TOP-LEVEL SUMMARY OF COMPETENCY MODEL FRAMEWORK

FOUNDATION COMPETENCIES TIERS (1-3)

Tier 1: Personal Effectiveness
- Interpersonal Skills & Teamwork
- Integrity
- Professionalism
- Ethics
- Adaptability & Flexibility
- Dependability & Reliability
- Lifelong Learning

Tier 2: Academic Competencies
- Reading
- Writing
- Mathematics
- Science
- Communication: Listening & Speaking
- Critical and Analytic Thinking
- Basic Computer Skills

Tier 3: Workplace Competencies
- Collaboration
- Planning & Organizing
- Innovative Thinking
- Problem Solving & Decision Making
- Working with Tools & Technology
- Business Fundamentals

Tier 4: Industry-Wide Technical Competencies
- Principles of Information Technology
- Information Management
- Networks & Mobility
- Software Development
- User & Customer Support
- Digital Media
- Compliance
- Security & Data Integrity
Tier 1—Personal Effectiveness Competencies

<table>
<thead>
<tr>
<th>1. Interpersonal Skills &amp; Teamwork: Displaying skills to work with others from diverse backgrounds.</th>
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<tbody>
<tr>
<td>▪ Respect the opinions, perspectives, customs, and individual differences of others</td>
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<tr>
<td>▪ Interact appropriately and respectfully with supervisors and coworkers</td>
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<tr>
<td>▪ Use appropriate strategies and solutions for dealing with conflicts and differences to maintain a smooth workflow</td>
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<table>
<thead>
<tr>
<th>2. Integrity: Displaying accepted social and work behaviors.</th>
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<tbody>
<tr>
<td>▪ Treat others with honesty, fairness, and respect</td>
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<tr>
<td>▪ Comply with ethical standards for your field</td>
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<tr>
<td>▪ Take responsibility for accomplishing work goals within accepted timeframes</td>
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<tr>
<td>▪ Accept responsibility for one’s decisions and actions</td>
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<thead>
<tr>
<th>3. Professionalism: Maintaining a professional demeanor at work.</th>
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<tr>
<td>▪ Demonstrate emotional intelligence</td>
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<tr>
<td>▪ Demonstrate self-control by maintaining composure and dealing calmly with stressful situations</td>
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<tr>
<td>▪ Accept criticism and attempt to learn from mistakes</td>
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<tr>
<td>▪ Demonstrate positive attitude towards work</td>
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<tr>
<td>▪ Dress appropriately for occupation and maintain appropriate personal hygiene</td>
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<td>▪ Refrain from substance abuse</td>
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<tr>
<th>4. Ethics: Demonstrating a willingness to work.</th>
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<tbody>
<tr>
<td>▪ Pursue work with energy, drive, and effort to accomplish tasks</td>
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<tr>
<td>▪ Demonstrate discipline by persisting at a task despite interruptions, obstacles, or setbacks</td>
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<tr>
<td>▪ Take initiative in seeking out new responsibilities and work challenges</td>
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<tr>
<td>▪ Establish and maintain personally challenging, but realistic work goals</td>
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<tr>
<td>▪ Strive to exceed standards and expectations</td>
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<thead>
<tr>
<th>5. Adaptability &amp; Flexibility: Displaying the capability to adapt to new, different, or changing requirements.</th>
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<tbody>
<tr>
<td>▪ Perform more than one task at a time while maintaining the ability to follow each task through to completion</td>
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<tr>
<td>▪ Deal with ambiguity by changing gears in response to unpredictable or unexpected events, pressures, situations, and job demands</td>
</tr>
<tr>
<td>▪ Effectively change plans, goals, actions, or priorities to deal with changing situations</td>
</tr>
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</table>
6. **Dependability & Reliability**: Displaying responsible behaviors at work.

- Behave consistently, predictably, and reliably
- Fulfill obligations, complete assignments, and meet deadlines
- Follow written and verbal directions
- Comply with organizational rules, policies, and procedures

7. **Lifelong Learning**: Displaying a willingness to learn and apply new knowledge and skills.

