Model curriculum

Information technology
Acknowledgments

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About Us

The AICPA’s Certified Information Technology Professional (CITP®) credential represents the intersection of technology and finance. The CITP credential is granted exclusively to CPAs and recognized equivalents who specialize and demonstrate specific skills, expertise and experience in areas that include:

- Information security and cyber risks
- Business intelligence, data management and analytics
- IT governance, risks and controls

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Preface

The AICPA developed the Model Information Technology Curriculum (MITC) as a resource for accounting educators seeking to develop or enhance their course offerings. The MITC has been designed to help students gain foundational skills and knowledge related to the integration of information technology in accounting and to increase students’ chances for success, regardless of their chosen career path.

The MITC’s primary objective is to provide students with an understanding of the integral role of information technology within the accounting profession. To achieve this objective, the MITC recommends that faculty use a framework to help students organize their knowledge. The framework should consist of a series of topics, whether in a single course¹ or multiple courses, which are integrated in a logical manner. The MITC provides accounting educators with a sample framework which can be tailored to specific needs or adopted in its entirety.

Model Information Technology Curriculum

The MITC provides recommendations for designing the information technology component of the academic accounting curriculum in line with the CITP Exam Content Specification Outline and the AICPA’s vision. It provides a pathway to becoming an accounting technology professional or a Certified Information Technology Professional (CITP). Independent of a student’s interest in becoming an accounting technology professional or a CITP, the MITC will provide a sound foundation for future learning and prepare students to best serve their future employers and clients.

The MITC’s recommendations should be implemented after significant thought and discussion around adaptation, based on the specific needs and governing mission of the accounting program. Due to the wide variety of accounting programs, no one approach can be adopted without customization efforts. For example, many programs only have one required accounting information systems course at the undergraduate level. Other programs may require multiple graduate courses in accounting information systems.

The AICPA believes that a multi-course information technology accounting sequence is the most effective method to achieve the Overall Learning Outcomes, but recognizes that this ideal is not practical in all accounting programs. The Overall Learning Outcomes can, however, be used to guide discussions for any accounting program. The AICPA recognizes the difficulty of satisfactorily meeting all three Overall Learning Outcomes in a single course. If only one course can be offered in the curriculum, programs should make every effort to address the Overall Learning Outcomes in other courses, where appropriate.

¹ Given the changing nature of the topics, it may not be possible to envision a single course. The changes and the desired integration suggest close collaboration among educators, accounting and others.
Importance of Information Technology in the Accounting Curriculum

Information technology affects accounting professionals in every sector and service line. As we move into the future, technology will help them automate today’s manual auditing and accounting processes so they can spend more time on analyzing the data, protecting sensitive client data or their organization’s network, while understanding and anticipating the potential risks involved with the new or improved processes. At the core of accounting is information and data. Whether we focus on how to analyze, secure or audit that information, accounting professionals must understand how to utilize technology and evaluate associated risk. With the rise in the utilization of computer assisted auditing techniques (CAATs), tax operations, management reporting via visualization and dashboards, cloud technologies and automation, it’s imperative that accountants be proficient in technology.

Technological innovation is not only allowing accounting professionals to deliver core audit and tax services more effectively and efficiently, but also creating new opportunities for them to deliver value to clients and employers. There is growing demand for accounting professionals with specialized skills and knowledge of technology and systems to help organizations achieve their business goals, manage the risk technology introduces as well as meet information governance, risk and compliance needs. As evidenced by the statistics that follow, advisory service opportunities in areas such as IT risk, business intelligence, data analysis and cybersecurity continue to grow.

![Nearly 65% of firms are increasing their technology advisory services, including:](image1)
- IT Risk & Assurance
- Information Security & Privacy
- Data Management
- Business Solutions
(2019 Accounting Today Top 100 Firms Report)

![Worldwide spending on cybersecurity is predicted to top $1 trillion for the five-year period from 2017 to 2021](image2)

![Demand for Business Intelligence professionals is expected to grow 15.3% through 2022](image3)
(U.S. Bureau of Labor Statistics)

![Demand for IT Security professionals is expected to grow 36.5% through 2022](image4)
(U.S. Bureau of Labor Statistics)

Information technology is pervasive, complex and plays a critical role in most business decisions. Accounting faculty should carefully examine the information technology component of their curricula to ensure that all accounting students understand the integral role of information technology in the accounting profession.

