### Florida Department of Education Statewide Course Numbering System

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#### CTS 120 - SECURITY+

Institutions Statewide Course Detail

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Statewide Course Detail

Discipline 010

**Discipline Title** COMPUTER SCIENCE & COMPUTING TECHNOLOGIES

**Discipline Definition** THIS DISCIPLINE INCLUDES THE FOLLOWING PREFIXES: CAP -

COMPUTER APPLICATIONS DEVELOPMENT; CDA - COMPUTER DESIGN/ARCHITECTURE; CEN - COMPUTER SOFTWARE ENGINEERING; CGS - COMPUTER GENERAL STUDIES; CIS - COMPUTER SCIENCE AND

INFORMATION SYSTEMS; CNT - COMPUTER NETWORKS; COP -COMPUTER PROGRAMMING; COT - COMPUTING THEORY; CTS -COMPUTER TECHNOLOGY AND SKILLS; IDC - INTERDISCIPLINARY COMPUTING. COURSES LISTED UNDER THE CAP, CDA, CEN, CIS, CNT, COP AND COT PREFIXES ARE INTENDED FOR STUDENTS WHO ARE PURSUING DEGREE PROGRAMS. THE CGS, CTS AND IDC PREFIXES ARE USED FOR COMPUTER COURSES THAT MAY OR MAY NOT BE INTENDED FOR NON-MAJORS. COURSES USING THE COMPUTER MERELY AS A TOOL BUT NOT REQUIRING COMPUTER SKILLS PER SE SHOULD BE IDENTIFIED

WITH ANOTHER DISCIPLINE OR SUBJECT.

**Prefix** CTS

**Prefix Title** COMPUTER TECHNOLOGY AND SKILLS

**Prefix Definition** COURSES FOCUSING ON CAREER AND TECHNICAL SKILL DEVELOPMENT,

CERTIFICATION, AND VENDOR/BRAND-SPECIFIC SKILLS.

100-199 Century

**Century Title** TECHNOLOGY CONCEPTS

Decade 120-129

**Decade Title** SECURITY CERTIFICATION

**Statewide Course** 120

**Statewide Course Title** SECURITY+ Status

GUARANTEED TRANSFER TO INSTITUTION OFFERING SAME COURSE. Transfer

**Course Intent** LOWER

**Prerequisites** NO NE **Corequisites** NO NE

**Profile Description** THIS COURSE IS DESIGNED TO PROVIDE A STUDENT WITH A BROAD-

BASED KNOWLEDGE OF NETWORK SECURITY, AND TO PREPARE STUDENTS FOR FURTHER STUDY IN SPECIALIZED SECURITY FIELDS. THIS COURSE WILL ALSO PREPARE THE STUDENT TO TAKE THE COMPTIA

SECURITY+ CERTIFICATION EXAM.

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#### CTS 120 - SECURITY+

Institution	s Statewide C	ourse Detail	Locate State	wide Course 🧓
Institutio	n List		Page 1 / 1	
Institutio	n Course Number	Course Title	Course Status	Effective Date
BRE	CTS 2120C	NETWORK SECURITY FUNDAMENTALS	ACTIVE	08/02/2007
BRO	CTS 2120C	SECURITY+	ACTIVE	08/01/2010
CC	CTS 1120	INTRODUCTION TO NETWORK SECURITY	ACTIVE	08/01/2012
CF	CTS 2120	SECURITY FUNDAMENTALS	ACTIVE	08/01/2011
FSCJ	CTS 1120	FUNDAMENTALS OF INFORMATION SECURITY	ACTIVE	01/10/2010
GCSC	CTS 1120	COMPUTER AND NETWORK SECURITY (SECURITY+)	ACTIVE	08/01/2011
MDC	CTS 1120	FUNDAMENTALS OF NETWORKING SECURITY	ACTIVE	08/02/2009
PEN	CTS 2120C	SECURITY +	ACTIVE	08/02/2011
PHCC	CTS 1120	INTRODUCTION TO NETWORK SECURITY	ACTIVE	08/02/2009
SEMINOLE	CTS 1120	INTRODUCTION TO INTERNETWORKING SECURITY (SECURITY	ACTIVE	08/02/2009
SPC	CTS 1120	INTRODUCTION TO NETWORK SECURITY FOUNDATIONS	ACTIVE	07/24/2010
VC	CTS 1120	INTRODUCTION TO NETWORK SECURITY	ACTIVE	08/01/2012