- Demonstrate an interest and willingness to pursue personal and professional lifelong learning and development
- Treat unexpected circumstances as opportunities to learn and adopt new techniques
- Seek feedback and modify behavior for improvement
- Broaden knowledge and skills through science fairs, reading publications, job shadowing, and continuing education
- Use newly learned knowledge and skills to complete specific tasks
- Take charge of personal career development by identifying personal interests and career pathways
**IT Sector Competency Model**

*INDUSTRY-DRIVEN COMPETENCY MODEL FRAMEWORK*

**Tier 2—Academic Competencies**

<table>
<thead>
<tr>
<th>1. <strong>Reading:</strong> Understanding written sentences and paragraphs in work-related documents.</th>
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</thead>
<tbody>
<tr>
<td>- Locate, understand, and interpret written technical and non-technical information in documents such as manuals, reports, memos, graphs, charts, tables, schedules, and signs</td>
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<tr>
<td>- Identify relevant details, facts, specifications, and main ideas</td>
</tr>
<tr>
<td>- Understand the essential message and purpose of written materials</td>
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<tr>
<td>- Infer or locate meaning of unknown or technical vocabulary</td>
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<thead>
<tr>
<th>2. <strong>Writing:</strong> Using standard English to compile information and prepare written reports.</th>
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<tbody>
<tr>
<td>- Use correct English spelling, grammar, and punctuation to produce logical and accurate written correspondence, instructions, and documentation</td>
</tr>
<tr>
<td>- Communicate thoughts, ideas, information, and messages, which may contain technical material, in a logical, organized, and coherent manner</td>
</tr>
<tr>
<td>- Create documents such as letters, directions, manuals, reports, graphs, and flow charts</td>
</tr>
<tr>
<td>- Write words, numbers, sentences, reports, and data using technical terminology and notations</td>
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<tr>
<td>- Explain complex ideas to technical and nontechnical audiences</td>
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<thead>
<tr>
<th>3. <strong>Mathematics:</strong> Using mathematics to express ideas and solve problems.</th>
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</thead>
<tbody>
<tr>
<td>- Know and apply mathematical principles:</td>
</tr>
<tr>
<td>- Number Systems and Relationships - whole numbers, decimals, fractions, binary, octal, and hexadecimal numbers</td>
</tr>
<tr>
<td>- Arithmetic – arithmetic operations on numbers, percentages, square root, exponentiation, and logarithmic functions</td>
</tr>
<tr>
<td>- Plane and Solid Geometry – distance, perimeter, area, and volume</td>
</tr>
<tr>
<td>- Measurement – measurement of length, mass, time, systems of measurement, units, and conversion between systems (e.g. from English to metric)</td>
</tr>
<tr>
<td>- Mathematical Notation - the language of mathematics to express mathematical ideas</td>
</tr>
<tr>
<td>- Mathematical Reasoning and Problem Solving – inductive and deductive reasoning, conjectures, arguments, strategies, and interpretation of results</td>
</tr>
<tr>
<td>- Elementary Statistics and Laws of Probability – mean, median, and standard deviation</td>
</tr>
<tr>
<td>- Elementary Algebra and Trigonometry – symbols, equations, and functions</td>
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| 4. **Science:** Using scientific rules and methods to solve problems. |
### IT Sector Competency Model

**INDUSTRY-DRIVEN COMPETENCY MODEL FRAMEWORK**

- Understand the scientific method (identify problems, collect information, form and validate hypotheses, draw conclusions) and apply basic scientific research
- Apply basic scientific principles to work-related problems
  - Physical
  - Chemical
  - Biological
  - Environmental
  - Technological

### 5. Communication—Listening & Speaking: Giving full attention to what others are saying and speaking in English well enough to be understood by others.

