2006 Clinger-Cohen Core Competencies
Learning Objectives

The Clinger-Cohen Core Competencies have been endorsed to serve as a baseline to assist organizations in complying with Section 11315 (c) (3) of Title 40 and Section 209 of the E-Government Act. These Competencies and their associated learning objectives are designed to promote continuous learning, and are updated every two years by the Federal CIO Council. References listed next to selected learning objectives are designed to guide the learning process but should not be considered all-inclusive.

Clinger-Cohen Core Competencies	Learning Objectives
1.0: Policy and Organization	*General Discussion: The CIO has one of the most cross cutting positions in both government and private industry and must be able to talk to an extremely wide range of people. Additionally, the CIO must be comfortable in a fast changing (technology, legislation, policy, and politics) environment and be able to bring focus to the size and scope of the job.*
Competency 1.1- Department/Agency missions, organization, functions, policies, and procedures	1.1 LO 1: Explore the varied interpretations of IT including IT as discussed in legislation; IT focus (operational vs. technical); and its typical usage in organizational structures.
	1.1 LO 2: List and describe the elements of the CIO's role that are common to all CIOs regardless of their organization's size.
	1.1 LO 3: Define the role of the CIO, differentiating between the role of the CIO as the Chief Operating Officer (COO) of the information group, and the role of the CIO as a critical staff member of the top management team. (See also 5.7 LO 4.)
	1.1 LO 4: Describe the various models/patterns of organizational structure in Federal agencies and evaluate the organizational structure of the CIO's own agency against general models available. (See also 1.4 LO 2.)
	1.1 LO 5: Using metrics where possible, identify and discuss the environment, attributes, and best practices that characterize an effective CIO

	organization.
	1.1 LO 6: Discuss and illustrate how the IT mission and structure supports the enterprise mission. (See also 5.1 LO 3.)
	1.1 LO 7: Identify and discuss the ways in which an organization's stated mission and/or mission statement influences its decision making. (See also 5.1 LO 3.)
Competency 1.2-Governing laws and authorities • 40 USC §11315 • E-Government Act • Government Performance and Results Act (GPRA) • Paperwork Reduction Act (PRA) • Government Paperwork Elimination Action (GPEA) • 44 USC Chapter 31 • Federal Information Security Management Act (FISMA) • OMB Circulars A-11 and A-130 • Presidential Decision Directive (PDD) 63 • Executive Order (EO) 13228 • EO 13231	1.2 LO 1: Identify current and emerging legislation and/or regulations relevant to the CIO's responsibilities. Assess the provisions of the legislation, including performance mandates, and discuss their organizational implications. (See also 5.1 LO 9.)
	1.2 LO 2: Discuss the role (impact, interaction) of oversight, regulatory, and government-wide policy groups on the CIO and his/her responsibilities and organization.
	1.2 LO 3: Discuss the growing importance of national and international standards issued by organizations such as the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) and their impact on the IT business environment.

	1.2 LO 4: Discuss the applicability of governing laws and authorities to contractor-managed/hosted systems and/or websites.
	1.2 LO 5: Discuss the importance of utilizing a comprehensive system to track, evaluate and communicate emerging legislation, regulations, and intergovernmental legislation, including changes in acquisition regulations/guidelines. List the steps necessary to develop, implement and maintain such a monitoring system.
	1.2 LO 6: Compare and contrast metrics that can be used to assess the organization's performance, particularly its compliance with relevant legislation, and the intent of that legislation. Consider both IT legislation and other relevant legislation. (See also 1.3 LO 5.)
Competency 1.3-Federal government decision-making, policy-making process, and budget formulation and execution process	1.3 LO 1: Discuss the strategic planning process for the CIO and IT. Demonstrate the importance of the process as it assesses the internal and external organizational environment; addresses organizational strengths, weaknesses, and culture; and anticipates and forecasts the impact of future trends.
	1.3 LO 2: Design a strategic planning process that links IT/CIO strategic plans to enterprise/program strategic plans, and enterprise/program strategic goals and plans to government-wide strategy, strategic goals and performance objectives.
	1.3 LO 3: Discuss the advantages and limitations of different decision-making approaches, and identify a method or methods of effective decision-making that supports the agency mission.
	1.3 LO 4: Describe approaches needed to develop a culture/climate of innovation and creativity that will support the Clinger-Cohen mandate to create and develop IT initiatives.
	1.3 LO 5: Identify and evaluate methods that assess the CIO's effectiveness as he/she implements the organization's strategic plan. (See also 1.2 LO 5.)
Competency 1.4-Linkages and interrelationships	1.4 LO 1: Describe Agency head, Chief Financial Officer (CFO), Chief Operating Officer (COO),

among Agency heads and COO, CIO, CTO and CFO functions	Chief Technology Officer (CTO) and CIO roles as well as the changing role of the CIO mandated by regulations, legislation and evolving agency practices.
	1.4 LO 2: Describe the various models/patterns of organizational inter-relationships in and among Federal agencies; compare/contrast the organizational structure of the CIO's own agency to general models available to take advantage of these interrelationships. (See also 1.1 LO 4.)
	1.4 LO 3: Utilizing a systems perspective, discuss organizational structure, line and staff responsibilities, the flow of communications, independent and interdependent decision-making, and the contribution of IT and the CIO to the organizational structure. Analyze these organizational interactions within your own organization.
	1.4 LO 4: Describe and map both the structure and the processes of an organization and its information flows.
	1.4 LO 5: Assess technology's role in streamlining delivery of services to external entities (include citizenry, federal, state, local and international governments.)
	1.4 LO 6: Examine Clinger-Cohen and more recent legislation which govern the creation and development of IT initiatives. Compare these mandates to approaches taken in your organization.
Competency 1.5- Intergovernmental programs, policies, and processes	1.5 LO 1: Discuss the legislative, regulatory and coordination dimensions and mechanisms of intergovernmental programs, policies and processes.
• EO 13388 • EO 13356	1.5 LO 2: Analyze the role of the CIO and the challenges associated with implementing effective information sharing internally and cross-agency. Include an examination of the laws and regulations; technical issues; procedural obstacles; and cultural barriers. (See also 3.6 LO 1, 10.4 LO 2.)
	1.5 LO 3: Analyze multi-sector partnership opportunities enabled by technology that may

	assist the CIO in fulfilling the organization's mission.
	1.5 LO 4: Discuss the effect of Government policy- making, coordinating organizations, and/or advisory groups on individual government organizations.
	1.5 LO 5: Oversight and enforcement entities external to the CIO's organization may affect the CIO in fulfilling his/her responsibilities. Discuss the role of the CIO in interacting with these entities and their programs and policies.
Competency 1.6-Records management	*General Discussion: Organizations create and preserve records to meet their business needs and records management requirements mandated by law and regulation. These records requirements impact technology and establish requirements for IT programs to implement and support*
	1.6 LO 1: Identify and discuss the impact of records and information management within organizations on systems design and the integrity, authenticity, and preservation of electronic records, information assurance, and Freedom of Information Act (FOIA) compliance.
	1.6 LO 2: Discuss the role of records management in developing and maintaining information resources that support the organization's business needs and processes.
	1.6 LO 3: Describe managing the full life cycle of information from creation or acquisition through its destruction. This includes organizing, categorizing, classifying, disseminating, and migrating.
	1.6 LO 4: Discuss the records management strategies that contribute to cost-effective, productive information services.
• 44 USC Chapter 31 • E-Government Act • OMB Circular A-130 • National Archives and Records Administration (NARA) regulations	1.6 LO 5: Discuss records management requirements established in statute and regulation
	1.6 LO 6: Identify records management issues

	associated with vital records and disaster recovery and how to address those issues in your agency.
	1.6 LO 7: Compare, contrast and evaluate knowledge management and records management tools.
Competency 1.7- Knowledge management	*General Discussion: Knowledge Management (KM) involves the use of disciplined processes (and their supporting tools) to optimize application of knowledge in support of the organization's overall mission. Knowledge Management as a discipline is exploding because of needs arising from budget, growth and personnel issues coupled with the realization that knowledge (including the retention and reuse of intellectual capital) has value. Although the availability of technology is enabling the explosive growth being seen in KM, it is essential to remember that Knowledge Management is much more than technology. KM involves linking people to people, people to content and content to content.*
	1.7 LO 1: Define Knowledge Management and its four levels: Data, Information, Knowledge, and Wisdom.
	1.7 LO 2: Compare the various roles that a CIO may assume in support of Knowledge Management.
	1.7 LO 3: Discuss how Knowledge Management is used to support the strategic goals of an organization.
	1.7 LO 4: Examine the effect of Knowledge Management on individual and organizational effectiveness, including KM's potential effect on business processes.
	1.7 LO 5: Explore the role of organizational culture in the development and implementation of an integrated KM process.
	1.7 LO 6: Identify and evaluate technological tools that may be used in implementing Knowledge Management systems.
	1.7 LO 7: Describe the role of technology in converting data and information into organizational knowledge.
	1.7 LO 8: Develop a policy statement on

	Knowledge Management that clearly articulates a vision of KM's attributes and its strategic importance to your organization.
	1.7 LO 9: Formulate a KM process that incorporates best practices.
	1.7 LO 10: Chart a KM process for an organization that addresses identifying the information that is required; the methods of obtaining the information; the role of technology in the KM process, and the ownership of the KM process
	1.7 LO 11: Evaluate a variety of organizational approaches (policies, budget, assessment, rewards) that can be used to institutionalize the paradigm shift needed to make Knowledge Management processes successful.
	1.7 LO 12: Assess potential linkages among COO, CIO, CFO and CKO functions in an organization. Describe the ways in which these relationships can be enhanced through a comprehensive KM process.
.	1.7 LO 13: Identify approaches that can be developed and implemented to develop a culture of knowledge sharing, collaboration and support of KM.
	1.7 LO 14: Distinguish between Communities of Practice and Communities of Interest and explain their contribution to a comprehensive KM process.
	1.7 LO 15: Evaluate approaches to measuring the effectiveness of KM efforts.
	1.7 LO 16: Prepare a business case that can be used to support the development and implementation of a comprehensive Knowledge Management process at the participant's organization.
2.0: Leadership/ Management	*General Discussion: Management concepts are important <u>but</u> CIOs must move beyond management to leadership. They must be able to understand the dimensions of Clinger-Cohen, and how they play out operationally in their organization. Interpersonal skills are essential for success because of the frequency of change, and the need to communicate vision*.

Competency 2.1-Defining roles, skill sets, and responsibilities of Senior Officials, CIO staff, and stakeholders	2.1 LO 1: Compare and contrast theories of multiple management and leadership roles and skills. Illustrate their application in the workplace.
	2.1 LO 2: Compare the various roles and skills of a CIO with the OPM listing of Executive Core Qualifications that all CIOs are expected to demonstrate and determine opportunities for improvement.
	2.1 LO 3: Identify the interpersonal skills demonstrated by leaders and discuss the importance of these interpersonal skills in supporting essential leadership and management roles.
	2.1 LO 4: Discuss the importance of CIOs identifying their own interpersonal skill sets, as well as those of their staff.
	2.1 LO 5: Define leadership and distinguish among the different types of leaders.
	2.1 LO 6: Discuss visionary and transformational leadership and why such leadership is so important today.
	2.1 LO 7: Discuss the relationship between program visionary leadership and technical visionary leadership and the need for both.
	2.1 LO 8: Discuss the elements found in a dynamic organizational environment and articulate and apply the methods needed to create a shared vision that empowers such an environment.
	2.1 LO 9: Define the communication process, the variety of communication media, and demonstrate effective communication skills.
	2.1 LO 10: Discuss communications barriers present in various situations and media, and practice/model approaches to overcome and/or manage these communication barriers.
	2.1 LO 11: Identify and demonstrate behaviors related to effective listening and feedback.
	2.1 LO 12: Discuss the advantages and disadvantages of each of the different small group and network communication patterns.

