Principles of Cybersecurity

SECOND EDITION

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Correlates to objectives for Certiport IT Specialist—Cybersecurity, Certiport IT Specialist—Network Security, Cisco Certified Support Technician in Cybersecurity, and NOCTI Cybersecurity Fundamentals certifications

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INTRODUCTION

Cybersecurity is the field of computer science related to protecting digital assets and computer systems against unauthorized or criminal access and use. The Bureau of Labor Statistics reports there are roughly 83,000 jobs in this area with a median salary of nearly $90,000. It projects a growth of 37 percent through 2024. Demand for individuals with cybersecurity skills is expected to be very high. The Cybersecurity Council has reported an unprecedented demand for highly skilled cybersecurity practitioners. These individuals are needed for building security into new and existing networks. They also need to be capable of assessing security on a real-time basis. These individuals are the front-line defenders against cybersecurity threats across industries and governmental agencies.

Principles of Cybersecurity will prepare you with skills and knowledge needed in the field of cybersecurity. By studying this text, you will learn about security threats and vulnerabilities. In addition, you will learn how to identify these issues and how to combat them. This text also helps prepare you for certification in the following:

- Certiport Information Technology (IT) Specialist in Cybersecurity
- Certiport Information Technology (IT) Specialist in Network Security
- Cisco Certified Support Technician in Cybersecurity
- NOCTI Cybersecurity Fundamentals

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NEW TO THIS EDITION

The second edition of *Principles of Cybersecurity* has been revised to reflect new and emerging topics in the cybersecurity field. In addition, the chapter content and visuals have been updated to reflect the ever-changing technological tools used in cybersecurity. An overview of the changes made to this edition has been provided.

- Content is tailored to cover topics discussed in four cybersecurity certifications:
  - Certiport Information Technology (IT) Specialist in Cybersecurity
  - Certiport Information Technology (IT) Specialist in Network Security
  - Cisco Certified Support Technician in Cybersecurity
  - NOCTI Cybersecurity Fundamentals
- Assessment activities and questions have been revised to fully correlate to measurable learning outcomes.
- Quick Look activities revised to be adapted to either Windows 10 or 11.
- Use of new and emerging terminology in the cybersecurity field such as *ethical* and *malicious hackers* as well as *closed* and *clear box testing*.
- Remodel of an entire chapter to focus specifically on common malware, vulnerabilities, and threats.
- New content focuses on new and emerging technologies such as artificial intelligence and personal cloud computing.
- New content introduces students to basic concepts of adding users in Linux programs in addition to Windows programs.
- Revision of content covering software vulnerabilities as well as the addition of protection methods.
- Compliance and frameworks content has been revised to reflect the latest laws as well as support materials affecting the cybersecurity field.
- New content discusses the history of computer forensics and common forensics frameworks.
- Coverage of career readiness topics expanded to include topics on researching careers and education options as well as writing cover messages as part of the application process.
- For digital users, a new Command Line Interface Management Handbook is a new module lesson provided on the Digital Companion.

CREDENTIALING PARTNERS AND SUPPORT

Goodheart-Willcox appreciates the value of industry credentials, certifications, and accreditation. We are pleased to partner with leading organizations to support students and programs in achieving credentials. Integrating industry-recognized credentialing into a career and technical education (CTE) program provides many benefits for the student and for the institution. By achieving third-party certificates, students gain confidence, have proof of a measurable level of knowledge and skills, and earn a valuable achievement to include in their résumés. For educators and administrators, industry-recognized credentials and accreditation validate learning, enhance the credibility of programs, and provide valuable data to measure student performance and help guide continuous program improvement.

Principles of Cybersecurity is correlated to the Cybersecurity Fundamentals credential offered by NOCTI.

NOCTI

NOCTI Certifications

Goodheart-Willcox is pleased to partner with NOCTI, a leading provider of industry certification solutions for CTE programs across the nation. With over 50 years of experience, NOCTI is a valuable partner in the CTE community's efforts to improve America's workforce. Goodheart-Willcox has created correlations between select products and the standards and competencies that make up the NOCTI credentials, to the benefit of states, instructors, and students working to achieve NOCTI credentials.

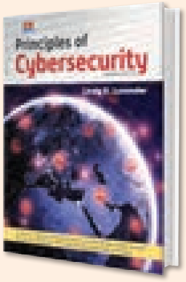
NOCTI certifications (knowledge-based and skill-based) are developed by national teams of subject matter experts as part of the process that meets personnel accrediting standards and requirements under ISO 17.024, resulting in credentials measuring skills and competencies critical for learner success outside the classroom. From online test delivery and psychometric services to digital badging and professional development, NOCTI uses the latest tools and methods to provide relevant solutions for those in CTE. For more information about NOCTI, visit www.nocti.org.

