ACCOUNTING DEPARTMENT
Internal Controls and Accounting Information Systems - A Data Analytics Perspective
ACCT-GB.3315

Instructor: Prof. Joel Lanz, MBA, CPA/CGMA/CFF/CITP, CFE, CISSP, CISA, CISM
Email: jlanz@stern.nyu.edu **or** jlanz@joellanzcpa.com (quicker)
Office: KMC 10-95
Office Hours: W 12:30-1:30, 4:30-5:00 and by appointment
Phone: (212) 998-0067 or (516) 933-3662 (quicker)

DATES	Section #	DAY	TIME	LOCATION
1/31-5/2	20	W	1:30pm-4:20pm	TBD

COURSE OBJECTIVES/GOALS:

The purpose of this course is to help prepare you for a successful career in public practice, industry, or government by understanding how accountants and other financial professionals rely on, manage and translate data generated by accounting information systems and other technology-related data sources to guide clients and organizations in making better business decisions in an increasingly complex and data-driven world. Using an accountant's perspective, the course will integrate the study of big-data analytics and technology, and the application of related software to the establishment and management and auditing of internal control systems.

On their website, the International Federation of Accountants summarized the challenges and opportunities facing the accounting profession:

> "After 600 years of a two-ledger bookkeeping practice and 30 years of Excel spreadsheets, businesses are moving quickly toward the use of automation to account for daily transactions. This seismic shift will not only impact the way business operates, but also the day-to-day role of accountants. Technological developments continue to significantly impact nearly every aspect of business across all organizations regardless of size or sector. Rapid transformation continues to challenge the status quo and change thinking. From social media to self-driving cars, the last decade alone has seen ground breaking technological advancements in all industries. Accountancy—the language of business—is no exception. The importance of professional accountants monitoring and adapting to changes driven by technology is clear. Doing so will enable us to continue to support organizations and help us remain relevant as the marketplace and society undergo rapid change.
>
> The introduction of emerging technologies brings new opportunities for both how professional accountants operate and the nature of our roles. This includes the impact of automation on transactional tasks, cloud computing and new emerging areas, such as cybersecurity and predictive analytics, together with a focus on providing valuable insights. Looking forward, blockchain, artificial intelligence and advancements in robotics are expected to further transform business models and change workforces skills and competencies.[1]

As they enter the accounting profession and throughout their careers, students will be called upon to deliver on the profession's recognized expertise in information analysis and business insight. Engagements and assignments may vary, but in addition to performing financial audit and other services requiring a professional license issued by the state, clients and employers will call upon today's students to utilize their unique combination of business, industry, and data analysis skills to effectively deliver a variety of management advisory services whether as a consultant or employee. These services include but are not limited to technology risk management, forensic accounting, business valuation, acquisition due diligence, fraud investigation, business forecasting, model risk management, executive information system development, cybersecurity assurance, tax data management, and many others.

---

[1] https://www.ifac.org/global-knowledge-gateway/technology?overview

We will examine the impact of data analytics in delivering the expected business solutions identified above including its impact on the financial statement audit. The course will focus on determining and assuring the reliability (accuracy, completeness, and validity) of data from its origination to its use in business decision making. The course will examine various IT audit and forensic investigation strategies and the impact of data analytics and business intelligence in strengthening the effectiveness of accounting services and value. Students will learn how to assess and consider the impact of IT governance, risk, and compliance on business and service delivery operations. Focusing on various COSO publications, the course will examine how IT affects business processes and the controls needed to reduce financial reporting risk. The course will also discuss the latest trends in audit data analytics.

After completing the course students will understand how to assess accounting system controls and to effectively design risk mitigation strategies for systems – whether as an auditor, consultant or manager. This will include using common audit and forensic data analytic techniques to identify anomalies for the major financial reporting cycles. Students should also be able to leverage this understanding in contributing to various aspects in acquisition and merger due diligence assignments. Recent regulatory and assurance developments will also be discussed.

