrastructures for Compliance*
- Elefterie, L., & Badea, G. (2016). The impact of information technology on the audit process. *Economics, Management, and Financial Markets, 11*(1), 303-309.
- Kim, S. L., Teo, T. S. H., Bhattacherjee, A., & Nam, K. (2017). IS auditor characteristics, audit process variables, and IS audit satisfaction: An empirical study in South Korea. *Information Systems Frontiers, 19*(3), 577-591.

Discussion (25 points)

Critical Thinking (75 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1: TJX Credit Card Breach Analysis

Please read about the TJX Credit Card Breach in the Case Study section of Chapter 1 and then answer the following questions:

- Do you feel that TJX properly handled the incident upon discovery of the breach? How are incident-response procedures important to the IT security program?
- Had TJX collected and retained unnecessary personal data? What are the risks of holding onto data?
- What were the results of TJX's payment-card processing audits and third-party vulnerability audits?
- How were weaknesses and vulnerabilities within TJX discovered and documented through internal security assessments?

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: Privacy Laws and Regulations in IT Compliance Audits

IT compliance audits must consider privacy data and the application of an appropriate privacy control framework within organizations. Discuss the laws and regulations across multiple boundaries in which business is conducted. Your paper on privacy laws and regulations must be considered within an IT compliance audit.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Module 2

Readings

- Chapters 4 & 5 in *Auditing IT Infrastructures for Compliance*
- Hoy, Z., & Foley, A. (2015). A structured approach to integrating audits to create organizational efficiencies ISO 9001 and ISO 27001 audits. *Total Quality Management & Business Excellence: An Official Journal of the European Society for Organizational Excellence, 26*(5/6), 690-702.
- ISACA releases audit and assurance programs. (2018). *Computer Security Update, 19*(1).

Discussion (25 points)

Critical Thinking (75 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1: The COSO Framework

The COSO framework of internal controls is practiced within companies around the world. The objectives of the COSO framework are closely related to its five components. For this week's activity, please discuss these five components of the COSO framework. Be sure to include each component's impact on each of the COSO framework objectives. What do you feel an auditor would most be concerned with during an IT audit?

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: Discussing the Differences between COBIT and ISO 27000

Despite the focus on information security, ISO 27000 envelops many of the tasks we undertake in our lives that utilize technology. For this week's activity, please discuss the differences between COBIT and the ISO 27000 series in relation to IT auditing. Be sure to clearly identify and explain at least three important differences.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Module 3

Readings

- Chapters 5, 6, & 7 in *Auditing IT Infrastructures for Compliance*
- Shamala, P., Ahmad, R., Zolait, A., & Sedek, M. (2017). Integrating information quality dimensions into information security risk management (ISRM). *Journal of Information Security and Applications, 36*, 1-10.
- Webb, J., Maynard, S. B., Ahmad, A., & Shanks, G. (2016). Foundations for an intelligence-driven Information security risk-management system. *JITTA: Journal of Information Technology Theory and Application, 17*(3), 25-50.

Discussion (25 points)

Critical Thinking (75 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1: Risk Management

Whether an organization's risk management function is focused on traditional insurable risks or broader enterprise-wide risk management, an audit of risk management should be among the first priorities for senior leadership. If a separate risk management department does not exist, it is even more important as fewer resources are dedicated to the process of identifying and evaluating risks and ensuring appropriate risk responses are intact. With this in mind, write a 3- to 4-page paper, citing at least three sources, on how an organization can benefit from an objective evaluation of the risk management function.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: Qualitative vs. Quantitative Audits

The qualitative and quantitative audits are not mutually exclusive but are complementary. While it makes sense to compare and contrast the two approaches individually, a combined approach is perhaps the best way to achieve a comprehensive audit. We often start with a quantitative examination, while keeping an eye out for anomalies that raise more qualitative concerns. In your critical thinking activity this week, discuss these two approaches separately, providing examples of each approach during an IT audit. Complete your activity with a discussion on how a combined approach may be the most effective approach during an IT audit. On the contrary, you can take a devil's advocate approach and discuss why a combined approach is *not* the most effective.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Portfolio Milestone (25 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1:

Please review the Portfolio Project Option #1 in Module 8.