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LAST REVIEW: **NEXT REVIEW: 2014-2015 STATUS:** A (A, I, D)

(i.e. 2003-2004)

**COURSE TITLE:** Security+

**COMMON COURSE NUMBER: CTS2120C** 

**CREDIT HOURS: 4** CONTACT HOUR BREAKDOWN

(per 16 week term)

**CLOCK HOURS:** Lecture: 48 Lab: 16

(Voc. Course ONLY) Clinic: 0 Other: 0

**PREREQUISITE(S):** CTS1134C (with a grade of C or higher)

**COREQUISITE(S):** 

**PRE/COREQUISITE(S):** 

#### **COURSE DESCRIPTION** (750 characters, maximum):

This course provides the student with an understanding of the computer, network, infrastructure, and information security issues faced by industry worldwide. Expertise necessary to combat and protect intellectual property from theft and destruction are also developed. The skills developed by students who complete this course will prepare them for the Security+ certification exam.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

#### **UNIT TITLES**

- 1. Systems Security
- 2. Network Infrastructure
- 3. Access Control
- 4. Assessments & Audits
- 5. Cryptography
- 6. Organizational Security



#### **EVALUATION:**

Please provide a brief description (250 characters maximum) that details how students will be evaluated on the course outcomes.

Evaluation instruments will include written and/or skills-based examinations and individual in-class and/or take-home assignments. Evaluation methods may also include group in-class and/or take-home assignments.

Common Course Number: CTS2120C

#### **UNITS**

#### Unit 1

#### **General Outcome:**

1.0 The student shall: Understand Systems Security

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Differentiate among various systems security threats.
  - Privilege escalation
  - Virus
  - Worm
  - Trojan
  - Spyware
  - Spam
  - Adware
  - Rootkits
  - Botnets
  - Logic bomb
- 1.2 Explain the security risks pertaining to system hardware and peripherals.
  - BIOS
  - USB devices
  - Cell phones
  - Removable storage
  - Network attached storage
- 1.3 Implement OS hardening practices and procedures to achieve workstation and server security.
  - Hotfixes
  - Service packs
  - Patches
  - Patch management
  - Group policies
  - Security templates
  - Configuration baselines



### 1.4 Carry out the appropriate procedures to establish application security.

- ActiveX
- Java
- Scripting
- Browser
- Buffer overflows
- Cookies
- SMTP open relays
- Instant messaging
- P2P
- Input validation
- Cross-site scripting (XSS)

#### 1.5 Implement security applications.

- HIDS
- Personal software firewalls
- Antivirus
- Anti-spam
- Popup blockers

1.6 Explain the purpose and application of virtualization technology.



Common Course Number: CTS2120C

#### Unit 2

#### **General Outcome:**

2.0 The student shall: Understand Network Infrastructure

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Differentiate between the different ports & protocols, their respective threats and mitigation techniques.
  - Antiquated protocols
  - TCP/IP hijacking
  - Null sessions
  - Spoofing
  - Man-in-the-middle
  - Replay
  - DOS
  - DDOS
  - Domain Name Kiting
  - DNS poisoning
  - ARP poisoning
- 2.2 Distinguish between network design elements and components.
  - DMZ
  - VLAN
  - NAT
  - Network interconnections
  - NAC
  - Subnetting
  - Telephony
- 2.3 Determine the appropriate use of network security tools to facilitate network security.
  - NIDS
  - NIPS
  - Firewalls
  - Proxy servers
  - Honeypot
  - Internet content filters
  - Protocol analyzers
- 2.4 Apply the appropriate network tools to facilitate network security.
  - NIDS
  - Firewalls
  - Proxy servers