	2.1 LO 13: Describe the range and effect of interpersonal communications (including media) in individual, small group, and organizational communication.
	2.1 LO 14: Discuss and demonstrate the application of the principles of individual behavior and group behavior in organizations.
	2.1 LO 15: Define the concept of motivation and discuss its importance in the organization.
	2.1 LO 16: Evaluate both need-based theories of motivation and process-based theories. Illustrate/demonstrate the application of these theories in motivating individuals in the workplace.
	2.1 LO 17: Identify and analyze the needs of both internal and external stakeholders.
	2.1 LO 18: Discuss the advantages and limitations of different decision-making approaches, and identify methods of effective decision-making that support the specific agency mission of the CIO.
	2.1 LO 19: Describe the role of conflict in an organization and demonstrate effective conflict management skills.
	2.1 LO 20: Design approaches to champion initiatives.
Competency 2.2-Methods for building federal IT management and technical staff expertise	2.2 LO 1: Explain the importance of knowledge capital. (Also see Competency 1.7 on Knowledge management.)
	2.2 LO 2: Identify approaches and develop a plan to create an environment that encourages continuous learning.
	2.2 LO 3: Discuss/demonstrate how communication and learning opportunities needed to build/maintain technical staff expertise should address a variety of learning styles.
	2.2 LO 4: List, describe, and evaluate different individual and organizational developmental tools, including the use of gap analysis.
	2.2 LO 5: Analyze organizational structures to identify, evaluate, and plan career development paths.

	2.2 LO 6: Compare and contrast the effectiveness of various staff recruitment, development and retention plans. (Also see Competency 2.6 on Practices that attract and retain qualified IT personnel.)
	2.2 LO 7: Analyze organizational structure and current staffing to facilitate succession planning.
Competency 2.3- Competency testing - standards, certification, and performance assessment	2.3 LO 1: Describe IT certifications, tests, and academic degrees presented by IT personnel and contrast them with current federal recommendations and policies on this topic.
	2.3 LO 2: Discuss the concepts of organizational design as they apply to the development of job descriptions appropriate to the organization, and the development of selection criteria based upon both the job description and job specifications.
	2.3 LO 3: Identify and discuss positions, particularly those impacting IT, for which there are legislated or regulated requirements.
	2.3 LO 4: Discuss the role (appropriateness, advantages, limitations) of testing in the performance assessment process.
	2.3 LO 5: Compare, contrast and evaluate the various approaches to performance appraisal.
Competency 2.4- Partnership/team-building techniques	2.4 LO 1: Discuss Organizational Development techniques and their role in team building and partnering.
	2.4 LO 2: Discuss the principles of group dynamics and how they can assist a manager in anticipating behavior.
	2.4 LO 3: List and define typical team roles.
	2.4 LO 4: Identify and evaluate the attributes of organizational culture and discuss how the organization's culture affects its decision-making process.
	2.4 LO 5: Describe the team building process, including the need for trust and the importance of empowerment.
	2.4 LO 6: Discuss and apply the principles of team leadership in a variety of settings including a matrix environment, an inter-organizational

	environment, and a systems environment.
	2.4 LO 7: Describe the practices involved in good meeting discipline, including when to schedule (and not schedule) meetings, when to make decisions, and when to involve others in the decision-making process.
	2.4 LO 8: Evaluate the contributions that self-awareness tools bring to team building.
	2.4 LO 9: Discuss the significance of diversity and individual differences in communication and learning styles and their effect on team building activities. (See also 2.2 LO 3.)
	2.4 LO 10: Identify appropriate team-building approaches to be used in multi-disciplinary, inter-organizational, and partnership situations.
	2.4 LO 11: Compare and contrast the concepts and applications of teaming and partnering.
	2.4 LO 12: Discuss the particular dynamics associated with cross-boundary and interagency partnering. Describe/discuss both technical and cultural challenges.
Competency 2.5-Personnel performance management techniques	2.5 LO 1: Evaluate advantages and disadvantages of different performance management approaches.
	2.5 LO 2: Discuss the potential performance advantages of communicating job/role expectations.
	2.5 LO 3: Identify possible advantages and disadvantages of utilizing a process in which staff participate in identifying their performance objectives.
	2.5 LO 4: Examine the challenges and benefits derived from a pay-for-performance personnel appraisal program.
	2.5 LO 5: Justify the value of timely performance feedback, and identify opportunities to practice such timely feedback.
Competency 2.6-Practices that attract and retain qualified IT personnel	2.6 LO 1: Discuss the importance of encouragement, recognition and empowerment in workforce motivation, learning and retention.
	2.6 LO 2: Describe the ways in which a culture of trust functions as a motivator, encourages

	innovation, and retains personnel.
	2.6 LO 3: Design approaches to develop and implement a culture of trust.
	2.6 LO 4: Discuss the opportunities and challenges present in a workplace that exhibits diversity of all kinds, including, but not limited to, gender, race, creed, national origin and generational differences.
	2.6 LO 5: Support the concept that a clearly defined and jointly held vision improves personnel recruiting, retention and employee performance.
	2.6 LO 6: Develop a comprehensive plan to create an environment that encourages continuous learning and provides opportunities for staff to apply learning. (See 2.2 LO 1.)
	2.6 LO 7: Explain how lack of resources can impact job satisfaction and the achievement of organizational mission.
	2.6 LO 8: Identify federal human resources system flexibilities that can be used to acquire, develop and retain highly qualified IT personnel.
3.0: Process/Change Management	*General Discussion: The paramount role of the CIO is as Chief Visionary of the organization's information and technology—critical enablers for achieving mission and improving efficiency. The CIO works in strong partnership with the CEO/COO, and needs to be able to distinguish between the behavioral and effective dimensions of change management, including essential stakeholder "buy-in". It is important that CIOs be familiar with Organizational Development (OD) concepts. It is also essential for CIOs to be open to the role of Business Process Improvement as a frame/context for introducing <u>any</u> type of new business-based technology change.*
	3.0 LO 1: CIOs frequently must lead change (technology adoption, skill transfer, etc.) in an organization. Discuss the concept of change, and the dimensions of behavioral change.
	3.0 LO 2: Discuss the role of leadership in successful change initiatives.
	3.0 LO 3: Discuss the role of the CIO as a leader of change in his/her organization.

	3.0 LO 4: Justify the importance of stakeholder "buy-in" in successful change efforts.
	3.0 LO 5: Identify and demonstrate approaches that can be used by a CIO to achieve stakeholder support in change efforts.
	3.0 LO 6: Discuss Process Management as it relates to change management. Include the roles of strategic planning, and the transfer of strategic vision into tactical goals.
	3.0 LO 7: When considering the process of change management, discuss the role of goals, budgets and activities to achieve those goals.
	3.0 LO 8: Federal CIOs work within a large system that includes the Office of Management and Budget, the Federal CIO Council, different administrations, and multiple initiatives requiring change over years. Discuss the dimensions of the government environment as a factor in successful change management.
	3.0 LO 9: Describe how social networking supports effective change management.
Competency 3.1- Techniques/models of organizational development and change	*General Discussion: It is important that CIOs be familiar with Organizational Development (OD) concepts and OD's importance as an independent discipline. CIOs need to be able to critically assess the organization against strategic goals, be familiar with the tenets of change management, and assess planned change from a systems perspective*.
	3.1 LO 1: Discuss Organizational Development, its concepts and methods, and its importance as an independent discipline.
	3.1 LO 2: Identify and discuss methods and metrics available for organizational assessment that an executive may utilize to assess the need for change.
	3.1 LO 3: Discuss the importance of the organization and its stakeholders being ready for change. Design approaches (including the identification of key influential individuals) to prepare the workplace for change.
	3.1 LO 4: Design approaches to recognize, evaluate, communicate and champion change

	possibilities, including those arising from "best practices."
	3.1 LO 5: Discuss organizational resistance to change, including the identification of barriers and strategies for overcoming resistance.
	3.1 LO 6: List and describe the variety of change techniques and tools including education and training.
	3.1 LO 7: Differentiate between voluntary and mandated change strategies and the approaches to their implementation.
	3.1 LO 8: Assess planned change from a holistic systems perspective. Include the identification of multiple points at which risk assessment and abatement techniques should be applied.
	3.1 LO 9: Design a comprehensive plan to implement, communicate, and champion a unified change initiative.
Competency 3.2-Techniques and models of process management and control	3.2 LO 1: List and discuss the principles of process management and control.
	3.2 LO 2: Compare, contrast and evaluate the major tools, techniques and methods of process management.
	3.2 LO 3: Describe gap analysis and how to apply its results within an organization.
	3.2 LO 4: Assess internal control systems relative to other business systems.
Competency 3.3-Modeling and simulation tools and methods	3.3 LO 1: Identify and describe modeling and simulation approaches. Include among the approaches systems dynamics modeling, benefit cost analysis, costing, capital planning and investment control, forecasting, sourcing models (build or buy), and transferability (how transferable it is to the mission).
	3.3 LO 2: Compare and contrast among modeling and simulation tools, demonstrating that the tools chosen appropriately offer productivity, reliability, availability, and accessibility in support of the organization's missions.
	3.3 LO 3: Demonstrate how to build from

	business goals to process change and/or technology solutions.
	3.3 LO 4: Identify and describe tools for IM/IT product design and development. (Include among the tools object-oriented (OO) software, data warehousing, Component Object Model (COM), etc.)
Competency 3.4-Quality improvement models and methods	3.4 LO 1: Explain the different uses/meanings of the term "quality."
	3.4 LO 2: Identify and assess quality factors in business, information and technical areas.
	3.4 LO 3: Discuss the dimensions of "quality" when addressing customer (employees, customers, and stakeholders) expectations.
	3.4 LO 4: Identify and discuss the ways in which quality can be integrated into the culture of the organization.
	3.4 LO 5: Defend the integration of quality dimensions into the articulation of performance standards.
	3.4 LO 6: Develop a model of the relationships/linkages that emanate from customer needs and expectations (including quality perceptions), which result in organizational initiatives. Show how these expectations drive strategic planning and are linked to performance goals and objectives.
	3.4 LO 7: Illustrate the ways in which quality initiatives can advance strategic goals.
	3.4 LO 8: Describe the CIO's responsibility regarding quality improvement.
	3.4 LO 9: Differentiate and prioritize among quality factors.
	3.4 LO 10: Compare and contrast programs and standards associated with quality management. Include in the discussion ISO 9000, the Baldridge award, Quality Function Deployment (QFD), CMM, and Customer vs. Owner.
	3.4 LO 11: Define Activity Based Costing (ABC) and discuss the potential role of ABC as a process assessment tool. (See also 4.5 LO 2.)