**Listening**
- Receive, attend to, interpret, understand, and respond to verbal messages and other cues
- Apply active listening skills using reflection, restatement, questioning, and clarification
- Pick out important information in verbal messages
- Understand complex instructions

**Speaking/Presenting**
- Speak clearly and confidently using common English conventions including proper grammar, tone, and pace
- Express information to individuals or groups taking into account the audience and the nature of the information (e.g., explain technical concepts to non-technical audiences)
- Present ideas in a persuasive manner

### 6. Critical & Analytical Thinking: Using logic, reasoning, and analysis to address problems.

- Use the principles of logic to make valid inferences and analyze problems
- Use inductive and deductive reasoning to analyze, synthesize, compare, and interpret information
- Draw conclusions from relevant or missing information
- Understand the underlying relationship among facts and connections between issues
- Organize problems into manageable parts

### 7. Basic Computer Skills: Using a computer and related applications to input and retrieve information.
## Basic Computer Knowledge
- Understand and efficiently use basic computer hardware (e.g. PCs, printers) and software (e.g. word processing software, spreadsheet software) to perform tasks
- Understand common computer terminology (e.g., program, operating system) and be familiar with the fundamental capabilities of computers
- Demonstrate technological fluency

## Desktop Applications
- Use word processing programs to compose, organize, and edit simple documents and other business communications
- Use electronic mail to communicate and Internet applications to search for information
- Use spreadsheet, database, and presentation software
- Enter data and type materials quickly and accurately
- Double check work carefully and identify/correct typographical errors
- Manage file storage: use functions to store, retrieve, and sort detailed records
Tier 3—Workplace Competencies

   - Accept membership in and identify with the goals of a team
   - Work effectively with multi-disciplinary teams
   - Identify roles of team members and effectively communicate with all members of the team
   - Collaborate with others to formulate team objectives and develop consensus for best outcome
   - Use teamwork skills to achieve goals, solve problems, and manage conflict
   - Give and receive feedback constructively
   - Be open to considering new ways of doing things and the merits of new approaches to work
   - Strive for cross functional effectiveness
   - Leverage the strengths of others to accomplish a common goal
   - Participate on virtual teams
   - Respect cultural diversity

2. Planning & Organizing: Planning and prioritizing work to manage time effectively and accomplish assigned tasks.

   Planning & Organizing
   - Approach work in a methodical manner
   - Apply effective organizational skills
   - Keep track of details to ensure work is performed accurately and completely
   - Find new ways of organizing or planning work to accomplish tasks more efficiently

   Project Management
   - Develop and implement a plan for a project
   - Develop a timeline for sequencing the activities of a project
   - Keep track of time and resources
   - Anticipate obstacles
   - Keep all parties informed of progress and all relevant changes to project timelines
   - Engage in parallel-processing to keep multiple tasks moving forward

   Time Management
   - Establish specific goals to accomplish work in a timely manner
   - Prioritize various competing tasks and perform them efficiently according to their urgency
   - Ensure that others receive needed materials in time
   - Stay on schedule

3. Innovative Thinking: Generating innovative and creative solutions.

**Identify the Problem**
- Anticipate or recognize the existence of a problem
- Identify the nature of the problem by analyzing its component parts and defining critical issues
- Locate, obtain, and review information relevant to the problem

**Generate Alternatives**
- Generate a variety of approaches to the problem
- Think creatively to develop new ideas for and answers to work related problems
- Use logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems
- Apply concepts of probability to help make decisions
- Exercise good judgment

**Choose and Implement a Solution**
- Decisively choose the best solution after contemplating available approaches to the problem
- Commit to a solution in a timely manner
- Use strategies, tools, resources, and equipment to implement the solution
- Observe and evaluate the outcomes of implementing the solution to assess the need for alternative approaches and to identify lessons learned

### 5. Working with Tools & Technology: Selecting, using, and maintaining tools and technology to facilitate work activity.
## Selection & Application
- Identify, select, and apply tools or technological solutions appropriate to the task at hand (e.g., use statistical tools to show reliability of data)
- Identify potential hazards or risks related to the use of tools and equipment
- Operate tools and equipment in accordance with established operating procedures and safety standards
- Use information technology and computer applications as it supports the gathering, storage, manipulation, and transfer of data and information

## Keeping Current
- Demonstrate an interest in learning about new and emerging tools and technologies
- Identify sources of information concerning state-of-the-art tools, equipment, materials, technologies and methodologies
- Seek out opportunities to improve knowledge of tools and technologies that may assist in streamlining work and improving productivity

## Maintenance
- Perform routine maintenance on tools, technology, and equipment
- Determine causes of operating errors and decide what to do about it
- Troubleshoot maintenance problems in accordance with established procedures

