• Detailed Contents •

Preface	χv
Acknowledgments	xix
Chapter 1 • Cyberspace, the Internet, and	
the World Wide Web	1
• CASE STUDY 1.1: The Dark Side of the Internet	3
The Beginning of the Internet and Cyberspace	4
• CASE STUDY 1.2: The First-Ever Web Server	5
The Purpose of the Internet	6
Operations and Management Aspect	6
Social Aspect	7
Commercialization Aspect	7
 LEGAL ISSUE 1.1: Napster: The First File Sharing Program 	8
Vulnerabilities of the Internet	8
What Is a Vulnerability?	9
Time and Space	9
Lack of Barriers to Entry	9 10
Anonymity/Identity Asymmetries of Cyberspace	11
1s and 0s	12
THINK ABOUT IT 1.1	12
What Distinguishes Cyberspace, the Internet,	
and the World Wide Web?	12
• LEGAL ISSUE 1.2: Is It a Crime to Link to Infringed/Illegal Content?	14
WHAT CAN YOU DO? PREPARING FOR THE JOB OF THE FUTURE:	
Careers in Cybercrime and Cybersecurity	14
> Summary	15
➢ Key Terms	15
Discussion Questions	16
> Internet Resources	16
> Further Reading	16
Chapter 2 • What Is Cybersecurity?	17
 THINK ABOUT IT 2.1: What Is Cybersecurity and 	
Why Is It Important?	18
Origins and Nature of Cybersecurity	19
THINK ABOUT IT 2.2: War Games	20
Definitions	20
Definition of Cybersecurity	21
• CASE STUDY 2.1: The Original Hacker: Kevin Mitnick	23

Cybersecurity Policies	24
CASE STUDY 2.2: FusionX	25
Overview of Cyberspace Intrusions	25
Network-Based Attacks	26
CASE STUDY 2.3: Vitek Boden	27
Wireless Attacks	27
Man-in-the-Middle Attacks	28
 LEGAL ISSUE 2.1: Hacking With a Body Count? 	30
Securing Your Wi-Fi in a Wireless World	31
> Summary	31
Key Terms	32
 Discussion Questions 	32
> Internet Resources	32
	32
> Further Reading	
Appendix 2A	34
Chapter 3 • Threat Factors—Computers as Targets	37
• CASE STUDY 3.1: The Top 10 Data Breaches	38
The Evolution of Cybercrime	39
Phases of Convergence	39
Main Targets in Information Technology	. 39
 THINK ABOUT IT 3.1: Russian Cyberspies and the 2016 	
Presidential Election	40
Computers as a Target	42
Threats to Mobile Devices	43
CASE STUDY 3.2: Democratic Election Campaign—Hackers	,,
Steal Campaign Information	44
Viruses, Worms, and Trojan Horses	44
Viruses	44 47
Risks Created by Viruses Risks to Mobile Devices	47
CASE STUDY 3.3: The First Viruses	50
Worms	50 50
LEGAL ISSUE 3.1: The Morris Worm	51
Risks Created by Worms	52
Trojan Horses	53
Risks Created by Trojan Horses	54
• CASE STUDY 3.4: The U.S. Government Firewall Virus	55
Preventing Malware Intrusions	56
Antivirus Software	56
Firewall	57
Thoughtful User Behavior	57
 THINK ABOUT IT 3.2: Pokémon Go, Cybercriminals, 	_
and Cybersecurity	58
Encryption	58
WHAT CAN YOU DO? ENCRYPTING YOUR COMPUTER	60
Future Developments	61

> Summary	61
➤ Key Terms	62
Discussion Questions	62
> Internet Resources	62
> Further Reading	63
r urtiler iteauling	00
Chapter 4 • Threats to Cybersecurity by	
Criminals and Organized Crime	65
Cybercrimes	65
NORSE ATTACK MAP	66
Why Do People Commit Cybercrimes?	66
Fraud and Financial Crimes	66
Consumer Crimes	66
Identity Theft	66
WHAT CAN YOU DO? COUNTER MEASURES—	
PROTECTING YOUR IDENTITY	67
Phishing Scams	68
CASE STUDY 4.1: Advance Fee Fraud—Nigerian Phishing Scam	70
WHAT CAN YOU DO? COUNTERMEASURES TO PHISHING SCAMS	71 71
Spam Banks and Financial Corporations	71 72
Botnets	72
Logic Bombs	73
Viruses	74
Internet-Initiated Sexual Offending and Exploitation	74
Internet-Initiated Sexual Offending	74
Child Pornography	75
• LEGAL ISSUE 4.1	77
Snuff Films	77
Trafficking in Persons	78
• THINK ABOUT IT 4.1: Countermeasures to Child Pornography—	
Operation Predator and Operation Globe	80
Mail-Order Brides	80
Cyberbullying	82
Cyberharassment	82
Cyberstalking	83
Online Denigration	84
Online Impersonation	84
Online Exclusion	84
Tools Used	84
Social Media	84
YouTube	85 85
Gaming • CASE STUDY / 2. Cuberbullying and Suicide	85
CASE STUDY 4.2: Cyberbullying and Suicide	86
> Summary	87
Key Terms	87
Discussion Questions	87