- Internet content filters
- Protocol analyzers
- 2.5 Explain the vulnerabilities and mitigations associated with network devices.
  - Privilege escalation
  - Weak passwords
  - Back doors
  - Default accounts
  - DOS
- 2.6 Explain the vulnerabilities and mitigations associated with various transmission media.
  - Vampire taps
- 2.7 Explain the vulnerabilities and implement mitigations associated with wireless networking.
  - Data emanation
  - War driving
  - SSID broadcast
  - Blue jacking
  - Bluesnarfing
  - Rogue access points
  - Weak encryption



Common Course Number: CTS2120C

#### Unit 3

#### **General Outcome:**

3.0 The student shall: Understand Access Control

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Identify and apply industry best practices for access control methods.
  - Implicit deny
  - Least privilege
  - Separation of duties
  - Job rotation
- 3.2 Explain common access control models and the differences between each.
  - MAC
  - DAC
  - Role & Rule based access control
- 3.3 Organize users and computers into appropriate security groups and roles while distinguishing between appropriate rights and privileges.
- 3.4 Apply appropriate security controls to file and print resources.
- 3.5 Compare and implement logical access control methods.
  - ACL
  - Group policies
  - Password policy
  - Domain password policy
  - User names and passwords
  - Time of day restrictions
  - Account expiration
  - Logical tokens
- 3.6 Summarize the various authentication models and identify the components of each.
  - One, two and three-factor authentication
  - Single sign-on



#### 3.7 Deploy various authentication models and identify the components of each.

- Biometric reader
- RADIUS
- RAS
- LDAP
- Remote access policies
- Remote authentication
- VPN
- Kerberos
- CHAP
- PAP
- Mutual
- 802.1x
- TACACS

### 3.8 Explain the difference between identification and authentication (identity proofing).

#### 3.9 Explain and apply physical access security methods.

- Physical access logs/lists
- Hardware locks
- Physical access control ID badges
- Door access systems
- Man-trap
- Physical tokens
- Video surveillance camera types and positioning



Common Course Number: CTS2120C

#### Unit 4

#### **General Outcome:**

4.0 The student shall: Understand Assessments & Audits

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1 Conduct risk assessments and implement risk mitigation.
- 4.2 Carry out vulnerability assessments using common tools.
  - Port scanners
  - Vulnerability scanners
  - Protocol analyzers
  - OVAL
  - Password crackers
  - Network mappers
- 4.3 Within the realm of vulnerability assessments, explain the proper use of penetration testing versus vulnerability scanning.
- 4.4 Use monitoring tools on systems and networks and detect security-related anomalies.
  - Performance monitor
  - Systems monitor
  - Performance baseline
  - Protocol analyzers
- 4.5 Compare and contrast various types of monitoring methodologies.
  - Behavior-based
  - Signature-based
  - Anomaly-based
- 4.6 Execute proper logging procedures and evaluate the results.
  - Security application
  - DNS
  - System
  - Performance
  - Access
  - Firewall
  - Antivirus
- 4.7 Conduct periodic audits of system security settings.
  - User access and rights review
  - Storage and retention policies
  - Group policies.



Common Course Number: CTS2120C

#### Unit 5

#### **General Outcome:**

5.0 The student shall: Understand Cryptography

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

#### 5.1 Explain general cryptography concepts.

- Key management
- Steganography
- Symmetric key
- Asymmetric key
- Confidentiality
- Integrity and availability
- Non-repudiation
- Comparative strength of algorithms
- Digital signatures
- Whole disk encryption
- Trusted Platform Module (TPM)
- Single vs. Dual sided certificates
- Use of proven technologies