For example, responding to the above events, the AICPA has introduced new guidance to help practitioners expand their practices and continue to provide value to clients and employers and remain relevant in these areas. Notable initiatives include the introduction of the CGMA credential and its emphasis on the accountants ability to negotiate and advise on new technologies including big data and blockchain, the expansion of Service Organization Control (SOC) reports, the introduction of a cybersecurity assessment and advisory service and the issuance of a guide for audit data analytics.

While IT and data science professionals have the technical expertise necessary to ensure that IT hardware is secure or information and data analytic management solutions are properly deployed, their solutions lack the Certified Public Accountant (CPA) or financial manager's perspective and ability to understand the complicated business implications, governance challenges, and risks associated with technology and the implications of what data can reveal. This course will help students bridge the gap between the accounting, data science and information technology professions, enabling them to succeed in a rapidly changing business environment.

Course Learning Outcomes:

As a result of successfully completing the course, students should be able to:

1. Understand the IT Governance and Risk Management challenges faced in many business and the role of the professional accountant in helping clients navigate these challenges.
2. Learn how accounting-related data analytic tools such as IDEA are used in the profession to generate value-added business insights and identify potential frauds.
3. Apply statistical analysis tools to address audit and other advisory services challenges (e.g., forensic accounting, business intelligence, etc.).
4. Understand how dashboards and other visualization technologies (in IDEA and Tableau) are used to facilitate the performance of financial audits, discover business inefficiencies and identify potential fraud.
5. From an accountant's perspective, appreciate the risks associated with system and programming development, how these risks are managed and their impact on data accuracy, information reliability and financial statement disclosures.

6. Understand the challenges of extracting data from common sources including appreciating the impact of the AICPA Audit Data Standards.

COURSE REQUIREMENTS AND GRADING:

SEGMENT	% OF GRADE
Professional Behavior, Homework and Class Participation	10%
Term Project	30%
Two Exams (@ 30% each)	60%

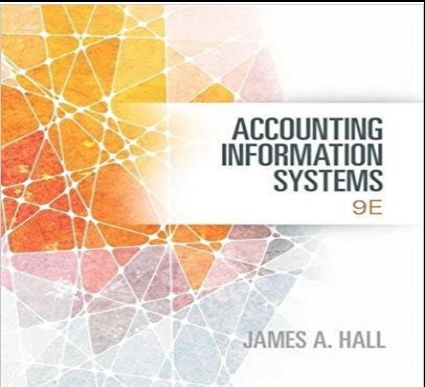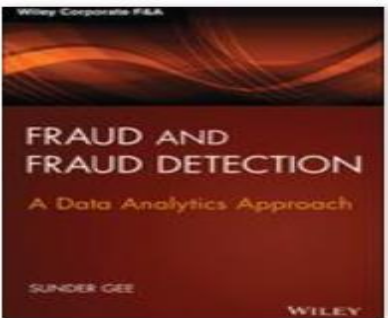Grades are determined following the following guidelines:
A's – awarded for excellent work.
B's – awarded for good or very good work.
C's (or below) – awarded for adequate or below work.

Course Materials:

Numerous course materials will be made available on the course website (e.g., most references identified in the lecture schedule). In addition, the following course materials are required:

	"Accounting Information Systems 9e: James A. Hall. ISBN-13: 978-1133934400 ISBN-10: 1133934404 NOTE: The 9e is fine for our course. A 10e is being introduced so you should find extremely good pricing.
	"Fraud and Fraud Detection: A Data Analytics Approach + Website – 1st edition," Gee, John Wiley & Sons, 2014, 9781118779651. (Gee). This book uses IDEA to illustrate various accounting-related data analytic techniques. Students will be provided with IDEA v10 student version software and access to the electronic version of the software's Data Analysis workbook. Through product documentation students will also be provided with additional background material to enhance their data analysis skills. (IDEA) *NOTE: Many of the examples in the book exceed the size limits of the student version of the software. The book illustrates the results of the queries. Students can practice with smaller files if desired.*

CI202 IDEA Data Analysis Workbook	Students will be provided with IDEA v10 software and access to the electronic version of the software's Data Analysis workbook. Through product documentation students will also be provided with additional background material to enhance their data analysis skills. (IDEA)

Re-Grading:

In line with Grading Guidelines for NYU Stern, the process of assigning grades is intended to be one of unbiased evaluation. This means that students are encouraged to respect the integrity and authority of the professor's grading system and discouraged from pursuing arbitrary challenges to it.