➤ Internet Resources	88
Further Reading	88
en e	
Chapter 5 • Threats to Cybersecurity by Hacktivists and	00
Nation-States	89
 THINK ABOUT IT 5.1: Cyberattacks on the Power Grid 	89
Threats to Cybersecurity	90
Local Threats	91
Types of Insider Threats	91
LEGAL ISSUE 5.1: Corporate Espionage—Inside	93
Security Breach at AMSC National Threats	93 93
National inreats Displeasure With the Government	93
Specific Causes	94
CASE STUDY 5.1: Edward Snowden—Going Dark	95
International Threats	95
CASE STUDY 5.2: The Hacked Company Graveyard	97
CASE STUDY 5.3: Inside the Office of Personnel	
Management Cyber Attack	99
THINK ABOUT IT 5.2: Setting Up a Cyberheist	99
Hackers	100
Evolution of the Term Hacker	100
The Hacker Community	101
"Black Hats," "White Hats," and "Gray Hats"	102
The Internet and the Transparent Citizen	103
 LEGAL ISSUE 5.2: Privacy Versus Security 	104
What Motivates Hackers?	104
THINK ABOUT IT 5.3: Why Do People Have a House Alarm?	105
 LEGAL ISSUE 5.3: California's Breach Notification Statute 	107
Summary	108
Key Terms	108
Discussion Questions	108
> Internet Resources	109
> Further Reading	109
•	
Chapter 6 • National Security:	
Cyberwarfare and Cyberespionage	111
Cyberwarfare	113
Nation-State Threats by Region	113
Syrian Electronic Army	114
Chinese	114
Russia and Eastern Europe	115
 CASE STUDY 6.1: North Korea and the Sony Hack 	116
Cyberespionage	116
Economic Cyberespionage	119
LEGAL ISSUE 6.1: Misappropriation of Information or Espionary	
Political Cyberespionage	120
The Threat of Inciders	120

 CASE STUDY 6.2: GhostNet 	121
 LEGAL ISSUE 6.2: The Fourth Amendment 	121
Cyberintelligence	122
Cybersabotage	122
Denial-of-Service Attacks	124
CASE STUDY 6.3: Rutgers State University—DDoS Attack	124
> Summary	125
Key Terms	125
Discussion Questions	125
➤ Internet Resources	126
> Further Reading	126
Chapter 7 • Cyberterrorism	127
THINK ABOUT IT 7.1: The Future of Terrorist Attacks	127
Cyberterrorism Defined	128
The Role of the Media	130
• CASE STUDY 7.1: Defining Cyberterrorism	
Within the Academic Context	130
 LEGAL ISSUE 7.1: The Role of Violence 	132
Evolution of the Threat	133
Technology Use by Extremists	134
Al-Qaeda	134
Boko Haram	134
The Islamic State (also known as ISIS/ISIL/Daesh)	134
Targets of Cyberterrorism	135
Probable Versus Possible	135
 CASE STUDY 7.2: The 2003 New York City Blackout Vulnerability of Critical Infrastructures 	136 137
	138
Risk Management Risk = Threat × Asset × Vulnerability	138
Asset Value Assessment	138
Threat Assessment	139
Vulnerability Assessment	139
Damage Potential	139
• THINK ABOUT IT 7.2: Critical Infrastructure Risk Assessment	140
> Summary	141
➢ Key Terms	141
Discussion Questions	141
> Internet Resources	142
> Further Reading	142
Chapter 8 • An Evolving Threat: The Deep Web	143
THINK ABOUT IT 8.1: Surface Web and Deep Web	144
The Surface Web	144
The Deep Web and Darknets	145
	145
Accessibility	140