To see how *Principles of Cybersecurity* correlates to credentialing and certification standards, visit the Correlations tab at www.g-w.com/principles-of-cybersecurity-2025.

TOOLS FOR STUDENT AND INSTRUCTOR SUCCESS

Student Tools

Student Text



Principles of Cybersecurity is an exciting, full-color, and highly illustrated learning resource that prepares students with skills needed in the cybersecurity field. This text will also help prepare students for industry-recognized certification. Students will learn a variety of cybersecurity topics as well as important employability skills for their future careers.

Lab Manual

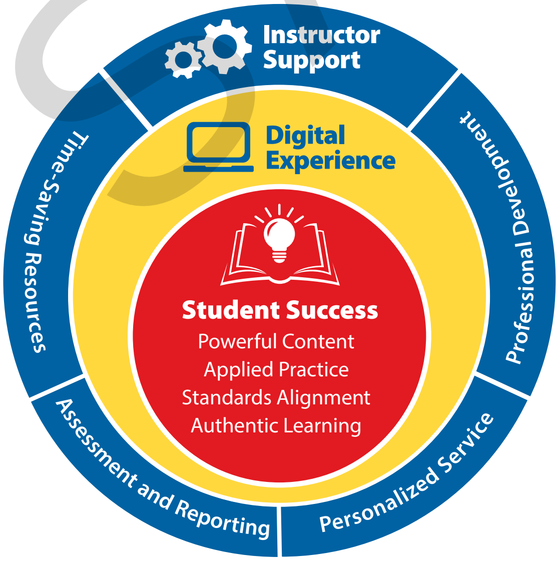
- Hands-on practice includes questions and activities.
- Organized to follow the textbook chapters to help students achieve key learning outcomes.

G-W Digital Companion

- E-flash cards and vocabulary exercises allow interaction with content to create opportunities to increase achievement.
- Command Line Interface Management Handbook provides basic concepts as well as hands-on activities using PowerShell and the Linux shell.

Online Learning Suite

- Provides easy-to-use access and navigation.
- Includes accessible resources for all learners.
- Encourages practice and repetition.



Instructor Tools

LMS Integration

Integrate Goodheart-Willcox content within your Learning Management System for a seamless user experience for both you and your students. EduHub LMS–ready content in Common Cartridge® format facilitates single sign-on integration and gives you control of student enrollment and data. With a Common Cartridge integration, you can access the LMS features and tools you are accustomed to using and G-W course resources in one convenient location—your LMS.

G-W Common Cartridge provides a complete learning package for you and your students. The included digital resources help your students remain engaged and learn effectively:

- **Digital Textbook**
- Online **Lab Manual content**
- **Drill and Practice** vocabulary activities
- **Command Line Interface Management Handbook** module lesson

When you incorporate G-W content into your courses via Common Cartridge, you have the flexibility to customize and structure the content to meet the educational needs of your students. You may also choose to add your own content to the course.

For instructors, the Common Cartridge includes the Online Instructor Resources. QTI® question banks are available within the Online Instructor Resources for import into your LMS. These prebuilt assessments help you measure student knowledge and track results in your LMS gradebook. Questions and tests can be customized to meet your assessment needs.

Online Instructor Resources

- The **Instructor Resources** provide instructors with time-saving preparation tools such as answer keys, editable lesson plans, and other teaching aids.
- **Instructor's Presentations for PowerPoint®** are fully customizable, richly illustrated slides that help you teach and visually reinforce the key concepts from each chapter.
- Administer and manage assessments to meet your classroom needs using **Assessment Software with Question Banks**, which include hundreds of multiple choice, completion, matching, and short answer questions to assess student knowledge of the content in each chapter.

See www.g-w.com/principles-of-cybersecurity-2025 for a list of all available resources.

Professional Development

- Expert content specialists
- Research-based pedagogy and instructional practices
- Options for virtual and in-person Professional Development

GUIDED TOUR

The instructional design includes student-focused learning tools to help students succeed. This visual guide highlights the features designed for the textbook.