If a student feels that an error has been made in the grading of an individual assignment or in assessing the overall course grade, a request to have the grade re-evaluated may be submitted. Students should submit such requests in writing to the professor within 7 days of receiving the grade, including a brief written statement supporting the request.

Professional Behavior, Homework and Class Participation:

Students will accumulate points by participating in class by asking questions or by successfully responding to questions posed during class. Points in this category can only accumulate by attending and actively participating in class.
NOTE 1: Depending on time availability in class, there may not be time for everyone to participate in every session. It is important that you proactively manage your participation and not wait to be called on to achieve the maximum grade for this category.
NOTE 2: Students are expected to have completed the reading assignment and attempt assigned problems to the best of their ability prior to class. Students will be at a significant disadvantage during lectures if they do not come appropriately prepared.
NOTE 3: The class time will consist of combined lecture/discussion of chapter material, and review of assigned homework. You are expected to contribute to the review of homework. Students will organize themselves into teams of four or five (depending on class registration). Teams will be called upon to lead the discussion of homework problems. This discussion will include both the answer and the team's perspective of why they chose their answer. Quality and effectiveness of team discussions will be a significant component incorporated into the student's grade for this component.

Term Project:

The term project provides students with the flexibility to choose and focus efforts on a Data Analysis and Accounting Systems-related topic that is most relevant to them and their career. Students can choose from **one** of five "pre-approved" options (please refer to Appendix A of the syllabus) or as provided for in OPTION F, create their own project.

The following generic rubric will be used for grading the term. Generally, submissions are expected to have 25-30 "PowerPoint" slides (except for the IDEA and Tableau options). The presentation is expected to include appropriate reference citations (including a bibliography supporting your research) and compliance with University policies (e.g., footnotes as required).

EXCELLENT (90%+)	GOOD (80-89%)	ADEQUATE (79% -)
Deliverable is well organized and clearly written. The underlying logic is clearly articulated and easy to follow. Words are chosen that express the intended meaning and support reader comprehension. Diagrams or analyses enhance and clarify presentation of ideas. Sentences are grammatically correct and free from spelling errors. Material is readable, and the graphics highlight and support the main ideas.	Deliverable is organized and clearly written for the most part. In some areas the logic or flow of ideas is difficult to follow. Words are well chosen with some minor exceptions. Diagrams are consistent with the ideas presented. Sentences are mostly grammatically correct. Material is mostly readable, and graphics reiterate but may not support the main ideas.	Deliverable lacks overall organization or clarity. Reader has to make considerable effort to understand the underlying logic and flow of ideas. Diagrams are absent or inconsistent, Poor grammar makes the deliverable material difficult to understand. Major aspects of the analysis or recommendations are absent. Diagrams or graphics are confusing.

Two Exams:

Further information on the exams will be provided during the semester. Make-up exams will only be given for *extremely highly unusual and extraordinary cases of **MEDICALLY DOCUMENTED** emergencies.*

Any decisions or exceptions to make up exams are at the sole and final discretion of the Professor.

GENERAL COURSE NOTICES

Students are expected to attend class and to be thoroughly prepared to discuss the assigned readings and assignments. Professional standards continually evolve and change. As part of their professional development, students will need to learn how to monitor developments and maintain their competencies.

All participants must engage in appropriate professional behavior. Professional behavior is characterized by the following attributes: prompt arrival to class, courteous behavior in class (i.e., being attentive while others are speaking, dedicating your attention to this class while the class is in session, leaving class at the designated time, etc.), and professional preparation for class. To prepare for class professionally, you should read the assignments prior to class, prepare assigned problems, engage in class discussion, and actively participate in group activities.