Competency 3.5- Business process redesign/reengineering models and methods	3.5 LO 1: Define Business Process Improvement, redesign, and reengineering (BPI/BPR).
	3.5 LO 2: Champy defines reengineering as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed." Discuss this statement and its implications for an organization.
	3.5 LO 3: Trace and assess the history, evolution, and relationships of Business Process Reengineering (BPR), Business Process Improvement (BPI), Total Quality Management (TQM), and similar initiatives.
	3.5 LO 4: Identify and discuss the characteristics of successful Business Process Improvement (BPI), redesign, and reengineering (BPR). Include discussion of process-centered governance structures, architectures, management approaches, knowledge and information flows, personnel job descriptions and roles and responsibilities.
	3.5 LO 5: List and discuss the models and methods that may be utilized in a comprehensive BPI effort. Include discussion of LEAN and Six Sigma; evaluate the benefits of such strategies and methods in the enterprise.
	3.5 LO 6: Identify the key management actions required to support a portfolio approach in managing a portfolio of process improvement initiatives across the enterprise.
	3.5 LO 7: Discuss the potential problems that may beset a BPI effort.
	3.5 LO 8: Design an integrated management approach to support embedding and institutionalization of process changes in organizations.
Competency 3.6- Cross-boundary process collaboration	3.6 LO 1: Identify the critical enablers for cross-boundary, inter-agency process collaboration required for E-Government and information sharing initiatives. Include discussion of common

	process languages, collaborative technology interfaces, process standards, network centric process concepts and thinking; and the critical technological and cultural challenges to cross-boundary, inter-agency process collaboration.
	3.6 LO 2: List and discuss the benefits and costs and unintended consequences of process outsourcing; identify best practices in process outsourcing and design strategies to address issues of partnering, contract management, and skills and knowledge retention.
4.0: Information Resources Strategy and Planning	*General Discussion: IT must be a value-adding dimension of the business plan. Information Resources Management (IRM) strategic planning must begin with the business strategic planning process and integrate with the organization's business functions and plans since business planning and IRM planning are parallel and coupled processes. Thus the CIO must be able to ask the right questions and understand the answers. IRM planning should also address cross-governmental and inter-agency planning issues as these are becoming increasingly important in E-Government implementation.*
Competency 4.1-IRM baseline assessment analysis	4.1 LO 1: Define and describe performance goals and distinguish performance goals from performance standards.
	4.1 LO 2: Explain classical benchmarking, particularly as applied to IT hardware, software, and IT staff skills and abilities.
	4.1 LO 3: Evaluate a current baseline analysis against established benchmarks.
	4.1 LO 4: Describe the ways in which benchmarks may be used to forecast performance of both your organization and your competition.
	4.1 LO 5: Explain the importance of IT performance assessment/analysis and summarize the ways in which assessment results can be used in developing appropriate and timely IRM strategies and plans that support business goals.
	4.1 LO 6: Design performance analysis and assessment approaches that address each element of IT. Include technology components

	(inventory of physical components, technical viability of components, capacity plan to manage extension of inventory and performance measuring plans to assess ability to remain current with technological evolution), personnel (capabilities and skills), organizational structure and culture, and business plan linkage.
	4.1 LO 7: Describe the relationship between IT strategic planning and IT functional analysis.
	4.1 LO 8: Describe how IT visionary strategic planning is linked to enterprise/program visionary strategic planning.
Competency 4.2- Interdepartmental, inter-agency IT functional analysis	4.2 LO 1: Define functional analysis in an IRM setting.
	4.2 LO 2: Define the context (purpose and goals) for functional analysis. Discuss when cross functional work is desirable and when it is not desirable; include discussion of E-Government goals and challenges.
	4.2 LO 3: Using a mission statement and baseline analysis, analyze the functional and cross-functional requirements for an IT group.
	4.2 LO 4: Using an example of an interagency or intergovernmental IT interaction, assess the potential challenges and consequences resulting from scope expansion.
	4.2 LO 5: Design systems to address interdepartmental, interagency and intergovernmental functional analyses.
	4.2 LO 6: Discuss when OD interventions may be needed for functional analysis to succeed. (See also Competency 3.1 on Techniques/models of organizational development and change).
	4.2 LO 7: List and describe functional analysis tools and issues. Include BPR, security, privacy, accessibility, and open access issues in this discussion. (See also Competency 10.0 on Information Security/Information Assurance).
	4.2 LO 8: IT needs can be addressed in a number of ways including, "Use what we've got, Build new, Acquire from the private sector, Acquire from the

	public sector," etc. Compare and contrast these potential solutions.
	4.2 LO 9: Justify the statement that "cross-functional IT aspects must be embedded in the system." Include the communication channels (interdepartmental, interagency, intergovernmental) appropriate to the level of discussion.
Competency 4.3-IT planning methodologies	4.3 LO 1: List and describe a comprehensive IT planning process.
	4.3 LO 2: Compare and contrast the range of IT planning methodologies. Include at least the following in the discussion of these IT planning methods: Martin's Information Engineering approach, gap analysis, weighted priorities (especially in terms of backbone questions), modeling techniques, Capability Maturity Modeling, Business Process Improvement and Business Process Reengineering.
	4.3 LO 3: Define the activities and tasks of IT planning, and assess the interoperability of the resources available.
Competency 4.4-Contingency and continuity of operations planning (COOP) • OMB Circular A-130, Appendix III • NIST SP 800-34 • Federal Preparedness Circular (FPC) 65	4.4 LO 1: Identify the need for contingency planning, and for garnering the needed resources to protect against costly IT "events." The discussion should include but not be limited to issues such as the following: data integrity, disaster recovery, emergency preparedness, system crash and backup planning, cyber terrorism, unfunded mandates and program contingencies such as Y2K. (See also 10.9 Critical infrastructure protection and disaster recovery planning.)
	4.4 LO 2: Develop and support contingency plans to protect against costly IT "events." Plans should identify risks to the IT plan, inventory opportunities for failure (including degradation of service), and identify resources to protect against such events.
	4.4 LO 3: Discuss the value of interoperability of resources in support of contingency needs.
	4.4 LO 4: Describe the benefits involved in a periodic review of contingency planning for IT.
	4.4 LO 5: Discuss the major elements involved in

	continuity of operations planning (COOP).
	4.4 LO 6: Develop a mock COOP with policies, procedures and plans to ensure the continuity of operations for information systems that support the operations and assets of an agency.
	4.4 LO 7: Evaluate (test) a plan to ensure the continuity of operations for information systems that support the operations and assets of an agency.
Competency 4.5-Monitoring and evaluation methods and techniques	4.5 LO 1: Identify and describe approaches that will assess the value, benefit, and cost of IT and its impact on the business, or the organization's components.
	4.5 LO 2: Discuss the value of Activity Based Costing (ABC) in demonstrating the value, and benefits of IT. (See also 3.4 LO 11.)
	4.5 LO 3: Demonstrate the value of establishing periodic and timely reviews and reporting milestones in which IT performance is evaluated against the IT strategic plan.
	4.5 LO 4: Describe the importance of establishing and evaluating program success factors.
	4.5 LO 5: Review standard project management planning and control tools. (See also Competency 6.0 on IT Project/Program Management.)
	4.5 LO 6: Identify ways in which IT milestones may be linked to the organizational reporting structure.
	4.5 LO 7: Describe how to do configuration planning with respect to IT plans, including identifying the baseline and tracking changes to the baseline.
5.0: IT Performance Assessment: Models and Methods	*General Discussion: The basic question: Is IT meeting both the business plan goals and the needs of constituents? The CIO must be aware of the range of perspectives on performance systems, and of the types of performance measures available and must embrace a systems perspective for IT and its assessment process(es). Additionally, the CIO must understand the importance of baseline assessment measures-existence, qualitative measures and quantitative measures (example: ROI) in the performance*

	assessment cycle.
Competency 5.1-GPRA (Government Performance and Results Act) and IT: Measuring the business value of IT-and customer satisfaction	5.1 LO 1: List and describe non-monetary contributions to business value including usability, efficiency, productivity and perceived value.
	5.1 LO 2: Illustrate sources of data that can be used to support assessment conclusions and decisions.
	5.1 LO 3: Describe how IT strategic planning relates to the business mission, vision, strategy, goals and objectives of an organization. (See 1.1 LO 6 and 1.1 LO 7.)
	5.1 LO 4: Describe how the IT systems support the IT strategic plan in terms of business mission, vision, strategy, goals and objectives of an organization.
	5.1 LO 5: Develop a strategic plan that is linked to specific performance goals. (See 1.1 LO 6 and 1.1 LO 7.)
	5.1 LO 6: Identify the ways that IT is tied to an organization's critical success factors.
	5.1 LO 7: Discuss how IT relates to both internal (process) customers, and external (Congress, customers, etc.) business drivers.
	5.1 LO 8: List and describe how IT aligns with the core process of the business.
• Clinger-Cohen Act • GPRA • PRA • GPEA • Chief Financial Officers Act • E-Government Act • FISMA • Section 508 • Defense Acquisition Workforce Act • PDD 63	5.1 LO 9: List current federal performance legislation and describe/discuss the performance mandates that a CIO must address. (See also 1.2 LO 1.)
Competency 5.2-Monitoring and measuring new system	5.2 LO 1: Identify criteria to be used when analyzing whether to replace an existing system.

	5.2 LO 2: Compare and contrast the characteristics and the challenges involved in "new" systems, both those that are replacing existing systems, and those that are completely new.
	5.2 LO 3: Identify criteria and integrate "go/ no go" checkpoints into a development life cycle.
	5.2 LO 4: List and describe the decision tools and evaluation systems that are typically used to make go/ no go decisions. Include tools that address cost and schedule data as well as rules of thumb such as "when a system gets behind 20%, it is time to `kill' it."
	5.2 LO 5: Identify and evaluate the criteria required to determine whether to "stop" or "kill" a project.
Competency 5.3-Measuring IT success	5.3 LO 1: Show IT's strength as a solution provider that can demonstrate business value.
	5.3 LO 2: List and explain the various criteria (time, budget, etc.) that may be used to determine IT "success." Assess the importance of aligning these criteria with stakeholder needs, customer needs and mission performance.
	5.3 LO 3: Identify and evaluate approaches/tools for measuring IT success that may be used (based on the organization's need for information). Include among the tools, the GQMM (Goals, Questions, Metrics, Measures) approach, the Balanced Scorecard (financial, customer, internal business process, innovation/learning), Benchmarking, Best Practices, the Clinger-Cohen Act, OMB Circular A-11 Exhibit 300, etc. (See 5.5 LO 1 and 6.3 LO 2.)
	5.3 LO 4: Identify and compare leading and lagging indicators that are appropriate for a specified organization and its activities.
	5.3 LO 5: Discuss the need for measurements, the limits of analysis, and the hazards of measurement for measurement's sake.
	5.3 LO 6: Distinguish between outcome (what the system needs to achieve) and output (what the system does).
	5.3 LO 7: Discuss the importance of identifying a