Chapter 3

Managing User Security

Overview

Chapter Preview

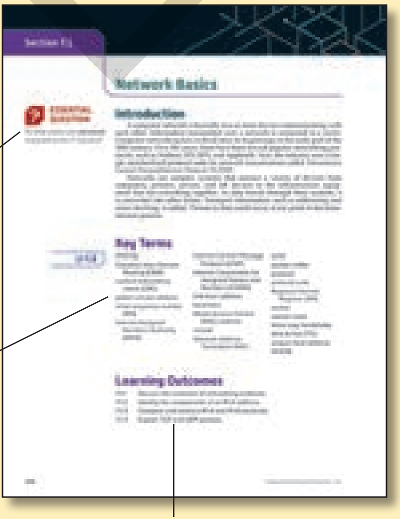
Reading Prep

Certification Objectives

Reading Prep literacy integration activities at the beginning of each chapter encourage development of confidence and skill in literacy and learning.

Certification Objectives list the Certiport, Cisco, and NOCTI objectives covered in the chapter to help you prepare for taking certification exams.

Chapter **Overview** provides a preview of the information you will learn about in the chapter.



Network Basics

Introduction

Key Terms

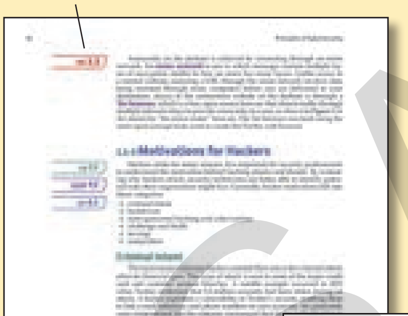
Learning Outcomes

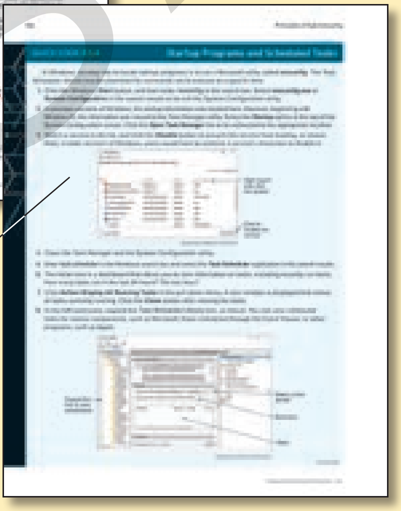
An **Essential Question** at the beginning of each section will engage you as you uncover the important points presented in the content.

Certification objective callouts enable you to focus learning on skills related to industry-recognized certifications.

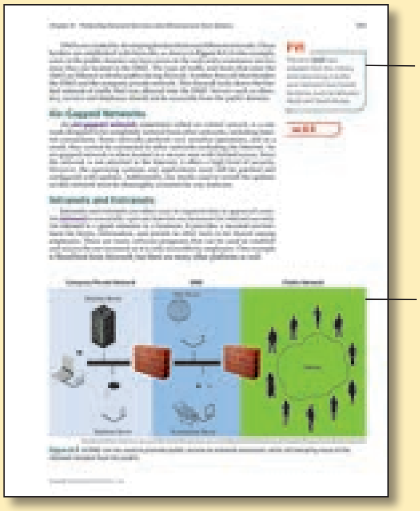
Key Terms provide a list of the important terms in each section so you can focus on learning technical terms associated with the content.

Learning Outcomes clearly identify the knowledge and skills to be obtained when the section is completed.



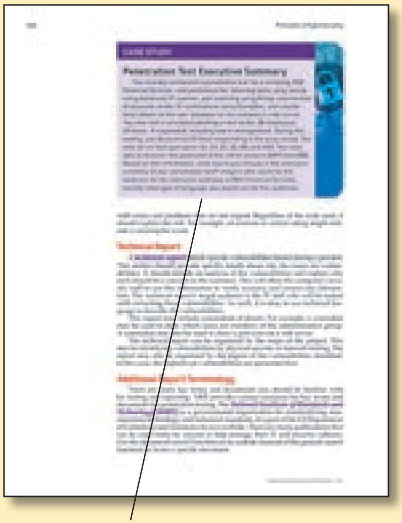


Quick Look activities allow you to immediately apply the concepts you just learned for reinforcement.

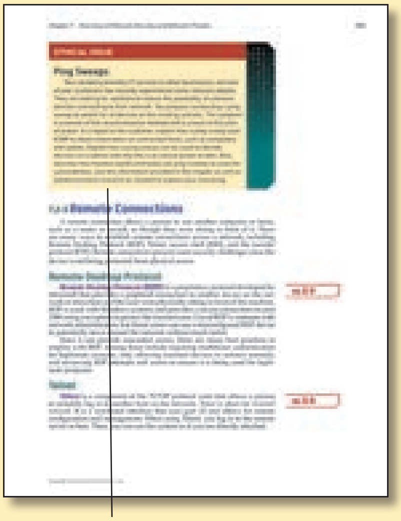


FYI features provide additional information to expand your learning of the material.