Objectives of the Information Technology Component of the Accounting Curriculum

The primary objective of the information technology component of the accounting curriculum is for students to understand how financial reporting and information technology interrelate and how
technical skills and financial acumen can be used to evaluate technology risks in support of business objectives. The knowledge and skills provided in the information technology component of the accounting curriculum should facilitate future learning even if the student does not expect to become an accounting technology professional. The information technology component of the accounting curriculum is also critical in that it makes students aware of the many career opportunities available to accounting professionals with an interest in information technology and shapes the perceptions of those students who may wish to become accounting technology professionals. As such, it plays a key role in attracting students towards accounting technology careers.

**Overall Learning Outcomes**

The Overall Learning Outcomes are listed here, followed by an expanded discussion of the core components of the outcomes and some suggested secondary objectives for each. The outcomes are both numbered and tied to the CITP Exam Content Specification Outline and the order is intended to be hierarchical.

1. Demonstrate knowledge of information security and cyber risks.
2. Demonstrate an understanding of business intelligence, data management and analytics.
3. Demonstrate knowledge pertaining to IT governance, risks and controls.

**Overall Learning Outcome No. 1: Demonstrate knowledge of information security and cyber risks.**

Students should demonstrate knowledge on establishing, implementing, and maintaining an effective framework for information security governance, and the corresponding policies, procedures, and standards needed to ensure proper control over the confidentiality, integrity, and availability of information.

Students should demonstrate a fundamental understanding of cybersecurity risk management and the major threat vectors for systems, including cyber adversaries, the cybercrime economy, and common types of attacks. They should possess knowledge pertaining to data breaches and their impact on information privacy, as well as how to manage system vulnerabilities.

Students should demonstrate an understanding of the AICPA’s Cybersecurity Risk Management reporting framework (SOC for Cybersecurity), including report content, target users, and uses of the report in conjunction with an entity’s overall cybersecurity risk mitigation strategy.

**Overall Learning Outcome No. 2: Demonstrate an understanding of business intelligence, data management and analytics.**

Students should possess knowledge of the information lifecycle, from identification of system information through destruction, and the various types of infrastructures and ERPs to support data. Students should understand how data is collected and manipulated, including the consolidation, cleaning, transformation, reduction, and processing of data. Students should demonstrate an understanding of data governance and its objectives, strategy, and policies.
Students should understand the various types of data analytics, including the tools and procedures to perform an analysis, and the methods of reporting and performance indicators. They should possess knowledge of predictive analytics, including the various models and techniques used in the application and deployment of predictive analytics. Students should also be familiar with the integration of analytics in the audit process. Students should be aware of prescriptive analytics and the resulting automation of selected decisions.

Lastly, students should possess a fundamental understanding of business intelligence management, including the various types of digital transformation and technology disruptors and the usage of data integration and data warehousing.

**Overall Learning Outcome No. 3: Demonstrate knowledge pertaining to IT governance, risks and controls.**

Students should understand the objectives and principles of IT governance, including key components and best practices. Students should be familiar with common IT governance roles, responsibilities and accountabilities and possess knowledge of the IT governance implementation process.

Students should have knowledge of the primary IT related risks and how to effectively identify, assess and mitigate the risks. They should be familiar with various IT frameworks, including COSO and COBIT, and the integration of frameworks with IT assessments. Additionally, students should understand how to determine key control areas for IT assessments, including ITGCs, application, business process, and change management controls.

Lastly, students should possess knowledge of the types of System and Organization Controls (SOC) Reporting, the purposes for SOC reporting, the users of SOC reports, and the responsibility of user auditors.