The Onion Router	147
Products Available	149
THINK ABOUT IT 8.2: Black Market Blood	149
The Hidden Wiki	150
The Silk Road	150
 THINK ABOUT IT 8.3: Dread Pirate Roberts and the Silk Road 	152
Payment: Cryptocurrency	153
Bitcoins (BTC or #)	153
Dash	154
Law Enforcement Response	154
Operation Onymous	155
Anonymous and "Vigilante Justice"	155
 THINK ABOUT IT 8.4: Online Vigilante Justice 	156
Terrorist Presence on the Deep and Dark Web	157
CASE STUDY 8.1: ISIS and the Threat of the Darknet	158
Legal Issues	158
LEGAL ISSUE 8.1: Anonymity and the First Amendment	160
> Summary	160
➤ Key Terms	161
Discussion Questions	161
➤ Internet Resources	161
Court Cases	161
Chapter 9 • Cybersecurity Operations	163
Chapter 9 • Cybersecurity Operations Theoretical Operations	
Theoretical Operations	163 163 164
Theoretical Operations Routine Activity Theory	163
Theoretical Operations Routine Activity Theory Role of Guardianship	163 164
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory	163 164 164
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory	163 164 164 165 165
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory	163 164 164 165
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture	163 164 164 165 165
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory	163 164 164 165 165 166 167
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto	163 164 164 165 165 166 167 168
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations	163 164 164 165 165 166 167
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies	163 164 164 165 165 166 167 168 168
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations	163 164 164 165 165 166 167 168 168 169
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA)	163 164 164 165 165 166 167 168 168 169 169
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security	163 164 164 165 165 166 167 168 168 169 169 169
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security Federal Bureau of Investigation Local Agencies Cyberterrorism Prevention Training	163 164 164 165 165 166 167 168 168 169 169 170 170 171
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security Federal Bureau of Investigation Local Agencies Cyberterrorism Prevention Training Private-Sector Collaboration	163 164 164 165 165 166 167 168 168 169 169 169 170 170 171 172 173
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security Federal Bureau of Investigation Local Agencies Cyberterrorism Prevention Training Private-Sector Collaboration • CASE STUDY 9.2: One Hat, Two Hat, White Hat, Red Hat	163 164 164 165 165 166 167 168 168 169 169 169 170 170 171 172 173
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security Federal Bureau of Investigation Local Agencies Cyberterrorism Prevention Training Private-Sector Collaboration • CASE STUDY 9.2: One Hat, Two Hat, White Hat, Red Hat Interagency Operations	163 164 164 165 165 166 167 168 168 169 169 170 170 171 172 173 174
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security Federal Bureau of Investigation Local Agencies Cyberterrorism Prevention Training Private-Sector Collaboration • CASE STUDY 9.2: One Hat, Two Hat, White Hat, Red Hat Interagency Operations Target Hardening	163 164 164 165 165 166 167 168 168 169 169 170 170 171 172 173 174 175
Theoretical Operations Routine Activity Theory Role of Guardianship Learning Theory Differential Association Theory Subculture Theory The Hacker Subculture DEF CON Convention • CASE STUDY 9.1: The Hacker's Manifesto Law Enforcement Operations Federal Agencies National Security Agency (NSA) Department of Homeland Security Federal Bureau of Investigation Local Agencies Cyberterrorism Prevention Training Private-Sector Collaboration • CASE STUDY 9.2: One Hat, Two Hat, White Hat, Red Hat Interagency Operations	163 164 164 165 165 166 167 168 168 169 169 170 170 171 172 173 174

Honeypots, Nets, and Tokens	176
THINK ABOUT IT 9.1: The Honeynet Project	178
LEGAL ISSUE 9.1: The Fourth Amendment	178
> Summary	179
> Key Terms	179
 Discussion Questions 	179

➤ Internet Resources	180
➤ Further Reading	180
Chapter 10 • Cybersecurity Policies and Legal Issues	181
 THINK ABOUT IT 10.1: Mirai: A Shot Across the Bow— 	
Distributed Denial-of-Service Attack	182
 CASE STUDY 10.1: A Holistic Approach to Cybersecurity 	183
National Cybersecurity Policies	184
Comprehensive National Cybersecurity Initiative, 2008	184
Cybersecurity Workforce Act of 2014	185
• CASE STUDY 10.2: Ransomware—California	107
Hospital Pays \$17,000	186
National Cybersecurity and Critical Infrastructure Protection Act of 2014	186
THINK ABOUT IT 10.2: Ransomware	187
International Cybersecurity Policies	188
LEGAL ISSUE 10.1: The Cyberwars in the Middle East	189
Legal Issues	190
Civil Rights	190
Security Versus Privacy	191
USA PATRIOT Act	192
• LEGAL ISSUE 10.2: United States v. Warshak	193
Jurisdictional Issues	194
Universal Jurisdiction	194
Budapest Convention on Cybersecurity (2001)	195
Network and Information Security Directive (2016)	195
Issues With Enforcement/Jurisdiction	195
 LEGAL ISSUE 10.3: Law of the Sea 	197
Summary	198
➤ Key Term	198
Discussion Questions	198
> Internet Resources	199
➤ Further Reading	199
•	
Chapter 11 • What the Future Holds	201
THINK ABOUT IT 11.1: Pizzeria "Comet Ping Pong" Is a Ohild Pagagagathy Bing	001
Child Pornography Ring	201
Data Is the New Oil	202
Data Mining Dataveillance	202 203
Pataveittaiite	203

Google	204
Manipulation of Data: The Screen Is Always Right	206
Censorship	207
Spoofing	208
E-Mail Spoofing	209
Stock Market Spoofing	209
 CASE STUDY 11.1: High-Frequency Trading—"Flash Boys" 	210
Emerging Threats	210
Internet of Things	210
Real-Time Location Services	211
Vulnerable Targets	212
GPS Jammers and Spoofers	212
Naval System	213
Aircraft	214
Army Bases	214
Women's Shelters	214
 THINK ABOUT IT 11.2: Dangerous Criminal or Researcher 	
Trying to Save Lives?	215
 LEGAL ISSUE 11.1: Health Care Records Are Worth Millions 	216
Potential/Emerging Perpetrators	216
Man in the Middle	216
Swatting	217
Crime Inc.	218
The Organizational Structure of Crime Inc.	218
Summary	219
Key Terms	219
Discussion Questions	220
Internet Resources	220
Further Reading	220
Appendix: Cybersecurity-Related Organizations	221
Glossary	225
Notes	231
Index	255
About the Authors	273