IT Sector Competency Model

INDUSTRY-DRIVEN COMPETENCY MODEL FRAMEWORK

Situational Awareness
- Understand trends in the industry and the company’s position in the market
- Recognize one’s role in the functioning of the company and understand the potential impact one’s own performance can have on the success of the organization
- Stay current on organizational strategies to maintain competitiveness

Business Practices
- Apply effective people and project management skills
- Use product improvement techniques
- Comply with the norms of conventional business etiquette

Business Ethics
- Act in the best interest of the company, the community, and the environment
- Comply with applicable laws and rules governing work and report loss, waste, or theft of company property to appropriate personnel
- Demonstrate professional ethics to protect the privacy of the client and preserve the integrity of the profession

Global Awareness
- IT supports globalization – intellectual work delivered at any time
- Effective response to business need
- Support innovation
- Global standards and standardization
Tier 4—Industry-Wide Technical Competencies

<table>
<thead>
<tr>
<th>Critical Work Functions:</th>
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<tr>
<td>• Information Management</td>
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<tr>
<td>• IT Financial Management</td>
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<tr>
<td>• Networking</td>
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<tr>
<td>• Software Development</td>
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<tr>
<td>• Search</td>
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<tr>
<td>• Systems Development Life Cycle</td>
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<tr>
<td>• User and Customer Support</td>
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<tr>
<td>• Visual Communications</td>
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<tr>
<td>• Web Systems and Technologies</td>
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</table>
Technical Content Areas:

Business Process Management
- Business activity management
- Business process management green IT (efficient use of computing resources)
- Change management
- Content management
- Document management
- Imaging
- Process improvement (Lean/Six-Sigma)
- Process modeling
- System process integration

IT Organizational Structure
- The IT firm/organization
- IT support within a company
- Support for business solutions

Platform Technologies
- Architecture and organization
- Computing infrastructures
- Enterprise deployment software
- Firmware
- Global standards
- Hardware
- Open source
- Operating systems

Systems Administration and Maintenance
- Administrative activities
- Administrative domains
- Applications

Systems Integration and Architecture
- Acquisition and sourcing
- Architecture
- Integration and deployment
- Organizational context
- Requirements

Testing and quality assurance

Analytics
Key performance indicators
Optimization
2. **Information Management**: The use of technology to control and safeguard the collection, organization, structure, processing and delivery of information.

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<th>Critical Work Functions:</th>
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<tbody>
<tr>
<td>- Analyze and Design Databases</td>
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<tr>
<td>- Business Intelligence</td>
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<tr>
<td>- Content Management</td>
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<tr>
<td>- Develop and Implement Databases</td>
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<tr>
<td>- Maintain Quality Assurance</td>
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<tr>
<td>- Perform Database Administration and Maintenance</td>
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<td>- Perform Database Testing</td>
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<tr>
<td>- Performance Analytics</td>
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<tr>
<td>- Provide Data Assurance</td>
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</table>
Technical Content Areas:

Business Intelligence
- Competitive intelligence
- Data analytics
- Data mining
- Predictive data modeling
- Web analytics

Data Administration
- Concepts and fundamentals of data management
- Content management – finding, sourcing, editing it
- Data integration
- Data modeling

Database Management
- Data architecture
- Data recovery
- Data search
- Data storage
- Database query languages
- Managing the database environment
- Metadata
- Semantic Web
- Special-purpose databases

3. Networks & Mobility: The processes, hardware, and software employed to facilitate communication between computer systems and devices.

Critical Work Functions:
- Design Local Area, Wide Area, and Virtual Networks
- Install and Expand New Facilities
- Optimize and Maintain Network Software and Hardware
- Manage, Administer and Secure Local Area Networks
- Perform Network Infrastructure Troubleshooting
Technical Content Areas:

- Application areas
- Foundations of networking
- LANS, WANS, virtual networks
- Mobile media
- Network management
- Physical layer
- Protocols (e.g. TCP, UDP, VoIP)
- Routing and switching
- Security
- Wireless

4. **Software Development**: The process of writing, testing, debugging/troubleshooting, and maintaining the source code of computer programs.