	few critical measures of IT success, and devise systems to keep those "critical measures" visible.
	5.3 LO 8: Explain the role of survey instruments in achieving IT success.
	5.3 LO 9: Assess success relative to risk.
Competency 5.4-Processes and tools for creating, administering and analyzing survey questionnaires	5.4 LO 1: Discuss the use of questionnaires and other survey instruments in addressing customer satisfaction and helping to identify gaps that may exist in the "soft side" of IT.
	5.4 LO 2: List, describe and evaluate the strengths and weaknesses of qualitative and quantitative data collection techniques including interviews, elite interviews, focus groups, surveys, questionnaires, etc.
	5.4 LO 3: List, describe and evaluate the applicability of frameworks such as maturity measures, CMM, ISO 9000, questionnaires in specific organizational settings.
	5.4 LO 4: List and discuss the characteristics of good survey design. Discuss validity and reliability.
Competency 5.5-Techniques for defining and selecting effective performance measures	5.5 LO 1: List, describe, and evaluate techniques that are appropriate for measuring effective performance. Identify where these techniques/practices may be found. Include best practices, benchmarking, etc. (See also 5.3 LO 3 and 6.3 LO 2.)
	5.5 LO 2: Describe how to choose measures of effectiveness which align with stakeholder needs, mission, vision, critical success factors, etc.
	5.5 LO 3: Discuss the advantages and disadvantages of building user feedback into the design and development of performance measures.
Competency 5.6-Examples of and criteria for systems performance evaluation	5.6 LO 1: Identify, evaluate and report on sources of performance evaluation information including internal databases, government-wide databases, proprietary databases, and available web sites.
	5.6 LO 2: Identify and prioritize criteria that address strategic and tactical dimensions of IT, demonstrating the ways in which typical criteria

	can be focused (business, information quality, technical application) and evaluating whether the technology is fulfilling strategic business needs as well as the tactical dimensions of service, information and system quality.
	5.6 LO 3: Discuss the approaches to, and the value of identifying/ prioritizing customers and stakeholders.
Competency 5.7-Managing IT reviews and oversight processes	5.7 LO 1: Discuss the significance/importance and impact of IT reviews.
	5.7 LO 2: Define the role and responsibilities of managers (program managers, project managers, program leads, etc.) in the IT review process.
	5.7 LO 3: Using a specified project plan, identify key performance parameters for each phase in the lifecycle that's being used. (See also 4.5 LO 6; and 5.1 LO 4.)
	5.7 LO 4: Describe the dual role of the CIO-as CEO in IT and in the Clinger-Cohen role in agency leadership. (See also 1.1 LO 3, and 1.4 LO 2.)
	5.7 LO 5: Describe the importance of the CIO "having a seat at the table." Consider that as part of the CIO's line responsibility, he/she is responsible for the reviews and the oversight process. He/she must have visibility in the process and also has the responsibility to advise the organization's leadership team.
	5.7 LO 6: Design a method to ensure that measurement data that has been collected in the assessment process is used in the review and decision making processes.
6.0: IT Project/Program Management	*General Discussion: The relationship between project management and program management is interdependent, not discrete, and progressively cumulative. A project is a specific investment having defined goals, objectives, requirements, lifecycle cost, a beginning and an end that delivers a specific product, service or result. A program is typically a group of related work efforts, including projects, managed in a coordinated way. Programs usually include elements of ongoing work. For program management processes to be*

	mature, project management processes must be mature. Effective decision making is essential to both project and program management.
	6.0 LO 1: Describe the project management lifecycle.
	6.0 LO 2: Discuss the CIO's lifecycle responsibility for project and program management.
	6.0 LO 3: Examine the importance of ethics, integrity and objectivity in program/project management.
	6.0 LO 4: Explore sources of project management standards.
• OMB M-04-19 • OMB Circular A-11, Exhibits 300 and 53	6.0 LO 5: Examine federal IT project/program manager qualification requirements and their impact on agency operations.
Competency 6.1-Project scope/requirements management	6.1 LO 1: Using a case study, analyze the need (business/mission) that is driving project requirements.
	6.1 LO 2: Define a project in terms of internal and external factors.
	6.1 LO 3: List and define the elements involved in the scope (money, time, people, impact, etc.) of a specified program/project being considered.
	6.1 LO 4: Discuss the ways in which project requirements affect project scope and scope management.
	6.1 LO 5: Discuss how the program/project scope elements address the needs of the organization, including its vision, values, history and culture.
	6.1 LO 6: Illustrate the essential and central role of information/knowledge in the management of projects/programs.
	6.1 LO 7: Assess and anticipate the potential positive and negative effects that arise from change (mission, organizational structure, organizational resources, and global/broad conceptual view).
	6.1 LO 8: Discuss and design approaches/systems to both track and control

	project requirements, technology changes, and user needs changes.
	6.1 LO 9: Discuss approaches to configuration management and develop procedures for establishing and maintaining a Configuration Control Board (CCB). (See also 9.2 LO 10.)
	6.1 LO 10: Illustrate how poor requirements management may cause "requirements creep."
	6.1 LO 11: List and discuss the types of organizational and project change that may occur due to partnering.
	6.1 LO 12: Evaluate the decision-making methods and tools (both micro and macro) and analyze the outputs they make available to the project/program manager.
	6.1 LO 13: Discuss the implications of rapid design modeling techniques and methods on requirements and scope management.
	6.1 LO 14: Discuss how to locate guidelines and best practices for implementing records management in IT projects.
	6.1 LO 15: Describe the relevant functional requirements contained in DoD 5015.2-STD, “Design Criteria for Electronic Records Management Software Applications” and discuss their impact on system design and implementation.
Competency 6.2-Project integration management	6.2 LO 1: Define and illustrate project integration and implementation.
	6.2 LO 2: Develop plans to integrate project management and business management.
	6.2 LO 3: Establish software management approaches to include promotion of process improvements, COTS risk assessment, human systems integration design and applications security analysis.
	6.2 LO 4: Discuss and give examples of the importance of innovation and creative thinking in creating alternate program integration strategies.
	6.2 LO 5: Describe integration across programs including the reallocation of resources.
	6.2 LO 6: Compare, contrast and evaluate

	available "knowledge management" tools.
	6.2 LO 7: Assess the value of electronic communication tools as an integration driver.
Competency 6.3-Project time/cost/ performance management	6.3 LO 1: Describe and evaluate project management planning techniques and tools that support the project lifecycle.
	6.3 LO 2: List, describe and evaluate project/program performance metrics. (See also 5.5 LO 1.)
	6.3 LO 3: Identify criteria and analyze performance, resources, cost, and schedule in order to achieve business objectives.
• OMB M-04-24 • OMB Circular A-11, Part 7 • ANSI/EIA-STD-748	6.3 LO 4: Discuss the required use of Earned Value Management by OMB to evaluate the performance of major federal IT investments.
	6.3 LO 5: Utilize an Earned Value Management System to analyze a business case.
	6.3 LO 6: Discuss the importance of program control processes and industry best practices.
	6.3 LO 7: Discuss the importance of financial management techniques and tools.
	6.3 LO 8: Identify, evaluate, and integrate cost, time and performance drivers in a project plan so that the tradeoffs that are made are reached in a realistic way.
Competency 6.4-Project quality management	6.4 LO 1: Define characteristics of quality. Include usability, quality assurance and quality control.
	6.4 LO 2: Identify quality requirements and evaluate/establish metrics to achieve those requirements.
	6.4 LO 3: Identify and discuss ways to build quality into systems.
	6.4 LO 4: Design and implement approaches to obtain feedback from users.
	6.4 LO 5: Discuss the advantages of independent verification and validation (IV&V) and design approaches to tie IV&V to the quality assurance program.
Competency 6.5-Project risk management	6.5 LO 1: Define risk.
	6.5 LO 2: Discuss technical, cost and

	management capability risks associated with project management.
• SEI from Carnegie Mellon University • Defense Systems Management College	6.5 LO 3: Discuss the use of risk taxonomy in identifying sources of risk.
	6.5 LO 4: Demonstrate the ability to perform SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis.
	6.5 LO 5: Identify approaches to quantify risk assessment and to prioritize among risks.
	6.5 LO 6: Describe and evaluate the risk mitigation process, and how it is tailored to particular situations.
	6.5 LO 7: Define the risk management process.
	6.5 LO 8: Characterize the differences among risk management, problem management and crisis management.
	6.5 LO 9: Evaluate monitoring and control systems. Discuss their implementation.
	6.5 LO 10: Discuss the need for risk management in completed systems. Include discussion of the "larger environment" in which the system will be functioning.
Competency 6.6-Project procurement management	6.6 LO 1: Describe the CIO's involvement in the early phases (concept exploration and procurement) of acquisition management.
	6.6 LO 2: Identify examples of issues that should be included in a project description and statement of work.
	6.6 LO 3: Identify the issues a project manager needs to address in a procurement management plan.
	6.6 LO 4: Identify necessary metrics to manage cost, schedule, and performance throughout the project lifecycle.
	6.6 LO 5: Describe budget strategies to mitigate the impact of changes in project scope.
Competency 6.7-System life cycle management	6.7 LO 1: Discuss the IT lifecycle as a discipline. List and describe the components of the system life cycle.

• SEI • ISO 12207 • STD-16 • ISO 9001	6.7 LO 2: List and describe the standards that apply to the life cycle.
	6.7 LO 3: Identify the impacts of costs, benefits, risks, resources, and time to market on the system life cycle.
	6.7 LO 4: Distinguish between system development life cycle and the system life cycle.
	6.7 LO 5: Describe the technology architectures, i.e., systems, hardware, software, and communications.
	6.7 LO 6: Evaluate the different parts of the life cycle to achieve a useful and cost effective outcome.
	6.7 LO 7: Describe the impact of Commercial-off-the-shelf (COTS) availability to the build or buy decision.
	6.7 LO 8: Discuss the heuristics of life cycle—when to know when you have enough, etc. Include Total Cost of Ownership, lessons learned, etc.
	6.7 LO 9: Discuss the importance of managing change.
.	6.7 LO 10: Discuss the complexities associated with the closeout of systems, including end of life, the termination of systems, destruction of databases, etc.
Competency 6.8-Software development, testing and implementation • ISO 9001 • ISO/IEC 12207	6.8 LO 1: Evaluate the strengths and weaknesses of different models, approaches and methodologies relating to software development such as CMMI, emerging best practices, IDEF (ICAM (Integrated Computer Added Manufacturing) Definition), Rapid Application Development (RAD), Joint Application Design (JAD), Object-Oriented (OO) software and Spiral Development. (See also Competency 12.6 on Software development technology.)
	6.8 LO 2: Discuss the importance of adopting and applying a systems engineering perspective and process to software development.