Consider the following additional points as you prepare for class:
- You should be prepared to discuss all readings on the dates assigned. We will not have enough time to cover everything that is important in the class, so you must take the initiative to raise questions on material that you do not understand.
- As clients expect from a licensed professional and their practice, appreciate the effort required to properly prepare for class.
- Leverage group study and automated tools to manage your time. As in the real world, you are encouraged to "network with your peers" as necessary (except for exams and term projects which should be done individually only) to prepare for and complete assignments – both in-person and using discussion boards.
- I have arranged for all classes to be recorded. Recorded classes are usually available within 24 hours. If there is an aspect of the lecture that you wish to rehear, note the time in your notes as this will facilitate your ability to access that aspect of the lecture.

Use of Electronic Devices in Class

While electronic/wireless devices can enhance the teaching and learning experience, they can also be a

potential source of distraction to students, instructors, and the classroom setting. In keeping with the opportunistic aspects of technology that serves as the course theme, <u>these devices will be permitted subject to the following terms:</u>

Students are welcome to use electronic devices during class that enhance their performance. However, the use of these resources must be "appropriate" for an academic setting. Examples of appropriate use during class include note taking on laptops or tablets; use of smartphones to calendar events/assignments; use of devices to complete quick internet searches for pertinent information. If students engage in "inappropriate" use of electronics within the class, then their right to use these devices in the future will be removed. Examples of inappropriate use include but are not limited to texting your friends or reading "non-AIS" texts while in class; sending emails/texts (an occasional and very limited "read" is permitted as long as not abused), surfing the net for non-class purposes (e.g., Facebook, LinkedIn and other social media). Additionally, as class lectures will be recorded in accordance with University practices, individual recordings of any type of class lecture (video or audio) is prohibited.

If there are ongoing issues with numerous students, I will remove the privilege from all students to ensure the necessary standards of an academic setting. Lack of compliance with these terms will impact the student's grade. *Students will be penalized five points of their class participation score for violating the above. If you need to "multi-task" please let me know prior to the start of the class and sit in a designated section that will not disrupt your fellow student's attention.*

Academic Integrity:

Integrity is critical to the learning process and to all that we do here at NYU Stern. As members of our community, all students agree to abide by the NYU Stern Student Code of Conduct, which includes a commitment to:
- Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage.
- Clearly acknowledge the work and efforts of others when submitting written work as one's own. Ideas, data, direct quotations (which should be designated with quotation marks), paraphrasing, creative expression, or any other incorporation of the work of others should be fully referenced.
- Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct. Our support also includes reporting any observed violations of this Code of Conduct or other School and University policies that are deemed to adversely affect the NYU Stern community.

NYU STERN Policies:

- Unless specifically identified in the syllabus, default Stern policies apply to this course.
- The School expects that students will conduct themselves with respect and professionalism toward faculty, students, and others present in class and will follow the rules laid down by the instructor for classroom behavior. Students who fail to do so may be asked to leave the classroom.
- Students are encouraged to work together for homework assignments.
- Course evaluations are important to us and to students who come after you. Please complete them thoughtfully.
- Your class will be recorded for educational purposes.

- The entire Stern Student Code of Conduct applies to all students enrolled in Stern courses and can be found at:
  - Undergraduate College: http://www.stern.nyu.edu/uc/codeofconduct
  - Graduate Programs: http://w4.stern.nyu.edu/studentactivities/involved.cfm?doc_id=102505

Student Contact Information:

Student contact information must be kept current in order to receive important notices from the school and from me. Your contact information is **online via your NYU Learns course e-mail**. Please check your local address, local phone number, and emergency contact information on the school's Web and revise as needed. All-important class notices, including class communications, will be sent only to your NYU Classes email address.

STUDENTS WITH DISABILITIES

If you have a qualified disability and will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Students with Disabilities (CSD, 998-4980, www.nyu.edu/csd) verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the CSD, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation.

GENERAL COURSE ADVICE:

Many Accounting and Finance majors find the subject matter of this course challenging. Former students (as well as my own observations) have identified and provided the following suggestions to enhance your ability to succeed in this course.