#### 5.2 Explain basic hashing concepts and map various algorithms to appropriate applications.

- SHA
- MD5
- LANMAN
- NTLM

#### 5.3 Explain basic encryption concepts and map various algorithms to appropriate applications.

- DES
- 3DES
- RSA
- PGP
- Elliptic curve
- AES
- AES256
- One time pad
- Transmission encryption (WEP TKIP, etc)



#### 5.4 Explain and implement protocols.

- SSL/TLS
- S/MIME
- PPTP
- HTTP vs. HTTPS vs. SHTTP
- L2TP
- IPSEC
- SSH

#### 5.5 Explain core concepts of public key cryptography.

- Public Key Infrastructure (PKI)
- Recovery agent
- Public key
- Private keys
- Certificate Authority (CA)
- Registration
- Key escrow
- Certificate Revocation List (CRL)
- Trust models

#### 5.6 Implement PKI and certificate management.

- Public Key Infrastructure (PKI)
- Recovery agent
- Public key
- Private keys
- Certificate Authority (CA)
- Registration
- Key escrow
- Certificate Revocation List (CRL)



Common Course Number: CTS2120C

#### Unit 6

#### **General Outcome:**

6.0 The student shall: Understand Organization Security

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

#### 6.1 Explain redundancy planning and its components.

- Hot site
- Cold site
- Warm site
- Backup generator
- Single point of failure
- RAID
- Spare parts
- Redundant servers
- Redundant ISP
- UPS
- Redundant connections

#### 6.2 Implement disaster recovery procedures.

- Planning
- Disaster recovery exercises
- Backup techniques and practices storage
- Schemes
- Restoration

#### 6.3 Differentiate between and execute appropriate incident response procedures.

- Forensics
- Chain of custody
- First responders
- Damage and loss control
- Reporting disclosure of



#### 6.4 Identify and explain applicable legislation and organizational policies.

- Secure disposal of computers
- Acceptable use policies
- Password complexity
- Change management
- Classification of information
- Mandatory vacations
- Personally Identifiable Information (PII)
- Due care
- Due diligence
- Due process
- SLA
- Security-related HR policy
- User education and awareness training

#### 6.5 Explain the importance of environmental controls.

- Fire suppression
- HVAC
- Shielding

#### 6.6 Explain the concept of and how to reduce the risks of social engineering.

- Phishing
- Hoaxes
- Shoulder surfing
- Dumpster diving
- User education and awareness training



#### INTRODUCTION

The CompTIA Security+ Certification is a vendor neutral credential. The CompTIA Security+ exam is an internationally recognized validation of foundation-level security skills and knowledge, and is used by organizations and security professionals around the globe.

The skills and knowledge measured by this examination are derived from an industry-wide Job Task Analysis (JTA) and were validated through a global survey in Q4, 2007. The results of this survey were used to validate the content of the domains and objectives and the overall domain weightings, ensuring the relative importance of the content.

The CompTIA Security+ Certification is aimed at an IT security professional who has:

- A minimum of 2 years experience in network administration with a focus on security
- Day to day technical information security experience
- Broad knowledge of security concerns and implementation including the topics in the domain list below

The table below lists the domain areas measured by this examination and the approximate extent to which they are represented in the examination:

Domain	% of Examination
1.0 Systems Security	21%
2.0 Network Infrastructure	20%
3.0 Access Control	17%
4.0 Assessments & Audits	15%
5.0 Cryptography	15%
6.0 Organizational Security	12%
Total	100%

<sup>\*\*</sup>Note: The lists of examples provided in bulleted format below each objective are not exhaustive lists. Other examples of technologies, processes or tasks pertaining to each objective may also be included on the exam although not listed or covered in this objectives document.

(A list of acronyms used in these Objectives appears at the end of this document.)

Objectives in italics are those objectives that contain content that has changed since the last version of the Security+ exam (2002 Objectives).