Week 3 Topic Approval**:** submit a fictitious company name as well as the type of business it conducts. In addition, you will need to choose any five items from the optional audit list below to include as part of your topic approval for this organization:

1. Operates within a Microsoft Windows environment
2. Houses a data center
3. Completed a disaster preparedness plan
4. Use of a web server
5. Employs a database
6. The private network contains a wireless network segment
7. Utilizes at least one instance of a virtual server
8. Makes use of the Cloud for a business process of your choice (storage, Software as a Service,

etc.)

Your topic paper should be 1-2 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least one scholarly reference in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2:
Please review the Portfolio Project Option #2 scenario in Module 8. For Milestone 1, you will start your final project by submitting a 2- to 3-page paper with the following information, at a minimum:

1. Provide an overview of IT security audits
2. Discuss the Cloud and virtualized environments
    a. What is Cloud computing?
    b. What is a virtualized environment?
3. What security factors must be considered in relation to Cloud and virtualized environments?

Your paper should be 2-3 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least two scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Module 4

Readings

- Chapters 8 & 9 in *Auditing IT Infrastructures for Compliance*
- Anonymous. (2016). March Networks introduces new security audit tool. *SDM, 46*(11), 113.
- Bornus, D. (2018). The security/compliance audit: A valuable diagnostic tool. *Corrections Today, 80*(3), 34-39

Discussion (25 points)

Critical Thinking (75 points)
Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1: Network Tools Review
Tools and resources can be especially useful in helping to ensure your hardware is managed properly. Choose a single firewall management solution, a single network scanning tool, and a single knowledge base to use for your review paper. Each of these should be examined for their usefulness, strengths and weaknesses and how they fare under scrutiny within the industry. You are to choose one from each of the three categories.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: Mobile Security Analysis
Mobile apps rely on the browser to operate, and as a result, the occurrence of web-based attacks on mobile devices is on the increase. Firewalls alone are no longer enough. With the rise of BYOD, companies must include mobile devices as part of their security policies. Your activity this week is two-fold: First, discuss five threats to mobile security. Second, discuss best practices for securing mobile devices within an organization.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Module 5

Readings

- Chapters 10 & 11 in *Auditing IT Infrastructures for Compliance*
- Guo, Y., Hu, X., Hu, B., Cheng, J., Zhou, M., & Kwok, R. Y. K. (2018). Mobile cyber physical systems: Current challenges and future networking applications. *IEEE Access, 6*, 12360-12368.
- Zeng, L., Xiao, Y., & Chen, H. (2015). Auditing overhead, auditing adaptation, and benchmark evaluation in Linux. *Security and Communication Networks, 8*(18), 3523-3534.

Discussion (25 points)

Critical Thinking (75 points)

Option 1: Auditing Wireless Networks

Investigate and clarify why wireless networks deserve special attention when it comes to the auditing techniques you will use. Careful consideration should be placed on the following points:

- Identify the additional risks inherent with a wireless networking environment
- Discuss the audit objectives for wireless auditing techniques
- Select several of the tools available for wireless auditing procedures to discuss in your paper
- Argue both the advantages and disadvantages of wireless networking concentrating on the corporate enterprise environment
- Special attention should be placed on wireless hardware and mobile devices
- Scrutinize the GAWN certification and its place in the industry

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: Web Server Audits

Web server auditing can go a long way in enforcing tighter security and ensuring business continuity. The power of log data is tremendous. Web server logs record valuable information pertaining to usage, errors, and other important security events. Using a specialized auditing tool can be extremely helpful during the audit of web servers. In your paper this week, please discuss the methods of identifying weak web server configurations and how to mitigate them for a secure web server. Possible concepts to include are SSL certificates, HTTPS usage, attack surface, SQL injection, vulnerability migration, and least privilege. Finally, conclude your activity with an overview of how to audit the web server's security and implement best practices.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Portfolio Milestone (25 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1:
As you prepare to formulate your outline, consider the areas that you will need to focus on. Your audit should include entity-level controls such as asset management, policies, standards, and procedures as well as employee management. Most organizations require the use of specific hardware including switches, a firewall, and, of course, data storage. These areas should also be included in your audit proposal. Lastly, the five audit option items you selected for your Week 3 topic approval will make up the rest of your outline.