Data analytics and accounting information systems differs from other accounting courses as it is not solely financial or numerical based. *Innovation, creative problem solving and "outside the box" thinking is critical to mastering the course contents.* This will require that students adapt a different study process than what might have worked well for them in other accounting courses. Consider leveraging study techniques used in Auditing, Management, MIS and Economics courses in developing your study plan.

Relating to the new CPA Exam revisions (2017), the new exam will test higher-order skills beyond basic content knowledge, i.e., critical thinking, problem solving, analytical ability and professional skepticism. The AICPA is increasing its assessment of these higher-order skills throughout each section of the Exam – especially in the BEC and AUD sections. As a result, the two exams will reflect these testing considerations. You will need to demonstrate the ability to apply course contents – not just memorize and understand. (Students can obtain further information on the new exam from http://www.aicpa.org/BECOMEACPA/CPAEXAM/NEXTEXAM/Pages/next-cpa-exam.aspx).

COURSE SCHEDULE: (subject to change)

DATE	LEC #	LECTURE COVERAGE
1/31	1	Unit A
2/7	2	Unit B
2/14	3	Unit B/Unit C
2/21	4	Unit C
2/28	5	Unit C/Unit D
3/7	6	Unit D
3/14	7	Spring Break
3/21	8	MIDTERM
3/28	9	Unit E
4/4	10	Unit E
4/11	11	Unit E/Unit F
4/18	12	Unit F
4/26	13	Unit F – TERM PROJECTS DUE
5/2	14	Catch-up and Course Review
5/9	15	FINAL

Unit Descriptions, Content, Readings and Homework

Given the diversity of Accounting Information System topics and their impact on different aspects of the accounting profession, students will typically bring different goals and objectives to the class. The following key describes how you should invest your time with the assigned preparatory readings:

REQUIRED	REFRESH	SKIM (RECOMMENDED)	OPTIONAL	SPECIALIST
Readings critically relate to course objectives and are within the scope of examinations or other graded components such as homework and class discussion.	Will vary by student's background and experience. Generally covered in previous coursework. Consider it the same as REQUIRED unless you already know the material.	Primarily background information that some may find useful or needed to supplement their technology or business risk background. Sometimes includes critical documents used by the accounting profession. Usually helps students better understand REQUIRED materials and class lectures.	Not required to achieve course objectives. These materials provide additional information and current thinking within the profession. May help explain the "why" of evolving professional practices and discussions.	Of interest primarily for students who will be practicing in the risk advisory departments of CPA firms, operational risk management areas, internal audit departments and some management accounting functions. Please consult professor for further guidance.

Unit #	Preparatory Readings	Lecture Discussions[2]	Comments, HW and Class Problems[3]
A Class Orientation and Course Introduction	1. REQUIRED – Read CGMA (AICPA) briefing "Big Data." 2. REQUIRED – Read CGMA (AICPA) briefing "Big Data Jargon Buster" 3. REQUIRED – "Audit Data Analytics: Opportunities and Tips," World Bank. 4. REQUIRED – "How CPAs and Their Firms are Addressing a Dynamic and Complex Risk (Cybersecurity)." Center for Audit Quality	• Class orientation • Syllabus review • Introduction to the course • Is information technology considered a business issue (why/why not)? • How do businesses benefit from data? • What are the pain points and threats associated with IT? • What are the critical AIS impact on CPAs and Management Accountants? • What competencies are needed? • How is AIS covered on the CPA exam? • How does external auditing, internal auditing, and advisory services differ as they related to accounting information systems? • What's all this noise about data analytics about? • How does data analytics impact the financial statement audit? • What is the impact of cybersecurity on the accounting profession? • How is cybersecurity impacting the financial statement audit?	Organize into groups for homework assignments and class discussions.
B Review of Foundational Accounting Information Systems Concepts	1. REFRESH Chapters 1-3 and 15 (Hall). Generally, these are basic review chapters covering the foundations of accounting information systems, fraud and internal control. Amount of effort and preparation will vary based on student's previous experience. 2. REFRESH Chapters 1-2 (Gee). These chapters introduce fraud concepts that are covered in greater detail in the Auditing and Forensic Accounting Courses.	• Can we rely on the data? • What is meant by Data Integrity? • What is Internal Control? • Why are outside stakeholders concerned about internal control? • What are the various COSO frameworks and how do promote internal control and minimize risks to the organization? • What are the risks to technology and information?	Hall – Problem 15-5; 15-8. Students may wish to refresh their understanding of IDEA – including some of the more basic concepts that may have been covered in other courses (e.g., Auditing).