### 1.0 Systems Security

#### 1.1 Differentiate among various systems security threats.

- Privilege escalation
- Virus
- Worm
- Trojan
- Spyware
- Spam
- Adware
- Rootkits
- Botnets
- Logic bomb

#### 1.2 Explain the security risks pertaining to system hardware and peripherals.

- BIOS
- USB devices
- Cell phones
- Removable storage
- Network attached storage

### 1.3 Implement OS hardening practices and procedures to achieve workstation and server security.

- Hotfixes
- Service packs
- Patches
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- Group policies
- Security templates
- Configuration baselines

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- Cookies
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- Instant messaging
- P2P
- Input validation
- Cross-site scripting (XSS)

#### 1.5 Implement security applications.

- HIDS
- Personal software firewalls
- Antivirus
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- Popup blockers

#### 1.6 Explain the purpose and application of virtualization technology.

#### 2.0 Network Infrastructure

### 2.1 Differentiate between the different ports & protocols, their respective threats and mitigation techniques.

- Antiquated protocols
- TCP/IP hijacking
- Null sessions
- Spoofing
- Man-in-the-middle
- Replay
- DOS
- DDOS
- Domain Name Kiting
- DNS poisoning
- ARP poisoning

#### 2.2 Distinguish between network design elements and components.

- DMZ
- VLAN
- NAT
- Network interconnections
- NAC
- Subnetting
- Telephony

### 2.3 Determine the appropriate use of network security tools to facilitate network security.

- NIDS
- NIPS
- Firewalls
- Proxy servers
- Honeypot
- Internet content filters
- Protocol analyzers

#### 2.4 Apply the appropriate network tools to facilitate network security.

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  - Blue jacking
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  - Roque access points
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#### 3.0 Access Control

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  - VPN

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- 3.9 Explain and apply physical access security methods.
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  - Door access systems
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  - Video surveillance camera types and positioning
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  - 4.1 Conduct risk assessments and implement risk mitigation.
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- Firewall
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### 5.0 Cryptography

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- Public Key Infrastructure (PKI)
- Recovery agent
- Public key
- Private keys
- Certificate Authority (CA)
- Registration
- Key escrow
- Certificate Revocation List (CRL)
- Trust models

#### 5.6 Implement PKI and certificate management.

- Public Key Infrastructure (PKI)
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- Certificate Revocation List (CRL)

### 6.0 Organizational Security

#### 6.1 Explain redundancy planning and its components.

- Hot site
- Cold site
- Warm site
- Backup generator
- Single point of failure
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- Spare parts
- Redundant servers
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- Reporting disclosure of

#### 6.4 Identify and explain applicable legislation and organizational policies.

Secure disposal of computers

- Acceptable use policies
- Password complexity
- Change management
- Classification of information
- Mandatory vacations
- Personally Identifiable Information (PII)
- Due care
- Due diligence
- Due process
- SLA
- Security-related HR policy
- · User education and awareness training

#### 6.5 Explain the importance of environmental controls.

- Fire suppression
- HVAC
- Shielding

#### 6.6 Explain the concept of and how to reduce the risks of social engineering.

- Phishing
- Hoaxes
- Shoulder surfing
- Dumpster diving
- User education and awareness training

3DES - Triple Digital Encryption Standard

ACL - Access Control List

AES - Advanced Encryption Standard

AES256 – Advanced Encryption Standards 256bit

AH - Authentication Header

ALE - Annualized Loss Expectancy

ARO - Annualized Rate of Occurrence

ARP - Address Resolution Protocol

AUP - Acceptable Use Policy

BIOS - Basic Input / Output System

**BOTS - Network Robots** 

CA - Certificate Authority

CAN - Controller Area Network

CCTV - Closed-circuit television

CERT – Computer Emergency Response Team

CHAP - Challenge Handshake Authentication Protocol

CIRT - Computer Incident Response Team

CRL - Certification Revocation List

DAC - Discretionary Access Control

DDOS - Distributed Denial of Service

DEP - Data Execution Prevention

DES - Digital Encryption Standard

DHCP - Dynamic Host Configuration Protocol

**DLL** - Dynamic Link Library

DMZ - Demilitarized Zone

DNS - Domain Name Service (Server)