	6.8 LO 3: Develop an analytical process to support the make vs. buy decision.
	6.8 LO 4: Discuss Pareto's law and the impact of core requirements-i.e., 80% of the design and testing is up front before coding begins.
• ISO 9126	6.8 LO 5: Describe elements for evaluating software quality and how they would be applicable in testing software capabilities.
	6.8 LO 6: Discuss available tools, techniques, and metrics for software testing.
7.0: Capital Planning and Investment Control (CPIC) • PRA • GPRA • Title V Extract-Federal Acquisition Streamlining Act of 1994 (PL 103-355) • Chief Financial Officers Act (PL 101-576) • BEA-Budget Enforcement Act • BBA-Balanced Budget Agreement • Subtitle III of Title 40 USC • OMB Circular A-11 • OMB Circular A-94 • OMB Circular A-109 • OMB Circular A-123 • OMB Circular A-127 • OMB Circular A-130 • Executive Order 13011 Sec. 2(b)(3)	*General Discussion: It is essential that CIOs understand the importance of Capital Planning and Investment Analysis. Capital planning is needed to provide a framework for running government with the same disciplines as private business. In addition to passage of the Clinger-Cohen Act (now codified in Title 40), there are an array of other legislation and fiscal guidance which are significant to effective Capital Planning and Investment Control.*
	7.0 LO 1: Discuss the appropriation process and the way that politics (both local agendas and national issues) may affect the capital planning and investment control process.
	7.0 LO 2: Schematize the entire IT lifecycle (using your agency or component's budgeting cycle or

	SA CMM SEI at Carnegie Mellon). Include both funding and retirement, and show how integral performance measures can support each phase of the cycle.
	7.0 LO 3: Demonstrate the importance of aligning capital planning with the agency mission.
	7.0 LO 4: Evaluate the roles that core mission, outsourcing and redesign play in CPIC.
Competency 7.1-Best practices	7.1 LO 1: Identify and evaluate current CPIC best practices. Include the GAO Information Technology Investment Management (ITIM) maturity model among those evaluated.
	7.1 LO 2: Evaluate current and emerging best practices relative to the enterprise's strategic plan.
	7.1 LO 3: Develop approaches to examine internal and external processes and practices and to develop appropriate benchmarks.
Competency 7.2-Cost benefit, economic, and risk analysis	7.2 LO 1: Describe and interpret a variety of methodologies used in cost benefit, economic and risk analysis.
	7.2 LO 2: Compare and contrast among the methodologies used in cost benefit, economic and risk analysis in order to be able to implement a single set of methodologies with common standards throughout a large organization. (See also 7.7 LO 4.)
	7.2 LO 3: Compare and contrast the implications of commonly used metrics such as ROI, NPV, Internal or Modified Internal Rate of Return (IRR, MIRR) etc. This comparison should address not only the outputs of the metrics, but also the assumptions upon which the metrics are based.
	7.2 LO 4: Identify and define processes to ensure the consistency of applied metrics across a range of projects under consideration in the capital planning process.
	7.2 LO 5: Analyze cost and economic data, assess its quality, and communicate its meaning to others.
	7.2 LO 6: Identify and evaluate qualitative approaches that can be used in risk analysis in addition to the more traditional quantitative

	methodologies.
	7.2 LO 7: Justify the reason that the Clinger-Cohen Act requires a risk-adjusted ROI before making an investment in IT.
	7.2 LO 8: When presented with a need, evaluate a variety of solutions that include, but are not limited to, IT-based solutions.
Competency 7.3-Risk management—models and methods	7.3 LO 1: Discuss the reasons why risk analysis and risk management are vital. Include discussion of the role risk management plays and how the specifics relate to the organization and its mission.
	7.3 LO 2: Discuss and illustrate major areas of risk such as cost, technical (including obsolescence) and management capability. (See also 6.5 LO 2.)
	7.3 LO 3: Compare and contrast the commonly accepted standards, tools, and methods used in risk management.
• GAO Investment Guide • OMB Circular A-94 • OMB Circular A-11, Part 3 • Capital Planning and Investment Guide • GAO Report on Assessing Risks and Returns	7.3 LO 4: Apply and evaluate commonly used best practices risk management models.
	7.3 LO 5: Given a business case, be able to apply risk management models and methods.
	7.3 LO 6: Identify approaches to uncover significant hard and soft areas of risk that might have been missed through the exclusive use of risk management models.
Competency 7.4-Weighing benefits of alternative IT investments	7.4 LO 1: Create an analysis and decision-making process that will ensure that when a CIO is presented with a need, ALL alternatives (and not only IT alternatives) are evaluated.
	7.4 LO 2: Compare and contrast the commonly accepted standards, tools, and methods available for evaluating benefits of alternative IT investments.
• OMB Circular A-94	7.4 LO 3: Compare and contrast the advantages

• OMB Circular A-11	of uniform IT investment assessment standards vs. the value of flexibility in assessing alternative IT investments.
	7.4 LO 4: Discuss the role of forecasting in cost-benefit analysis. Include situations in which IT systems are making an investment in information that does not show up immediately in the ROI, but needs to be inserted into the ROI forecast.
	7.4 LO 5: Evaluate cost benefits of alternative IT- and non IT-solutions, and be able to support and justify the best alternative.
	7.4 LO 6: Identify the types of decision tools and criteria that are used within the development life cycle to determine when a system has reached maturity. Discuss the importance of this process. Include concepts such as 80/20 and tools such as Pareto Analysis
Competency 7.5-Intergovernmental projects—federal, state, and local	7.5 LO 1: Assess the impact of federal regulatory changes on state and local partners. Include budget effects, etc. Examples may include "Welfare to Work," Medicare, etc.
	7.5 LO 2: Identify and/or design shared solutions between organizations to leverage investments.
Competency 7.6-Capital investment analysis-models and methods	7.6 LO 1: Compare, contrast and demonstrate the use of the various capital investment models and methods.
	7.6 LO 2: Using selected business cases apply the appropriate model to analyze each capital investment in IT.
	7.6 LO 3: Critique the Balanced Scorecard (BSC) method and justify its use as part of the capital investment analysis process.
Competency 7.7-Business case analysis	7.7 LO 1: Discuss the elements of a comprehensive Business Case Analysis including management, customers, and technical costs. Areas to address include at least the following 1. Best practices 2. Business Process Reengineering, Business Process Improvement and Benchmarking 3. Cost/benefit, economic, and risk analysis 4. Risk management 5. Weighing the benefits of alternative IT investments

	6. Evaluating over time the impacts and effects in technical, acquisition, risks, and organizational areas 7. Capital investment analysis 8. Portfolio analysis 9. Integration of performance with mission and budget process
	7.7 LO 2: Utilizing case studies, examine how Business Case Analysis provides the means to evaluate the quantitative and qualitative aspects of competing investment opportunities.
	7.7 LO 3: Verify the validity of measurements used in developing/calculating investment metrics.
	7.7 LO 4: Compare and contrast the models and methods of Business Case Analysis, both in government and in industry.
Competency 7.8-Investment review process	7.8 LO 1: Discuss the need for an investment review process. Include in the discussion, the role of the "decision makers" (and who they may be), and an identification of the types of information that will be needed.
	7.8 LO 2: Identify the information and measurement tools that will be needed for the investment review process. Include "checkpoints" that may trigger additional information.
	7.8 LO 3: Discuss different approaches to the investment review process. Include approaches that are oriented to the culture of the specific organization, e.g., some organizations are detailed and quantitative, others are consensus based, etc., and select appropriate approach to their culture.
	7.8 LO 4: List the stages of an investment review process. Design an investment review process that includes each of these steps/stages.
	7.8 LO 5: Since an investment lifecycle has many points of investment, describe the capital planning process in life-cycle terms. Include OMB Circular A-11 in the discussion.
Competency 7.9-IT portfolio management • Title 40 § 11101	7.9 LO 1: Discuss the steps required to move from assessment of individual IT capital investments to an integrated process for managing IT investments as portfolios. (See also

• OMB Circular A-130 • GAO/AIMD-10.1.13	7.2 LO 4.)
	7.9 LO 2: Establish analysis criteria and a process to link portfolio objectives to an agency's vision, mission, goals, objectives and priorities.
8.0: Acquisition	*General Discussion: Acquisition links technology investment to the business outcomes and results, as defined by the end consumer. Acquisition needs to move from what been a singular focus on process to one that considers both process and objectives. Acquisition anticipates what is needed before it is officially stated, and develops requirements that include the end users and must be linked to business outcomes.* *The CIO must understand the new dynamic, and understand lifecycle management. He/she must move from a risk averse process to one of risk management, and create an innovative acquisition environment throughout the organization. The CIO should monitor changes in acquisition models and methods.* *Acquisition includes four stages--(1) Defining the business objective; (2) Requirements definition and approval; (3) Sourcing and (4) Post-Award management—which are each critical to a successful IT acquisition.*
	8.0 LO 1: Compare and contrast acquisition, contracting, and procurement.
	8.0 LO 2: Describe the various phases of the acquisition lifecycle. Include reference to maintenance phase, purchasing, training, etc.
Competency 8.1- Acquisition strategy	8.1 LO 1: Describe the ways in which a strategic plan, annual performance plan, specific requirements, and capital planning process must drive the acquisition strategy.
	8.1 LO 2: Demonstrate the development of an acquisition strategy. Include interpretation of internal and external environments, the business, fiscal and political environments, awareness of A76 methodology, contracting strategy, and technological and environmental changes in the development of the acquisition strategy.
	8.1 LO 3: Identify and evaluate the range of

	alternatives to acquisition that should be explored in the pre-phase of the project. Include the roles of technology, reengineering, architecture, training, process improvement, procedure modification, elimination of functions, etc., in the listing of alternatives.
	8.1 LO 4: Discuss the differences between acquisition as a planned event and as a reactive event. In particular address reactive events that may be described as poor planning (i.e., a 5-year contract is due to expire in 6 weeks, and acquisition must react).
	8.1 LO 5: Illustrate the use of cost, schedule, and performance goals in the planning and management of acquisitions.
Competency 8.2- Acquisition models and methodologies, from traditional to streamlined	8.2 LO 1: Compare, contrast, and evaluate various acquisition philosophies. Include, but do not limit the identification to: changing the operational process instead of purchasing; doing the work in house or outsourcing; outsourcing to one or to several contractors; intergovernmental outsourcing; unitary RFP or multiple awards; and the level at which the acquisition is managed.
	8.2 LO 2: Design an acquisition philosophy or model that fits the organization's mission, needs, and culture. Among the factors considered include sourcing issues, type(s) of contract, modular contracting, award fees, use of subcontractors, etc.
	8.2 LO 3: Compare, contrast, and evaluate acquisition methodologies. Include, but do not limit, the analysis to: 1. Methodologies that establish internal decision making process 2. Time, budget, performance, risk management as elements of analysis 3. Determination of resources or authority to acquire by self, e.g., single procurement vs. OMB Circular A-109 Fly-off 4. Procuring an annual renewable service approach (as opposed to purchasing) 5. Relations with users and industry during the process 6. Evaluation methodology to be used

	7. Commercial item (COTS driven) 8. RFP/solicitation 9. Market research/RFI (request for information) 10. GWAC (Government-wide Acquisition Contract) 11. Delegate parts of process (Executive Agent needed) 12. GSA Schedules
	8.2 LO 4: Define the components typically included in an acquisition model. These components might include the relationship between government and supplier, internal relations, the motivation of the supplier, elements of sourcing, etc.
	8.2 LO 5: Evaluate the more traditional methods available for acquisition. Include the FAR (which includes several methods), DFAR, the Uniform Commercial Code (UCC), etc.
	8.2 LO 6: List and describe various streamlined acquisition models. Include among the models considered: DoD 5000; FAA's spiral development model; IRS's outsourcing acquisition-agency as super system's integrator; commercial best practices (off-the-shelf) SAP (Streamlined Acquisition Process); Defense Enterprise Program (C17); and USMC Compressed Acquisition.
	8.2 LO 7: Using tools, methodologies and rules evaluate the development acquisition model/plan for different acquisitions. Include the vehicle to be used (i.e., GSA schedule, contractor motivation, unitary RFP or multiple awards, etc.).
Competency 8.3- Post-award IT contract management	8.3 LO 1: List and describe post-award contract management methods and strategies that must be anticipated and incorporated into the planning phase of the contract. Include at least the following in the listing and description: 1. Performance-based service contracts. 2. Methods of control (interfaces, checkpoints). 3. Benchmarks (agreed-upon). 4. Tracking performance -- build a system for tracking and rewarding good performance. 5. Creating incentives for good performance