Critical Work Functions:

- Analyze, Design, Develop, Adapt, Test and Maintain computer and Internet-based Applications
- Apply Principles of User-centered Design to Increase the Usability
- Establish and Maintain Consistency of a Product’s Performance and its Functional and Physical Attributes with its Requirements, Design, and Operational Information Throughout its Life Cycle
- Implement, Support and Maintain Applications
- Test and Validate Applications
Technical Content Areas:

Application Architecture
- Configuration and adaptation
- Deployment
- Global standards
- Patterns
- Risk management
- Scalability
- Standards
- Strategies

Development/Programming Fundamentals
- Data structures (list, vector, array, stack, queue, tree, graph)
- Algorithms (sorting, searching)
- Basic programming constructs (assignment, arithmetic expressions, loops, conditions, input/output, error handling)
- Event-driven programming
- Object oriented programming
- Programming concurrent processes
- User interface/user experience (UI/UX)

Development/Programming Technologies
- Data mapping and exchange
- Familiarity with multiple programming languages
- Integrative coding
- Inter-systems communications
- Parallel systems development/programming
- Scripting techniques
- Software security practices

Social Networking Services
- Business/educational/personal networks
- Internal/external services
- Privacy/security
- Social capital

Web Development
- Quality assurance
- Technical content
- Web site design
5. **User & Customer Support**: The range of services providing assistance and technical support to help users implement and solve problems related to computer technology.

**Critical Work Functions:**
- Assess User Needs
- Deploy Hardware/Software
- Monitor Metrics and Performance
- Provide Customer Service and Support
- Provide Training on New Hardware/Software
- Troubleshoot Problems

**Technical Content Areas:**

**Engagement**
- Communicating with the user
- Community architecture
- Content development and categorization
- Engagement success metrics
- Gadgets
- Inventory and audit of content assets

**Helpdesk Functions**
- Administrative activities
- Application support
- Asset management
- Computing infrastructures and networks
- Configuration management
- Incident and problem management
- Operating systems
- Release management
- Systems administration, monitoring, and maintenance
- Strategies for engaging the community
- User participation guidelines/ground rules

6. **Digital Media**: Conveyance of ideas and information in forms such as presentation of audio, text, pictures, diagrams, photos, et cetera.
### Critical Work Functions:
- Design, Edit and Develop Audio, Video, Graphic and Animations
- Use Specialized Software Applications to Create Digital Media for Kiosks, Computer Applications, Websites, Print Media, Broadcast Media And Entertainment
- Visualize Graphic Representation of Concepts or Data

### Technical Content Areas:
- Digital media application test and implementation
- Digital media design
- Digital media production and acquisition
- Gaming
- Graphics
- Multi-media technology
- Multi-user applications
- Streaming technologies
- Utilization and optimization
- Videos and dialogues
- Visual and functional design

### 7. Compliance:
The standards, processes, and procedures in place to ensure that products comply with regulatory requirements.

### Critical Work Functions:
- Conduct Business Within the Standards of Corporate Ethics and Compliance
- Develop Measures to Ensure that Data and Information Systems Comply With Federal, State, Local Laws and Regulations, and Third Party Guidelines
- Develop Measures to Protect Confidential Data
- Follow Governance, Risk Management and Compliance Procedures
Technical Content Areas:

Compliance Standards
- Global standards
- Internet standards

Important Topics
- Intellectual property
- Professional ethics
- Safeguarding confidential data

Public Policy
- Client program management operations (PMO)
- Code of Federal Regulations (CFR)
- ISO requirements
- State and local laws

8. Security & Data Integrity: The standards, issues, and applications used to protect information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction.

Critical Work Functions:
- Assure data and information systems are available to authorized uses
- Ensure data integrity
- Protect data and information systems from accidental disclosure or destruction
- Protect data and information systems from unauthorized access or modification
- Protect data and information systems vulnerable to inappropriate use or malicious compromise
### Technical Content Areas:

#### Data Accessibility
- Fundamentals of data security
- Operational issues
- Policy development
- User and customer support

#### Data Integrity
- Business continuity
- Disaster recovery
- Encryption
- ID management
- Information states
- Redundancy

#### Security Clearance
- US Citizenship (if required)

#### Threats
- Attacks
- Forensics
- Security domains
- Security mechanisms
- Security services
- Security tools
- Threat analysis model
- Vulnerabilities