DOS - Denial of Service

DSA - Digital Signature Algorithm

EAP - Extensible Authentication Protocol

ECC - Elliptic Curve Cryptography

FTP - File Transfer Protocol

GRE - Generic Routing Encapsulation

HDD - Hard Disk Drive

HIDS - Host Based Intrusion Detection System

HIPS - Host Based Intrusion Prevention System

HTTP - Hypertext Transfer Protocol

HTTPS - Hypertext Transfer Protocol over SSL

HVAC - Heating, Ventilation Air Conditioning

ICMP - Internet Control Message Protocol

ID - Identification

IKE – Internet Key Exchange

IM - Instant messaging

IMAP4 - Internet Message Access Protocol v4

IP - Internet Protocol

IPSEC - Internet Protocol Security

IRC - Internet Relay Chat

ISP - Internet Service Provider

**KDC** - Key Distribution Center

L2TP - Layer 2 Tunneling Protocol

LANMAN – Local Area Network Manager

LDAP - Lightweight Directory Access Protocol

MAC - Mandatory Access Control / Media Access Control

MAC - Message Authentication Code

MAN - Metropolitan Area Network

MBR - Master Boot Record

MD5 - Message Digest 5

MSCHAP – Microsoft Challenge Handshake Authentication

Protocol

MTU - Maximum Transmission Unit

NAC - Network Access Control

NAT - Network Address Translation

NIDS - Network Based Intrusion Detection System

NIPS - Network Based Intrusion Prevention System

NOS - Network Operating System

NTFS - New Technology File System

NTLM - New Technology LANMAN

NTP - Network Time Protocol

OS - Operating System

OVAL - Open Vulnerability Assessment Language

PAP - Password Authentication Protocol

PAT - Port Address Translation

PBX - Private Branch Exchange

PGP - Pretty Good Privacy

PII - Personally Identifiable Information

PKI - Public Key Infrastructure

POTS - Plain Old Telephone Service

PPP - Point-to-point Protocol

PPTP - Point to Point Tunneling Protocol

PTZ - Pan-Tilt-Zoom

RA - Recovery Agent

RAD - Rapid application development

RADIUS - Remote Authentication Dial-in User Server

RAID - Redundant Array of Inexpensive Disks

RAS - Remote Access Server

RBAC - Role Based Access Control

RBAC - Rule Based Access Control

RSA - Rivest, Shamir, & Adleman

S/MIME – Secure / Multipurpose internet Mail Extensions

SCSI - Small Computer System Interface

SHA - Secure Hashing Algorithm

SHTTP - Secure Hypertext Transfer Protocol

SIM - Subscriber Identity Module

SLA - Service Level Agreement

SLE - Single Loss Expectancy

SMTP - Simple Mail Transfer Protocol

SNMP - Simple Network Management Protocol

SONET - Synchronous Optical Network Technologies

SPIM - Spam over Internet Messaging

SSH - Secure Shell

SSL - Secure Sockets Layer

SSO – Single Sign On

STP - Shielded Twisted Pair

TACACS - Terminal Access Controller Access Control System

TCP/IP - Transmission Control Protocol / Internet Protocol

TKIP - Temporal Key Integrity Protocol

TKIP - Temporal Key Interchange Protocol

TLS - Transport Layer Security

TPM - Trusted Platform Module

**UPS - Uninterruptable Power Supply** 

**URL** - Universal Resource Locator

USB - Universal Serial Bus

UTP - Unshielded Twisted Pair

VLAN - Virtual Local Area Network

VoIP - Voice over IP

VPN - Virtual Private Network

VTC - Video Teleconferencing

WAP - Wireless Access Point

WEP - Wired Equivalent Privacy

WIDS – Wireless Intrusion Detection System

WIPS - Wireless Intrusion Prevention System

WPA - Wi-Fi Protected Access