	(includes share in the savings e.g. California Franchise Tax Board) 6. Managing changes in the contract -- negotiation between users and contractors about requirements scope creep 7. Termination strategies
	8.3 LO 2: Discuss the management of partnering relationships. Include organizational interface and structure of the relationship (i.e., motivation, checkpoints, information needs, metrics, etc.).
	8.3 LO 3: Discuss the importance of pre-termination and termination decision points.
Competency 8.4-IT acquisition best practices	8.4 LO 1: Devise systems for tracking and evaluating commercial and other public sector "best practices." Include state, local, and other federal agency best practices. Discuss the importance of leading change and implementing appropriate best practices.
	8.4 LO 2: Discuss approaches to encouraging ethical acquisition behavior on the part of all involved in the acquisition process.
	8.4 LO 3: Discuss leadership and management approaches that will create an environment of trust within the organization. (References: SA-CMM, Software Program Managers Network (both a repository and a network)
	8.4 LO 4: Define "knowledge management" and "knowledge sharing" as they relate to acquisition. (See also Competency 1.7 on Knowledge management.)
.	8.4 LO 5: Discuss the utility of lease versus purchase analyses for IT acquisitions.
Competency 8.5-Software Acquisition Management • OMB Circular A-11 • OMB Circular A-130 • M-04-19 • SEI	8.5 LO 1: Discuss the elements included in a well-defined agency policy for acquisition of software.
	8.5 LO 2: Construct a solicitation proposal and

	evaluate vendor qualifications.
	8.5 LO 3: Discuss common causes of cost, schedule and performance problems associated with software procurement.
	8.5 LO 4. Apply requirements management and risk mitigation techniques associated with software acquisition. (See also Competency 6.6 on Project procurement management.)
	8.5 LO 5. Discuss the use of software acquisition models and tools utilized to manage the life cycle planning.
	8.5 LO 6: Evaluate software performance measures and metrics. (See also 6.8 LO 5 and LO 6.)
9.0: E-Government	*E-Government/ E-Business/ E-Commerce are changing the look of business, the feel of business and the way business and government work. They are changing the traditional way of viewing the individual agency and its needs. E-Government demands that CIOs be aware of their stakeholders (program managers, functional areas, employees, suppliers, the public) as customers. CIOs need to have a strategic vision for E-Government and E-Business, and need to utilize business case analysis and BPR/BPI. Program leadership should be responsible for identifying and implement E-Government solutions that will improve business effectiveness.* *CIOs should be aware that there might be a distinction between E-Government and E-Commerce. They will be dealing with intra- and inter-governmental agencies, and external customers. There is a stewardship responsibility, and security/privacy concerns. Certain roles are inherently governmental and can't be "contracted out." CIOs must engage in risk management in making certain decisions regarding E-Government.* *Baseline technology underlies E-Government and CIOs should maintain a model of continuous improvement enabling the model of E-Business through utilization of emerging technologies.*
Competency 9.1-Strategic business issues and	9.1 LO 1: Evaluate current collaborative E-Government efforts and the benefits/risks

changes associated with E-Government	associated with them.
	9.1 LO 2: Evaluate the demands of E-Government and E-Business as driven by external factors, including legislation, regulations and the market place.
	9.1 LO 3: Discuss how E-Government requirements and other critical issues compete for support in the budget and relate them to mission alignment, budget oversight, and capital planning coordination.
	9.1 LO 4: Evaluate internal factors, including records management, human resources, etc., when making decisions involving E-Government/ E-Commerce.
	9.1 LO 5: Plan and develop business case processes in support of E-Government initiatives.
	9.1 LO 6: Evaluate alternative business models and partnerships for delivery of E-Government services that are enabled by technology.
	9.1 LO 7: Analyze the value of Enterprise Resource Planning (ERP), supply chain management, and Customer Relationship Management (CRM) in developing appropriate E-Government projects.
	9.1 LO 8: Develop methods to ensure citizen/public focus is maintained during the strategic planning process.
	9.1 LO 9: Analyze examples of E-Government solutions and their impact on employees, customers and suppliers.
	9.1 LO 10: Identify and evaluate the timeframes and skill sets needed for successful E-Government.
Competency 9.2-Web development and maintenance strategies	9.2 LO 1: Assess the impact of web development technology on the implementation of E-Government. (Also see Competency 12.4 on Web technology.)
	9.2 LO 2: Evaluate build/buy partnership issues relative to web development.
	9.2 LO 3: Assess delivery strategies as part of web development.

	9.2 LO 4: Identify strategies and oversight required for web-based development.
	9.2: LO 5: Explore the organizational implications and structure needed for web-based development.
	9.2 LO 6: Discuss approaches to web content management.
	9.2 LO 7: Compare, contrast and evaluate a single agency approach to E-Government versus a multi-agency portal with a common infrastructure.
	9.2 LO 8: Identify and evaluate best practices to determine when to move a project on-line.
	9.2 LO 9: Analyze considerations related to privacy, security and accessibility in government web sites. (See also 9.7 LO 1, 10.4 LO 1 and 10.4 LO 4.)
	9.2 LO 10: Discuss the importance of maintaining a disciplined process for software configuration changes to web sites and the impact of web site problems on data reliability and customer/client satisfaction. (See also 6.1 LO 9.)
Competency 9.3-Industry standards and practices for communications	9.3 LO 1: Identify and evaluate industry standards and practices regarding development of programs, projects, etc., in support of E-Government.
	9.3 LO 2: Evaluate the differences between browser-based and client-based applications and their suitability for various E-Government initiatives.
	9.3 LO 3: Compare, contrast, and evaluate customer relations management in private sector versus government implementations.
	9.3 LO 4: Identify advantages and disadvantages of developing interagency common operating environments. Consider political, cultural and business dimensions in such common operating environments.
Competency 9.4-Channel issues (supply chains)	9.4 LO 1: Identify and define the different channel and supply chain issues (including people, data, and suppliers) in E-Government and E-Commerce.
	9.4 LO 2: Evaluate supply chain models to ensure that the various channels of service delivery are

	both mission-focused and optimized.
	9.4 LO 3: Explore optional expansion of potential channels through federal exchanges and auctions, including property asset disposal.
Competency 9.5-Dynamic pricing	9.5 LO 1: Compare and contrast the history of government-based public information transactions and those that occur in private industry
	9.5 LO 2: Discuss the value of government information and how to draw the line between free transactions and revenue-producing transactions in E-Government.
	9.5 LO 3: Analyze and evaluate alternative funding models in development and delivery of E-Government, E-Commerce, and E-Business.
Competency 9.6-Consumer/citizen information services	9.6 LO 1: Discuss the existing Customer Relationship Models (CRM) and evaluate the value of those models to the participant's organization.
	9.6 LO 2: Evaluate the significance of market research and consumer profiles in E-Government and E-Business.
	9.6 LO 3: Forecast consumer/citizen expectations regarding E-Government.
	9.6 LO 4: Discuss the advantages and disadvantages of marketing internally and externally to electronically deliver government services to the public.
Competency 9.7-Information accessibility (including Section 508 compliance)	9.7 LO 1: Discuss today's critical social issues (including privacy, affordability, accessibility, and electronic and information technology accessibility for people with disabilities) and the role of the CIO in advocating their inclusion in all phases of planning and development.
	9.7 LO 2: Define and discuss the Digital Divide and identify recent trends in narrowing the gap worldwide.
• FOIA • Section 508 of the Rehabilitation Act • NIST SP 800-37	9.7 LO 3: List and discuss the laws, standards and regulations relative to security, privacy, accessibility and confidentiality and how they impact delivery of E-Government/E-Commerce services.
	9.7 LO 4: Discuss the role of the CIO as a leader

	of change in E-Government/E-Commerce.
10.0: Information security/Information Assurance (IA)	*General Discussion: The Federal Information Security Management Act (FISMA) charges each Federal CIO with the responsibilities to develop and maintain an agency-wide information security program, including security policies, procedures and control techniques to both protect and defend information, systems and networks. CIOs must be able to assess the risks associated with vulnerable systems and information; determine the levels of security protection required; institute cost-effective methods to reduce risk to acceptable levels; and periodically test the capabilities of those techniques and controls. In addition, they must oversee the training programs to ensure that both the protectors and users of information and systems have the knowledge necessary to adequately protect organizational assets. The Office of Management and Budget (OMB) promulgates procedures for FISMA compliance and has levied additional requirements for information security programs through OMB Circular A-130. The competencies below are organized around the FISMA and OMB requirements and have been cross referenced against the content of the Committee on National Security Systems Instruction (CNSSI) 4012 of June 2004 and National Institute of Standards and Technology guidance. Additionally, there are legislative and regulatory requirements that mandate specific care for certain types of information including (but not limited to) mission sensitive information, corporate fiduciary information and personally identifiable information.*
	10.0 LO 1: Explain the global risks, challenges and opportunities associated with the current and future information security environment.
	10.0 LO 2: Describe the impact of breaches in security and loss of trust on the business/mission of an organization.
Competency 10.1-CIO information security roles and responsibilities	10.1 LO 1: Analyze the FISMA and implementing policies, procedures, and standards (including NIST, OMB, and CNSSI No. 4012) to determine the information security managerial roles and

• FISMA §3544 • CNSSI No. 4012 (Functions 6 and 8)	responsibilities of senior managers responsible for information or information systems/technology, *viz.,* CIO, Chief Technology Officer (CTO), approving authorities under information systems certification and accreditation, *etc.*
	10.1 LO 2: Identify recognized sources of best practices in IT security/IA. Include NIST (particularly NIST SP 800-26); USCERT; JTF-CND; National Infrastructure Coordinating Center (NICC); SysAdmin, Audit, Network, Security (SANS) Institute; National Defense University, Center for Internet Security (CIS), Computer Security Institute (CSI), SEI, GAO, and the National Computer Security Center (NCSC) among the sources.
	10.1 LO 3: Define the items that constitute basic IA literacy necessary to be a senior manager responsible for information or information systems/technology.
	10.1 LO 4: Identify and evaluate resources needed to achieve an acceptable level of security and to remedy security deficiencies based on system criticality and information sensitivity.
Competency 10.2- Information security/related legislation, policies and procedures • FISMA §3544(a)(2)(C), (b)(2) and (b)(5) • FISMA §3545 • NIST SP 800-23 • NIST SP 800-36 • NIST SP 800-64 • NIST SP 800-55 • CNSSI No. 4012 (Functions 3 and 5) • E-Government Act • The Patriot Act • Sarbanes-Oxley Act • Electronics Management and Federal Records Act • Federal Managers	10.2 LO 1: Explain the important implications from the array of legislation, regulations and standards related to information assurance and security.