**Teaching Methods**

Faculty should use a variety of active teaching methods to achieve the learning outcomes of the MITC, with consideration to their institution’s and program’s mission and accounting curricula. When introducing technical topics, faculty is encouraged to use an approach that integrates planning, research, and financial reporting concepts from a decision-making perspective.

The intent of the MITC is to recommend the learning outcomes a student should attain before beginning a professional career. As such, these outcomes may be achieved through a variety of channels, including undergraduate or graduate courses, in-class or out-of-class experiences, and components within traditional accounting courses or other discipline-based courses.

Pedagogy may incorporate active learning approaches such as:

- in-class discussions
- student presentations
- practitioner presentations
- case studies and simulations
- collaborative learning activities
- role-plays and service learning activities

Assignments should enable students to gain knowledge in the core areas of information technology, while further developing their communication, critical-thinking and interpersonal skills. While traditional problem solving can reinforce lecture and independent reading assignments, there are several opportunities to help students achieve the learning objectives unique to the information technology component of the accounting curriculum. For example, case studies, presentations by student teams, and cooperation with state and local accounting societies all may be considered means of helping students develop their personal competencies, while enhancing their information technology knowledge. Faculty may also consider incorporating practicing CITPs and subject matter experts into their programs.

A sample syllabus designed for a 3-credit hour course has been included as part of the MITC. To reiterate the point made earlier, the AICPA recognizes the difficulty in satisfying all three Overall Learning Outcomes in a single course. The sample syllabus is intended to provide a discussion vehicle for including all three Overall Learning Outcomes in a single course.

Summary

The MITC can be a useful tool for accounting programs and faculty as they assist students in developing foundational information technology related knowledge and skills. There are multiple opportunities for customization with MITC. To meet the changing needs of the accounting profession, accounting faculty should periodically revisit their information technology curriculum and its role in accounting programs to ensure students are prepared to enter the business world as knowledgeable professionals and valued business advisors.
Appendices and Examples

Sample Syllabus

Recommended Text


Learning Outcomes

1. Demonstrate knowledge of information security and cyber risks.
2. Demonstrate an understanding of business intelligence, data management and analytics.
3. Demonstrate knowledge pertaining to IT governance, risks and controls.

Description

The sample syllabus introduces key components of information security governance and cybersecurity risk management, including the use of the SOC for Cybersecurity report as a tool for reporting IT security and risk management. The sample syllabus then covers data management and the information lifecycle, the utilization and deployment of data analytics, and the integration of analytics in the audit process. It concludes with coverage of IT governance and strategy, IT risk identification and assessment, and System and Organization Controls (SOC) reporting.

I. INFORMATION SECURITY GOVERNANCE (300 minutes; Singleton et al. Chapter 1)

- Information security strategy
- Policy, procedures, processes, and standards
- Logical access controls
- Hardware and physical access controls
- Security authorization & authentication
- Business continuity and disaster recovery

Supplemental resource: Information Security Governance self-study online course

II. CYBERSECURITY RISK MANAGEMENT (300 minutes; Singleton et al. Chapter 1)

- Cybersecurity threats
- Data breaches and privacy
- Vulnerability management

Supplemental reading: A CPAs introduction to Cybersecurity; CPA cybersecurity checklist
Supplemental resource: Cybersecurity Fundamentals for Finance & Accounting Professionals Certificate Program
III. SOC FOR CYBERSECURITY (150 minutes; Singleton et al. Chapter 1)

- Purpose
- Content
- Target audiences
- How to use in conjunction with cybersecurity risk mitigation

Supplemental reading: SOC for Cybersecurity Brochure; Illustrative Cybersecurity Risk Management Report; Description Criteria for Management’s Description of an Entity’s Cybersecurity Risk Management Program
Supplemental resource: SOC for Cybersecurity Certificate Program

IV. FIRST MIDTERM EXAM (75 minutes)

V. DATA MANAGEMENT (150 minutes; Singleton et al. Chapter 2)

- Information lifecycle management
- Infrastructures and platforms
- Data preparation/manipulation
- Data governance