	3. REFRESH Executive summary of COSO's Internal Control Integrated Framework (IC); 4. OPTIONAL "Evolution of Auditing from the Traditional Approach to the Future Audit" (AICPA) 5. SPECIALIST Selection/extracts of various COSO executive summaries (ES) and whitepapers (W) available at the COSO website - Enterprise Risk Management for Cloud Computing (W).	• What is the impact of information technology on COSO's 17 Principles? • What are the differences between COSO and COSO ERM? • What are the eight elements of COSO's Enterprise Risk Management—Integrated Framework? • How does management employ internal control systems as part of organizational and IT governance initiatives? • How do internal control systems help organizations achieve objectives and respond to risks? • What are the typical control goals for operations and information processes? • What physical security controls are typically used by a data center? • What is the purpose and what is involved with Disaster Recovery Planning?	
C Introduction to Audit Data Analytics, Computer Audit Techniques and Data Analytic Concepts	1. REQUIRED – Read Chapters 3- 6 GEE. 2. REQUIRED – Read "Why Predictive Analytics Should be a CPA Thing," (AICPA) 3. REQUIRED – Read "Introduction to Data Analysis for Auditors and Accountants," CPA Journal, February 2017. 4. REQUIRED - "Data in Business Analytics: Implications for the Audit Profession," CPA Journal June 2017. 5. REQUIRED– Hall Chapter 17 6. REQUIRED "Analytics and Cybersecurity: The Shape of Things to Come" Chapters 1-6 (CPA Australia) 7. REQUIRED "Audit Data Analytics Alert" (CPA Canada). 8. SKIM "Audit Insights: Data Analytics" (ICAEW) 9. SKIM "The Current State of Continuous Auditing and	• What is the role of data analytics in the accounting profession? • What are the real-world challenges in getting the data? • How do accountants ensure the reliability of data used for analytical techniques? • What is the relationship between data analytics, business intelligence and big data? • If it impacts the business will it impact us as accounting professionals? • What does internet of things have to do with data analytics and how do accountants approach data reliability issues? • How does data analytics differ from computer assisted audit techniques? • What is the difference between descriptive, predictive and prescriptive analytics? • What is meant by Big Data and what are its characteristics?	Hall Problem 17-12 and 15. The AICPA recently introduced its "Audit Data Analytics Guide." We will be discussing this guide beginning in this Unit and may reference in other units too.

	Continuous Monitoring" (AICPA) 10. SKIM IDEA Tutorial (Note: Optional for those who have taken a course that used IDEA- e.g., Auditing). 11. SKIM EY's Global Data Forensics Analytics Survey 2016 12. SKIM Advanced Statistical Case Study (IDEA) – Focus on what IDEA can do rather than how it does it. 13. OPTIONAL "Evolution of Auditing from the Traditional Approach to the Future Audit" (AICPA) 14. SPECIALIST "Audit Data Standard: Base Standard" (AICPA) 15. SPECIALIST "Infer, Predict, and Assure: Accounting Opportunities in Data Analytics" (Accounting Horizons 9/2015) 16. OPTIONAL & SPECIALIST – At the end of the CPA Journal article identified in #3 above, there are references and links to well-regarded videos on audit analytics.	• What are the current trends to be aware of? • What types of tools are available to perform data analytics? • How is data visualization being used by accountants to communicate information? • How is Benford's Law used in forensic analytics and how does IDEA support its use? • How does the Numbers Duplication Test supplement Benford's Law analysis? • How are Z-scores used in forensic analytics? • What is the purpose of the relative size factor test? • How are the same-same-same and same-same different tests used? • How is correlation used in fraud detection and financial projections? • How can IDEA be used for other advanced data and forensic analysis? • How are program change activities controlled? • How are application controls tested? • What are some traditional computer assisted audit techniques?	
D Application and System Development Activities	1. REQUIRED Hall 13 and 14.	• What is the SDLC, who participates in it and what is the accountant's role? • How is systems analysis performed and why is the accountant uniquely qualified to perform? • What role does the finance function play in SDLC activities? • What are the major activities relating to implementing and system conversion? • How does the SDLC get applied to applications? • Why is SDLC so important to data analytic projects? • What is COTS and why is it increasingly popular? • What are CASE tools and how are they used?	Hall Problem 13-4. Problem 14-7.