Financial Integrity Act of 1982 • The Federal Property and Administration Service • GPEA • GPRA • National Archives and Records Act • Computer Fraud and Abuse Act • National Security Decision Directive (NSDD) 298 • Federal Financial Institution Examination Council • Foreign Corrupt Practices Act of 1977 • Auditing Standards including SAS 30 and FCPA Compliance • Standards of Due Care and Legal Precedence	
• OMB M-06-16	10.2 LO 2: Evaluate security management policies and practices to ensure that they are cost effective and effectively reduce risk.
	10.2 LO 3: Describe how to apply IA concepts to ensure compliance with other applicable requirements, including those standards and guidelines for national security systems issued in accordance with law and as directed by the President.
	10.2 LO 4: Develop and describe how to implement a methodology to annually evaluate the effectiveness of information security policies, procedures, and practices.
	10.2 LO 5: Demonstrate how information security is addressed throughout the life cycle of an agency's information system.
	10.2 LO 6: Evaluate procedures for detecting,

	reporting, and responding to security incidents, to ensure that they are consistent with standards and guidelines issued pursuant to section 3546(b) of FISMA.
Competency 10.3-Privacy and personally identifiable information	10.3 LO 1: Explain generally accepted definitions of privacy and security. Distinguish between privacy issues and security concerns.
• Privacy Act • FOIA • Health Insurance Portability and Accountability Act (HIPAA) of 1996 • E-Government Act • OMB Circular A-130 • OMB M-99-18 • OMB M-01-05 • OMB M-03-22 • OMB M-06-15 • OMB M-06-16 • OMB M-06-19 • NIST SP 800-6	10.3 LO 2: Identify and discuss legislation, regulations and policies regarding privacy and personally identifiable information.
	10.3 LO 3: Analyze the effects of these laws and regulations in differing contexts.
	10.3 LO 4: Evaluate security and privacy laws and regulations relative to the openness that is sought by the Freedom of Information Act (FOIA).
	10.3 LO 5: Assess internal and external factors affecting an organization's privacy policies and practices.
	10.3 LO 6: Discuss and give examples of the importance of planning, developing, and implementing systems which address privacy. (See also 12.4 LO 4.)
• E-Government Act • OMB Circular A-130 • OMB Circular A-11	10.3 LO 7: Explain the Privacy Impact Assessment (PIA) process, the type of events which require a PIA, and the content of a PIA.
	10.3 LO 8: Identify and discuss privacy issues that may occur relative to other IT responsibilities such as records management, archival records, FOIA requests, declassification, firewalls, and security involving partners (extended enterprises).

Competency 10.4- Information and information systems threats and vulnerabilities • NSDD 298 • DoDD 5205.2	10.4 LO 1: Explain the use of the operations security (OPSEC) cycle (identifying critical information, analyzing threats, analyzing vulnerabilities, assessing risk, and applying countermeasures) for implementing a security system that protects information about a mission, operations or activity (thus denying or mitigating an adversary's ability to compromise or interrupt that mission, operation or activity).
	10.4 LO 2: Examine the inherent security challenges associated with implementing cross-agency information sharing capabilities. (See also 1.5 LO 2.)
	10.4 LO 3: Analyze the security implications of software assurance, as it applies to confidentiality, and integrity, including legislation dealing with source manufacturing. Include internal GOTS, external COTS, internet/intranet, legacy codes, applicable legislation regarding source manufacturing, and the types of individuals (U.S. trained, foreign national H-1B visa holders, off-shore workforce, etc.) developing software.
	10.4 LO 4: Explain security issues and interdependencies related to various technologies and their impact on the security architecture of an organization.
• NIST SP 800-42 • NSA Security Configuration Guides • http://sectools.org	10.4 LO 5: Formulate strategies to defend against the actions of hackers, state-sponsored attackers and other threat sources such as hactivists, transnational organized crime, industrial and international espionage.
	10.4 LO 6: Explain the role of human factors in IA. Include human computer interaction, design, training, sabotage, human error prevention and error identification, personal use policies and monitoring, and internal contractor integrity.
• OMB M-06-16	10.4 LO 7: Explain the challenges and requirements associated with the physical security of mobile and remotely-accessed information.
	10.4 LO 8: Evaluate security considerations and risks associated with emerging technology.
	10.4 LO 9: Address the impact of technology transitions on systems operations and IA.

	10.4 LO 10: List and discuss response assistance that is available. Include USCERT, DOE's CIAC, the U.S. Secret Service's National Threat Assessment Center, DoD CERT, the CERT Center and commercial services including MS security group and Cisco.
Competency 10.5- Information security controls planning and management • FISMA §3544(a)(2)(B) and (D) • NIST SP 800-53 (and associated publications) • FIPS Pub 199 • FIPS Pub 200 • CNSSI No 4012 (Functions 4, 7, 10) • Tile 40 §11331 • OMB Circular A-130	10.5 LO 1: Determine the levels of information security appropriate to protect an organization's information, information systems, and networks in accordance with standards promulgated under section 11331 of title 40.
	10.5 LO 2: Explain the concepts of confidentiality, integrity, and availability as applied to Information Systems Security.
	10.5 LO 3: Explain the use and types of security controls as directed in federal policies and procedures.
	10.5 LO 4: Based on a risk analysis, select the security controls or other means to mitigate risks from unauthorized access, use, disruption, modification, or destruction of information and information systems.
	10.5 LO 5: Develop a security plan and evaluate its compliance with agency and federal regulations for protection of the confidentiality, integrity, and availability of information, information systems, and networks.
• Homeland Security Presidential Directive 12 (HSPD-12)	10.5 LO 6: Explain the standards for employer and contractor identification prior to gaining physical access to federally controlled facilities and logical access to federally controlled

	information systems.
	10.5 LO 7: Evaluate the performance of security controls and techniques to ensure that they are effectively implemented (includes testing those security controls and techniques). Discuss current federal-wide initiatives.
Competency 10.6- IA risk management • FISMA §3544(a)(2)(A) • OMB Circular A-130, Appendix III • NIST SP 800-30 • NIST SP 800-37 • NIST SP 800-59 • CNSSI No. 4012 (Functions 1, 2, 9)	10.6 LO 1: Assess the risk and magnitude of the harm that could result from the unauthorized access, use, disclosure, disruption, modification, or destruction of information and information systems that support the operations and assets under the control of an organization.
	10.6 LO 2: Specify responsibilities and criteria for granting approvals.
	10.6 LO 3: Develop implementing procedures for granting authority to operation (i.e., certification and accreditation).
	10.6 LO 4: Formulate risk management plans to mitigate identified IA weaknesses.
Competency 10.7- Enterprise-wide information security program management • FISMA §3544(a)(3)(B) • FISMA §3544(b) • OMB Circular A-130, Appendix III	10.7 LO 1: Evaluate an agency-wide information security program and modify the program to comply with changes in policies, laws, regulations, standards, threats, and vulnerabilities.
	10.7 LO 2: Model how to document remedial action to address deficiencies in information security policies, procedures, and practices of an organization.
• FISMA §3544(a)(3)(D) • FISMA §3544(b)(4) • NIST SP 800-16 • NIST SP 800-50 • CNSSI No. 4012	10.7 LO 3: Develop a plan and implementing procedures for a comprehensive IA education and training program. Include training proposals for general manager requirements; all personnel with significant responsibilities for information security;

(Function Two under Countermeasures)	awareness training requirements; and a continuous learning plan that monitors and disseminates information about IA best practices and incident lessons learned throughout the enterprise program.
Competency 10.8-Information security reporting compliance • FISMA §3544(c) • OMB M-03-19 • OMB Circular No. A-11, Section 300	10.8 LO 1: Develop an example of a quarterly IT Security Report in accordance with FISMA and OMB guidance.
	10.8 LO 2: Develop policies to identify and comply with intrusion reporting requirements.
	10.8 LO 3: Develop the security and privacy sections for a business case.
Competency 10.9-Critical infrastructure protection and disaster recovery planning • FISMA §3544(b)(8) • OMB Circular A-130, Appendix III • PDD 63 • HSPD-7	10.9 LO 1: Explain concerns regarding the protection of America's critical infrastructures, both governmental and commercial, including power, transportation, banking and telecommunications systems. Include in the discussion key homeland security laws and policies, global trade practices and other efforts to protect and maintain America's physical and cyber infrastructure.
	10.9 LO 2: Discuss the disaster recovery planning process and its place within the overall continuity of operations and business continuity management process. (See also Competency 4.4 on Contingency and continuity of operations planning (COOP.))
	10.9 LO 3: Discuss the major elements involved in disaster recovery planning ranging from dealing with the emergency situation to recovery.
11.0: Enterprise Architecture	*General Discussion: An enterprise architecture (EA) establishes an agency-wide roadmap to meet mission goals through the optimal performance of core business processes and supporting information technology (IT) resources*

	(e.g. systems, applications, databases, websites, and networks). Enterprise architectures are essential for evolving existing business processes and IT resources, as well as developing new processes and resources that provide maximum mission value. EA includes a sequencing plan for transitioning from the baseline business and technology operating environment to the target environment.
	11.0 LO 1: Explain the multi-dimensional nature of how enterprise architecture describes and documents an enterprise, how architecture supports the organization's mission, and why architectures evolve over time.
Competency 11.1- Enterprise architecture functions and governance	11.1 LO 1: Identify and describe roles in an EA program, such as those for the Executive Sponsor, Chief Information Officer, Chief (or Enterprise) Architect, Solutions Architects, Data Architects, and Systems Architects.
	11.1 LO 2: Describe how strategic planning is related to enterprise architecture and program visionary planning.
• Clinger-Cohen Act • E-Government Act • GPEA • FISMA • GPRA • OMB Circulars A-130 and A-11 • GAO • Federal CIO Council	11.1 LO 3: Describe and discuss impacts of key regulatory requirements and guidance as they relate to enterprise architecture.
	11.1 LO 4: Articulate how an agency would interact with the Federal CIO Council's EA Governance Subcommittee in implementing its enterprise architecture.
	11.1 LO 5: Identify the enterprise architecture responsibilities of various agency managerial groups such as a Technical Review Board, Investment Review Board, and Executive Steering Committee and how they contribute to the agency's business and technology governance

	process.
Competency 11.2-Key enterprise architecture concepts	11.2 LO 1: Identify and describe the purpose of the main elements of an enterprise architecture, including architecture drivers, strategic direction, baseline and target architectures, the sequencing plan, architectural segments, work products, repositories, best practices and standards.
	11.2 LO 2: Describe business reasons for developing an enterprise architecture (EA) and discuss benefits that can be derived from successful implementation of a sound EA.
	11.2 LO 3: Describe the major components or layers of an architecture and their integration, to include the business, data and technology layers.
	11.2 LO 4: Describe the relationship between enterprise architecture and ongoing developments in creating web services (such as service oriented architecture), as well as current mainstream standards for web-based information exchange and enterprise application integration.
	11.2 LO 5: Compare and contrast the dimensions of different architectural frameworks. Discuss Federal and DoD architecture frameworks.
	11.2 LO 6: Describe the purpose and use of reference models in enterprise architecture development.
	11.2 LO 7: Explain the differences among documentation frameworks" (e.g., the Federal Enterprise Architecture Framework (FEAF), the Department of Defense Architecture Framework (DODAF), or the Zachman Framework) and architecture reference models such as those provided in the Federal Enterprise Architecture (FEA).
	11.2 LO 8: Describe how the FEA reference models and profiles support agency IT program analysis and annual status reporting.
	11.2 LO 9: Identify EA best practices for the strategy, technology and business levels of an architecture and demonstrate how to apply them in the implementation and use of the architecture.
	11.2 LO 10: Discuss the need for security and privacy as they relate to, and are integrated into,