Supplemental resource: Data Analysis Fundamentals Certificate Program

VI. DATA ANALYSIS & REPORTING (150 minutes; Singleton et al. Chapter 2)

- Data analytics
- Predictive analytics
- Audit data analytics

Supplemental reading: Criteria for Describing a Set of Data and Evaluating Its Integrity; Background of illustrative use cases for applying criteria
Supplemental resources: Analytics and Big Data for Accountants self-study online course; Integrating Audit Data Analytics into the Audit Process self-study online course

VII. BUSINESS INTELLIGENCE MANAGEMENT (150 minutes; Singleton et al. Chapter 2)

- Digital transformation & technology disruptors
- Data integration
- Data warehousing

Supplemental resource: Data Analysis Modeling Certificate Program

VIII. SECOND MIDTERM EXAM (75 minutes)

IX. IT GOVERNANCE & STRATEGY (300 minutes; Singleton et al. Chapter 3)
- Role of IT governance within an organization
- IT governance principles
- IT governance roles & responsibilities
- IT governance implementation
- Benefits of effective IT governance

Supplemental resource: IT Governance, Risks and Controls self-study online course

X. IT RISKS, PROCESS & CONTROLS (300 minutes; Singleton et al. Chapter 3)

- IT Risk identification and assessment
- IT control frameworks
- IT general controls
- Application controls
- Business process management
- Change management
- Assessment of IT controls

Supplemental resource: IT Governance, Risks and Controls self-study online course

XI. SYSTEM AND ORGANIZATION CONTROLS REPORTING (150 minutes; Singleton et al. Chapter 3)

- System and Organization Controls Reporting Overview
- Types of Reporting

Supplemental reading: What Are SOC for Service Organizations Reports ?; SOC 2® examinations and SOC for cybersecurity examinations: Understanding the key distinctions
Supplemental resource: Introduction to SOC for Service Organizations Reporting self-study online course

XII. FINAL EXAM

Total 2,100 contact minutes = 42 contact hours (50 minutes per contact hour)
Additional Resources

Certified Information Technology Professional (CITP®) Credential

- CITP Credential Handbook
- CITP Credential Pathway
- CITP Examination
- The CITP Examination Content Specification Outline (CSO) lists the foundational areas of knowledge needed for a CITP credential holder to objectively and ethically deliver services in a competent and confident manner.
- AICPA Education resources covering topical areas from the CITP CSO:

Module I. Information Security & Cyber Risks

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<th>Available format(s)</th>
<th>CPE hours</th>
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<td>Cybersecurity Fundamentals for Finance &amp; Accounting Professionals Certificate</td>
<td>Self-study online</td>
<td>15.5</td>
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<td>Cybersecurity Advisory Services Certificate</td>
<td>Self-study online, webcast</td>
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<tr>
<td>SOC for Cybersecurity Certificate</td>
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Module II. Business Intelligence, Data Management & Analytics

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<td>Data Analysis Fundamentals Certificate</td>
<td>Self-study online</td>
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<tr>
<td>Analytics and Big Data for Accountants</td>
<td>Self-study online, hard-copy text</td>
<td>6.5</td>
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<tr>
<td>Integrating Audit Data Analytics into the Audit Process</td>
<td>Self-study online</td>
<td>7.5</td>
</tr>
<tr>
<td>Data Analytics Modeling Certificate</td>
<td>Self-study online</td>
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</tr>
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The AICPA Information Technology Center provides members, faculty and students access to the latest technology information, tools and resources in areas that include:

- Artificial intelligence
- Blockchain
- Cybersecurity/Information security
- Data analytics/Business intelligence
- Governance, risk & control
- Practice management
- Robotic process automation

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<tr>
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<td><strong>Introduction to SOC for Service Organizations Reporting</strong></td>
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<tr>
<td><strong>COSO Enterprise Risk Mgmt. Certificate Program</strong></td>
<td>Self-study online</td>
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