		• What are change controls and why are they important? • How is control over source program libraries maintained? • How are applications tested and what are the role of CAATs?	
E System Reliability, Cybersecurity and IT Audit	2. REQUIRED Hall Chapters 12 and 16. 3. REQUIRED "Service Organization Controls: Managing Risks by Obtaining a Service Auditor's Report," (AICPA) 4. REQUIRED "Analytics and Cybersecurity: The Shape of Things to Come" Chapters 7-12 (CPA Australia) 5. OPTIONAL COSO Enterprise Risk Management Executive Summary 6. SPECIALIST COSO Enterprise Risk Management for Cloud Computing (W); and "Understanding and Communicating Risk Appetite" (W).	• What do accountants need to know about internet technologies? • What is cloud computing and what are the classes of computing services provided? • What are the key risks associated with electronic commerce? • How is security, assurance and trust established by businesses? • How has the accounting profession responded to digital business challenges? • How are SOC reports used to help assess technology risks for outsourcing/cloud computing? • What's the difference between SOC1/SOC2/SOC3 and Type I and Type II? • What is meant by SOC for Cybersecurity and why did the AICPA introduce this service? • How is operating system security performed? • How are DBMS controlled? • How are computer networks managed to reduce risks? • How to protect from malware and other threats? • How are analytics used to manage cybersecurity threats?	Hall Problem 16-2, 5, 9.
F Using Audit Data Analytics to Solve AIS and Audit Revenue and Expenditure Challenges	1. REQUIRED GEE 10-11. 2. REQUIRED Selected IDEA videos. 3. REQUIRED Selected TABLEAU videos. 4. REFRESH Hall Chapters 4-6. 5. To be determined based on class background	• What are some of the more popular tests used for IDEA? • How do accountants use IDEA to analyze expense and payroll anomalies? • How to perform data familiarization? • What are the typical payroll data analytic tests? • How do accountants use IDEA to analyze expense anomalies? • What are the typical expense reimbursement data analytic tests? • What is Visualization and how does Tableau help?	Work thru the tutorials in the IDEA workbook. In addition to the topics to the left, the AICPA recently introduced its "Audit Data Analytics Guide." We will discuss the guidance provided in this

		- How to perform basic Tableau tasks. - How to incorporate visualization in financial statement audits. - To be determined based on class background	guide as to how it applies to certain audit procedures.

APPENDIX A – TERM PROJECT OPTIONS

OPTION A

Use any of the COSO Publications (available at www.coso.org) to analyze a current or historical event relating to any topic in the MS in Accounting curriculum. The goal of the project is to prepare a simulated written presentation (approximately 25-30 slide PowerPoint plus bibliography) to a client in the same industry in which the event occurred that illustrates lessons learned from the event and how the client can use the COSO guidance to avoid a similar problem. The following chart provides examples of projects based on illustrative COSO publications:

ILLUSTRATIVE COSO PUBLICATIONS	ILLUSTRATIVE TERM PROJECT
COSO in the Cyber Age: Report Offers Guidance on Using Frameworks to Assess Cyber Risks (2015)	How to leverage the COSO guidance to avoid a major breach (e.g., choose one -JP Morgan, Target, SONY, Equifax, etc.).
Leveraging COSO Across the Three Lines of Defense (2015)	How the three lines of defense could have prevented major trading scandals (e.g., choose one SOC GEN, Barings).
Enterprise Risk Management for Cloud Computing	Capital One is using AWS (Amazon Web Services) as a central part of its technology strategy – what cloud risks must bankers manage.
Improving Organizational Performance and Governance: How the COSO Frameworks Can Help.	Choose a business in trouble (or previously in trouble) and discuss how use of the COSO frameworks can or did enhance the performance of the business
ERM Framework	How the ERM Framework Update can better enable organizations to achieve business goals (should also demonstrate how use of the Update might have prevented a significant strategic loss or problem).
COSO Fraud Risk Management Guide	Choose a major computer facilitated fraud and identify how the guidance could have been used to mitigate the threat.

OPTION B

Review a well-known study, analysis, book or manual within the Data Analysis, Business Intelligence or AIS discipline. The goal of the project is to prepare a simulated written presentation (25-30 slide PowerPoint plus bibliography) to a client as to why they should implement the guidance provided for in the publication along with examples from industry to support the presentation's recommendations. Potential publications include:

- "CIS Controls for Effective Cyber Defense Version 6.1" (registration required).
- "Common Sense Guide to Mitigating Insider Threats, 4th Edition." CMU/SEI-2012-TR-012. Software Engineering Institute, Carnegie Mellon University. 2012.
- AICPA's "Audit Analytics and Continuous Audit," 2015.
- ISACA's "The Cyber Resilient Enterprise: What the Board of Directors Needs to Ask."
- NIST's Cybersecurity Framework (Executive Order 13638).
- "IT Risk: turning Business Threats into Competitive Advantage," by George Westerman and published by Harvard Business School Press, 2007. (may require purchase)
- Verizon's "Data Breach Investigation Report."

- "Competing on Analytics: The New Science of Winning," by Thomas Davenport and Jeanne Harris.
- "Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking," by Provost and Fawcett.
- "Super Crunchers: Why Thinking-By-Numbers is the New Way to Be Smart," by Ian Ayers.

OPTION C
Identify a significant technology-related trend impacting the accounting or finance professions and develop a presentation (25-30 PowerPoint slides plus bibliography) to inform your client of how these trends will impact their business. *Representative topics could include:*
- *The impact of blockchain technologies on the accounting profession.*
- *The impact of blockchain technologies on the finance or related industry.*
- *Technology-related considerations in acquisition due diligence.*
- *The Future of the Company's Finance function in a data driven world.*
- *How Data Analytics will change the future of the accounting profession and its impact on client services provided.*

It is expected that students selecting this option will include the Gartner Research Database available online from the NYU library.

OPTION D
Demonstrate advanced level IDEA skills
For students who are more technically inclined, this project option allows them to explore and learn the advanced features of IDEA, a data analytic tool that is very popular in the accounting profession. The student will deliver a project that uses IDEA to analyze a variety of complex datasets using the methodology provided for in the Gee textbook. The deliverable for this project is a forensic accounting report that describes, using professional standards what was performed, and conclusions reached.   Students will discuss their findings with the professor to "simulate" a cross-examination (e.g., by a lawyer in a forensic accounting case) of their conclusions. This will require a half-page written proposal that includes agreed to milestones and WRITTEN professor approval of the topic prior to submission of the project.

OPTION E
Demonstrate basic proficiency with Tableau
For students who are more technically inclined, this project option allows them to explore how Tableau software can be used by accountants to more effectively communicate financial information. The student will deliver a project that uses Tableau to visualize a complex dataset. The deliverable for this project is an executive dashboard or story point that enables a user to explore the data. In addition, you must submit a one-page user manual describing how to use your viz to explore the data. An accompanying PowerPoint presentation should cover the power of the viz to reveal new insights as well as the technical details regarding how the viz was created. This will require a half-page written proposal that include agreed to milestones and WRITTEN professor approval of the topic prior to submission of the project.

OPTION F
Create your own project
This will require a half-page written proposal and WRITTEN professor approval of the topic prior to submission of the project.