Tip: The topics included in your outline will serve as your section and sub-section headings on the final project.

Your paper should be 2-3 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2:
Please review Portfolio Project Option #2 scenario in Module 8. For Milestone 2, you will continue your final project by submitting a 4- to 6-page paper with the following information, at a minimum:

- Provide an overview of IT security audits
- Discuss the Cloud and virtualized environments
    - What is Cloud computing?
    - What is a virtualized environment?
    - What security factors must be considered in relation to Cloud and virtualized environments?
- Discuss the audit team
    - How do you select team members?
    - Are there any outsourced team members?
- Discuss regulations and legislations applicable to IT security audits
    - ISO 27001
    - HIPAA
    - COSO

Note that the first two sections were submitted as Milestone 1. Please make necessary updates based on instructor feedback on those two sections. Then, continue with Milestone 1 by including the new information discussed above for Milestone 2.

Your paper should be 4-6 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Module 6

Readings

- Chapter 12 in *Auditing IT Infrastructures for Compliance*
- Iovan, S., & Iovan, A. A. (2016). Cloud computing security. *Fiabilitate şi Durabilitate, 1*(s1), 206-212.
- Modi, C. N., & Acha, K. (2017). Virtualization layer security challenges and intrusion detection/prevention systems in cloud computing: A comprehensive review. *The Journal of Supercomputing, 73*(3), 1192-1234.

Discussion (25 points)

Critical Thinking (75 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1: Auditing and Assurance Expectations for Current Technology

Your organization wants to upgrade a portion of its IT infrastructure and has decided to use Microsoft Hyper V as a hypervisor to create several virtual servers in order to replace older hardware. It has also determined that Cloud computing for storing older, less sensitive data and utilizing Software as a Service for accessing the newest business applications will be rolled out to specific departments. Explain the challenges you will face as part of the internal IT audit team for your organization when auditing these newer technologies.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: Outsourcing IT Audits

Although Cloud computing and outsourced operations can provide benefits to a company in terms of cost and resource efficiency, they also introduce additional risks, as the company gives up control over its data and IT environment. In this written activity, discuss key controls to look for when you are auditing IT operations that have been outsourced.

Information that should be discussed:

- Outline requirements for compliance with applicable laws and regulations
- Specify how performance will be measured including SLAs
- Discuss key metrics and performance indicators
- Provide provisions for penalties upon nonperformance or delayed SLAs
- Gain assurance that data can be retrieved when needed
- Discuss nondisclosure clauses

Conclude your paper on the benefits versus the risks of outsourcing Cloud computing audits within an organization.

Your paper should be 3-4 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least three scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Module 7

Readings

- Chapters 13 & 14 in *Auditing IT Infrastructures for Compliance*
- Jiang, H., Chuck, D., & Chen, W. (2016). Energy-aware data center networks. *Journal of Network and Computer Applications*, 68, 80-89.
- Raju, E., Becker, P., & Tehler, H. (2018). Exploring interdependencies and common goals in disaster recovery coordination. *Procedia Engineering*, 212, 1002-1009.