	the enterprise architecture. Include issues such as cross-realm security, security consequences of aggregated architectural data, common identity management approaches, and revocation/repudiation mechanisms.
Competency 11.3-Enterprise architecture interpretation, development and maintenance	11.3 LO 1: Discuss how to assess an agency's baseline architecture in terms of its effectiveness in meeting enterprise/strategic goals and performance goals and identify gaps that should be addressed.
	11.3 LO 2: Describe basic architecture documentation (i.e., work product) methodologies at each level of a commonly used framework (e.g., Zachman, FEAF or DODAF).
	11.3 LO 3: Describe how simulation can be used in the development of an enterprise architecture.
	11.3 LO 4: Discuss the purpose and value of automated tools to document and analyze the enterprise architecture.
	11.3 LO 5: Discuss the importance and key aspects of model interpretation in understanding and sharing metadata, integration and component reuse, and achieving interoperability.
	11.3 LO 6: Discuss the benefits and importance of understanding the history of an organization's architecture and the business cases that were used to support it.
	11.3 LO 7: Discuss the strategic planning process and its importance in anticipating and forecasting the impact of future trends on an architecture.
	11.3 LO 8: Compare, contrast and evaluate internal and external sources of information that will assure awareness and understanding of new and emerging technology and its business implications.
	11.3 LO 9: Describe and define the role that architectural principles play in establishing an enterprise's architecture.
Competency 11.4-Use of enterprise architecture in IT investment decision making	11.4 LO 1: Describe the ways in which a strategic plan, annual performance plan, business requirements, architecture standards, and the capital planning and investment control process can drive an agency's or program's acquisition

	strategy.
	11.4 LO 2: Discuss the importance of mapping major IT capital investments to the organization's strategic goals and business line activities, as well as alignment with an agency's enterprise architecture.
	11.4 LO 3: Discuss the leadership challenges associated with organizational embracement of enterprise architecture and how to achieve buy-in from Line of Business owners and senior executives to maintain sufficient resources for an effective enterprise architecture program.
	11.4 LO 4: Describe the potential difficulties in implementing conflicting or competing architectural principles and the need to document the resolution for future reference.
	11.4 LO 5: Given the rate of change often seen in IT, as well as changing agency requirements, describe how an integrated capital planning and enterprise architecture process can help an agency to improve mission performance in the face of such change.
	11.4 LO 6: Describe the relationship between the Federal Enterprise Architecture Reference Models and an agency's capital planning and investment control process. Include a discussion of related sections of OMB Circulars A-11 and A130.
Competency 11.5-Data management	11.5 LO 1: Describe the basic components of a data management program.
	11.5 LO 2: Discuss the criticality of data interoperability to enterprise-wide information exchange, and the role of data standardization in supporting interoperability.
	11.5 LO 3: Discuss how the data architecture can be used to prioritize the elements of a data management program.
	11.5 LO 4: Discuss how the data architecture can be used to improve overall data quality within an agency.
	11.5 LO 5: Identify and discuss the attributes of data quality and how they would be identified in developing a data architecture.

	11.5 LO 6: Describe either the data strategy for OMB (for civilian agencies or DoD's strategy (i.e., Data Reference Model process for defense agencies) and how the strategy impacts the development of the data architecture.
	11.5 LO 7: Describe how the data architecture and related standards can be used in a data management program to promote and facilitate intra- and inter-governmental sharing of data and information.
	11.5 LO 8: Compare and contrast the differences between data management and records management and how they may support one another.
Competency 11.6-Performance measurement for enterprise architecture	11.6 LO 1: Define and describe performance goals and distinguish performance goals from performance standards.
	11.6 LO 2: Discuss and describe the role of IT performance goals and standards with respect to the enterprise/program strategic plan, general goals and performance goals.
	11.6 LO 3: Discuss how automated tools and techniques can be used to establish performance indicators as part of a CIO's "dashboard" for enterprise architecture performance. (See also 5.3 LO 2, 5.5 LO 3, and 5.6 LO 1.)
12.0: Technology Management and Assessment	*General Discussion: Since the inception of the Clinger-Cohen Act, the CIO's role as technology manager has become increasingly complex. The ability to ensure effective development and deployment of technology requires a broad awareness of current and emerging technology capabilities, standards, policies and law. CIOs must also be able to identify and evaluate the strategic benefits of technology applications within the business environment.*
Competency 12.1-Network and telecommunications technology	12.1 LO 1: Explain the capabilities and limitations of data transmission modes and media.
	12.1 LO 2: Evaluate management issues related to the selection of data transmission media.
	12.1 LO 3: Explain data transmission concepts, functions, and mechanisms, *e.g.,* multiplexing,

	common communications protocols, microwave, Very Small Aperture Terminal (VSAT), etc.
	12.1 LO 4: Describe how broader laws, policies and standards have been impacted by current regulation and management of telecommunications technologies.
	12.1 LO 5: Evaluate the benefits and limitations of commonly-used local wired and wireless voice and data communication architectures, devices, and protocols.
	12.1 LO 6: Evaluate the benefits and limitations of commonly-used wide-area wired and wireless voice and data architectures, devices and protocols.
	12.1 LO 7: Describe and assess technological enablers of electronic government and business transformation, *e.g.,* Simple Object Access Protocol (SOAP), Extensible Markup Language (XML), and Service Oriented Architecture.
Competency 12.2- Spectrum management	12.2 LO 1: Define spectrum and evaluate the relationship between federal agency missions and spectrum management.
	12.2 LO 2: Assess the potential impacts on spectrum availability and management arising from increased domestic and international demand.
	12.2 LO 3: Identify and evaluate tools and techniques available for effective spectrum management.
	12.2 LO 4: Identify recognized sources of best practices in spectrum-efficient technologies.
	12.2 LO 5: List and discuss spectrum management architecture issues and interdependencies.
	12.2 LO 6: Discuss supportability requirements that must be met prior to acquisition or modification of a new/existing telecommunications system.
Competency 12.3- Computer systems	12.3 LO 1: Develop plan for managing competing priorities among the portfolio of future hardware initiatives.
	12.3 LO 2: Investigate methods for managing

	hardware obsolescence.
	12.3 LO 3: Outline how to anticipate/forecast hardware requirements when software needs change.
	12.3 LO 4: Articulate process for judging when to upgrade hardware based on emerging software requirements.
	12.3 LO 5: Demonstrate how to manage transitions from legacy systems.
	12.3 LO 6: Describe strategies to manage the changing integration among software.
Competency 12.4- Web technology	12.4 LO 1: Investigate and classify new World Wide Web Consortium standards relative to web technology development.
	12.4 LO 2: Define Extensible Markup Language (XML) standards and use. Relate the XML standards to the Federal Enterprise Architecture (FEA) Data Reference Model (DRM).
	12.4 LO 3: Discuss the use of web technology to support E-Government development.
	12.4 LO 4: Discuss the impact of web technology on privacy.
	12.4 LO 5: Define and evaluate the use of Service Oriented Architectures (SOA) as they relate to web technology development. Relate SOA to the Federal Enterprise Architecture (FEA) Service Component Reference Model (SRM).
	12.4 LO 6: Define and evaluate industry best practices related to development and maintenance of SOA services.
	12.4 LO 7: Evaluate use of existing system sources and architectures to supplement SOA technology development.
	12.4 LO 8: Investigate and evaluate extensions and/or re-use of web technologies to support E-Government development initiatives across federal, state and local governments.
	12.3 LO 9: Analyze and evaluate strategies for retiring legacy systems by using web technologies.
	12.4 LO 10: Explain how performance metrics are

	used to measure the effectiveness of web technology development and deployment.
Competency 12.5-Data management technology	12.5 LO 1: Discuss the evolution of relational database management systems (RDBMS).
	12.5 LO 2: Describe the benefits and applications of data warehouses, as well as the challenges of development, and best practices for a successful implementation.
	12.5 LO 3: Outline the rationale behind data mining and describe the varied uses of data mining.
	12.5 LO 4: Describe the benefits and challenges of enterprise business intelligence.
	12.5 LO 5: Detail the increasing role of XML in data management.
	12.5 LO 6: Discuss Online Analytical Processing (OLAP) and the associated benefit of the use of multidimensional information.
Competency 12.6-Software development technology	12.6 LO1: Discuss the promise and opportunity of SOA and web services and how they might enable new applications.
	12.6 LO 2: Compare the benefits and limitations of open source software with vendor developed software.
	12.6 LO 3: Outline the criteria for determining whether to use COTS or to develop an in-house system. (See also Competency 6.8 on Software development, testing and implementation.)
	12.6 LO 4: Discuss the evolution of enterprise resource planning (ERP) and customer relationship management (CRM), as well as major ERP and CRM implementation challenges and best practices for assuring implementation success.
	12.6 LO 5: Describe the objectives of software assurance, and how best to incorporate them into an information technology organization.
	12.6 LO 6: Detail the growing trend of software as a service, and outline the criteria for deciding to purchase software in this manner.
	12.6 LO 7: Discuss the range of applications made possible by geographic information systems

	(GIS), and the particular challenges of utilizing GIS.
Competency 12.7-Special use technology	12.7 LO 1: Define, discuss and investigate the use of Supervisory Control and Data Acquisition Systems (SCADA) in government systems.
	12.7 LO 2: Define metrics to assess the effectiveness of SCADA systems used in contractor systems.
	12.7 LO 3: Define, discuss and investigate the use of electronic commerce technology to extend E-Government at the federal, state and local government levels.
	12.7 LO 4: Define metrics to assess the effective use of electronic commerce technology.
	12.7 LO 5: Define, discuss and investigate the use of collaborative technology.
	12.7 LO 6: Define metrics to assess the effective use of collaborative technology at all government levels.
	12.7 LO 7: Investigate industry best practices using collaborative technology to support global management and data exchange.
	12.7 LO 8: Define, discuss and investigate the use of modeling and simulation technology.
	12.7 LO 9: Define metrics to assess the effective use of modeling and simulation technology in development and testing of E-Government systems, and contractor systems and products.
	12.7 LO 10: Define, discuss and evaluate Human Computer Interface (HCI) technology. Define use of HCI technology in E-Government initiatives.
	12.7 LO 11: Define metrics to assess the effective use of HCI technology in government systems.
	12.7 LO 12: Research emerging technologies to supplement HCI standards.
	12.7 LO 13: Discuss and evaluate the capabilities of biometric-based personal identification/verification technology.
Competency 12.8-Emerging technology	12.8 LO1: Compare, contrast and evaluate internal and external sources of information that will assure awareness and understanding of new

	and emerging technology and its business implications.
	12.8 LO 2: Since rapidly emerging technology can overwhelm the regulatory responsibilities of a government entity, identify and evaluate approaches and methods to anticipate and forecast emerging and future trends
	12.8 LO 3: Describe strategies for managing competing priorities among the portfolio of future hardware (and related software) initiatives.
	12.8 LO 4: Describe how information technology can be used to gain a competitive advantage and how disruptive technologies might usurp a business marketplace.
	12.8 LO 5: Compare and contrast real options analysis to include the value of flexibility and volatility for risky projects.
	12.8 LO 6: Model scenario planning to cast a wider net of strategic IT projects to prepare for potentially massive changes in the business environment.