System Paradigms – 6%
Domain Scope
1. Skills and tools to gather requirements, source code development, evaluation and integration of components into a single system, and system validation
2. Design, selection, application, deployment, and management of computing systems to support an organization
3. Skills and concepts essential to the administration of operating systems, networks, software, file systems, file servers, web systems, database systems, and system documentation, policies, and procedures
4. Fundamentals of project management and the interplay between IT applications and related organizational processes
5. System integration issues, including integration in a system of systems and federation of systems, role of architectures in systems integration, performance and effectiveness
6. Education and support of users of computing systems.

Domain Competencies
A. Justify the way IT systems within an organization can represent stakeholders using different architectures and the ways these architectures relate to a system lifecycle. *(Requirements and development)*
B. Demonstrate a procurement process for software and hardware acquisition and explain the procedures one might use for testing the critical issues that could affect IT system performance. *(Testing and performance)*
C. Evaluate integration choices for middleware platforms and demonstrate how these choices affect testing and evaluation within the development of an IT system. *(Integration and evaluation)*
D. Use knowledge of information technology and sensitivity to the goals and constraints of the organization to develop and monitor effective and appropriate system administration policies within a government environment. *(System governance)*
E. Develop and implement procedures and employ technologies to achieve administrative policies within a corporate environment. *(Operational activities)*
F. Organize personnel and information technology resources into appropriate administrative domains in a technical center. *(Operational domains)*
G. Use appropriate and emerging technologies to improve performance of systems and discover the cause of performance problems in a system. *(Performance analysis)*

System Paradigms Subdomains
01 Perspectives and impact
(Level 1 minimal degree of engagement)
Competencies:
a. Contrast system integration and system architecture.
b. Explain the system integration from the organizational perspective.

02 Requirements
(Level 2 medium degree of engagement)
Competencies:
a. Compare the various requirements modeling techniques.
b. Contrast between non-functional and functional requirements.
c. Demonstrate the structure of a detailed use case.
d. Express a use case based on relating functional requirements.
e. Illustrate the types of event flows in a use case and under which conditions they occur.
f. Describe how requirements gathering complements a system development lifecycle.
g. Describe how use cases drive testing throughout a system lifecycle.

03 System architecture
(Level 1 minimal degree of engagement)
Competencies:
a. Demonstrate "architecture" in the context of system integration and architecture reflecting IEEE Standard 1471.
b. Justify how complex systems can be represented using architectural views and how this facilitates system evolution over time.
c. Describe how some specific architectural views relate to the system lifecycle.
d. Contrast the SOA, Zachman Framework, ITIL, COBIT, and ISO 20,000 architectural frameworks.
e. Describe how modeling tools support the description and management of architectural views with examples.

04 Acquisition and sourcing
(Level 2 medium degree of engagement)
Competencies:
a. Contrast between build and buy in software and hardware acquisition.
b. Demonstrate the advantages and drawbacks of building and buying in general.
c. Contrast between in-sourcing and out-sourcing for the acquisition of IT services and support.
d. Contrast the advantages and drawbacks of in-sourcing and out-sourcing in general.
e. Demonstrate the importance of testing, evaluation, and benchmarking in any IT sourcing decision.
f. Demonstrate primary components in a request for proposal (RFP).
g. Contrast the advantages and drawbacks of using RFPs in an IT sourcing decision.
h. Express the importance of a well-structured contract in any IT sourcing decision.
i. Given an RFP, justify one or more products that satisfy the criteria of the RFP.

05 Testing and quality assurance
(Level 2 medium degree of engagement)
Competencies:
a. Express different ways for current testing standards.
b. Demonstrate the various components of usability testing.
c. Express different ways to execute and evaluate an acceptance test.

06 Integration and deployment
(Level 2 medium degree of engagement)
Competencies:
a. Express different ways for middleware platforms.
b. Demonstrate the advantages and disadvantages of some middleware platforms.
c. Justify major considerations for the selection of an enterprise integration platform.
d. Express different ways of integration using the "wrapper" approach.
e. Express different ways of integration using the "glue code" approach.
f. Describe how a framework facilitates integration of components.
g. Describe how the data warehouse concept relates to enterprise information integration.
h. Describe how integration choices affect testing and evaluation.

07 System governance
(Level 2 medium degree of engagement)
Competencies:
a. Compare alternative vendors of systems resources and justify a selection.
b. Develop policies for a networked system in an application domain (e.g., health care organization).
c. Develop policies for a network that includes low capacity embedded devices (e.g., a smart home).
d. Develop a disaster recovery plan for a small enterprise.

08 Operational activities
(Level 3 large degree of engagement)
Competencies:
    a. Design and implement a user and group administrative structure that allows users to use system resources effectively.
    b. Design and construct development resources regarding administrative policies for different types of users.
    c. Develop and monitor project plans for major system administration activities.
    d. Install, configure, and test appropriate software and other resources.
    e. Install, configure, and test automated device management technologies.
    f. Design and implement a backup and restore strategy for a system.

09 Operational domains
(Level 3 large degree degree of engagement)
Competencies:
    a. Describe the scope of each operational domain in a system.
    b. Develop and justify policies for each domain that allow for smooth interaction between domains without sacrificing security.
    c. Develop and justify resource allocation plans for various operational domains.

10 Performance analysis
(Level 1 minimal degree of engagement)
Competencies:
    a. Design and implement a backup and restore strategy for a system.
    b. Test the veracity of a disaster recovery plan for a small enterprise.
    c. Confirm the accuracy and completeness of a backup.

Note: Level L1 (L1) used within a subdomain indicates a minimal degree of engagement associated with the learning proficiency of the fundamentals of the subdomain.

Levels 2 (L2) and 3 (L3) used within a subdomain indicate medium and large degrees of learning engagement associated with the application and transferring of learning to complex problems and situations.