Discussion (25 points)

Module 8

Readings

- Chapters 14 & 15 in *Auditing IT Infrastructures for Compliance*
- Doherty, C., & Heffernan, E. (2014). Internal audit a smart career move? *Accountancy Ireland, 46*(1), 30-32.
- Donathan, C. (2012). So you want to be an IT auditor? *The Internal Auditor, 69*(5), 25-26.
- Dysart, J. (2018). Quantum computing: The end of encryption? *Communications of the ACM, 61*(5), 28.
- Porter, D. (2018, June 26). Identifying the top 10 most common database security vulnerabilities [Blog post]. Retrieved from https://www.getfilecloud.com/blog/2018/06/identifying-the-top-10-most-common-database-security-vulnerabilities/#.XL6S1OhKiUl

Discussion (25 points)

Portfolio Project (300 points)

Choose one of the following two assignments to complete this week. Do not do both assignments. Identify your assignment choice in the title of your submission.

Option 1: IT Audit Proposal

IT audits help enterprises ensure the effective, efficient, secure, and reliable operation of the information technology that is critical to organizational success. The effectiveness of the audit depends largely on the quality of the audit program. The audit process consists of three phases: planning, fieldwork/documentation (acquiring data, testing controls, issue discovery and validation, documenting results) and reporting/follow-up (gathering report requirements, drafting the report, issuing the report and follow-up). The planning phase consists of five key steps:

- Determine audit subject.
- Define audit objective.
    - Audit processes are clearly defined by phase with activities clearly described.
- Set audit scope.
    - A clear scope helps the auditor determine the testing points relevant to the audit's objective.
- Perform pre-audit planning.
    - Pre-audit planning includes tasks such as conducting a risk assessment, identifying regulatory compliance requirements, and determining the resources that will be needed to perform the audit.
- Determine audit procedures and steps for data gathering.
    - This involves activities such as obtaining departmental policies for review, developing methodology to test and verify controls, and developing test scripts plus criteria to evaluate the test.

IT audit programs indicate three key success elements: standard frameworks, the operating environment of the entity under review, and the audit process used internally.

For the final project, you will create an IT audit proposal that includes the above information in detail for a fictitious company (this is the company you described in Milestone 1, which was due in Module 3).

Your audit proposal must be at least 10 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least eight scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

Option 2: IT Security Audit Project Report

Conducting an audit is imperative to assess the progress of a project and regular audit sessions ensure that an audit team is in sync with the established project objectives. Ideally, an audit process should have some level of flexibility. For the final project, you will create an IT security audit project report on Cloud and virtualized environments. At a minimum, your report should include the following:

- Provide an overview of IT security audits
- Discuss the Cloud and virtualized environments
    - What is Cloud computing?
    - What is a virtualized environment?
    - What security factors must be considered in relation to Cloud and virtualized environments?
- Discuss the audit team
    - How do you select team members?
    - Are there any outsourced team members?
- Discuss regulations and legislations applicable to IT security audits
    - ISO 27001
    - HIPAA
    - COSO
- Discuss the benefits of IT assurance and risk management in relation to Cloud and virtualized environments
- Discuss achieving compliance in a virtualized environment and the Cloud
- Evaluate tools
- Recognize the need for data security
    - Classify operational and legal concerns
- Conclude with a discussion on operations for successful use of the Cloud and virtualized environments

Your audit report must be at least 10 pages in length and conform to *CSU-Global Guide to Writing and APA*. Include at least eight scholarly references in addition to the course textbook. The CSU-Global Library is a good place to find these references.

COURSE POLICIES

Grading Scale	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

Course Grading

20% Discussion Participation
45% Critical Thinking Assignments
35% Final Portfolio Project

IN-CLASSROOM POLICIES

For information on late work and incomplete grade policies, please refer to our **In-Classroom Student Policies and Guidelines** or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

Academic Integrity
Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /repurposing your own work (see CSU-Global Guide to Writing & APA for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and internet resources.

Citing Sources with APA Style
All students are expected to follow the CSU-Global Guide to Writing & APA when citing in APA (based on the most recent APA style manual) for all assignments. A link to this guide should also be provided within most assignment descriptions in your course.

Disability Services Statement
CSU-Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

Netiquette
Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults, or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.