Labeled figures can be used as visual guides as well as enhance understanding of the material.

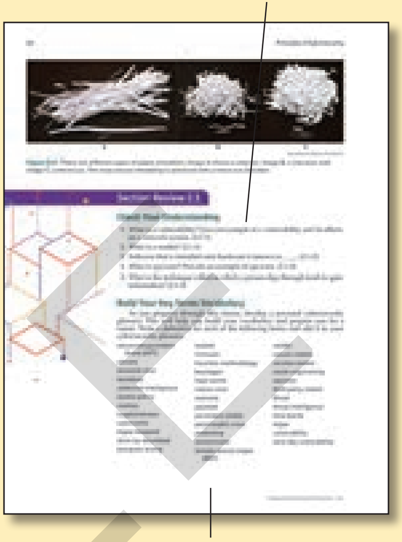


Case Study features present you with a scenario and ask you what action should be taken to connect your learning to real-life situations.



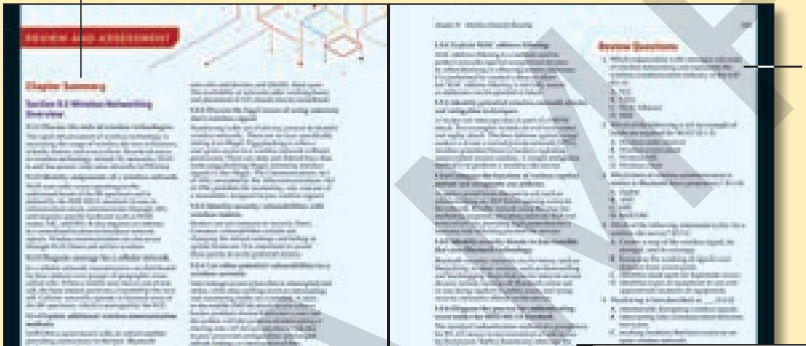
Ethical Issue features illustrate situations in which an ethical or moral judgment is needed.

Check Your Understanding questions at the end of each chapter section provide an opportunity to review what you have learned before moving on to additional content. Each question is tied to a Learning Outcome.



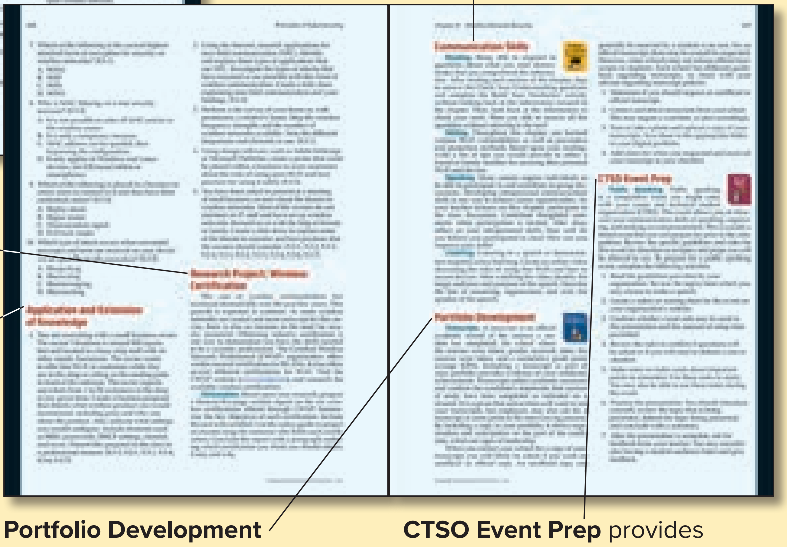
Build Your Key Terms Vocabulary activities review the key terms presented in each section. By completing these activities, you will be able to demonstrate your understanding of cybersecurity terms.

Chapter Summary presents key chapter concepts tied to each Learning Outcome for quick review.



Review Questions cover the concepts presented in the chapter as well as are tied to the Learning Outcomes, which enables you to evaluate your understanding of the material.

Communication Skills activities provide ways for you to demonstrate the literacy and career-readiness skills you have mastered.



Research Project provides you with an opportunity to apply your research skills by investigating a topic in greater detail.

Application and Extension of Knowledge activities challenge you to relate what you learned in the chapter to your own ideas and projects. Each activity is tied to a Learning Outcome.

Portfolio Development activities provide guidance in creating a personal digital portfolio for use when exploring volunteer, education, training, and career opportunities.

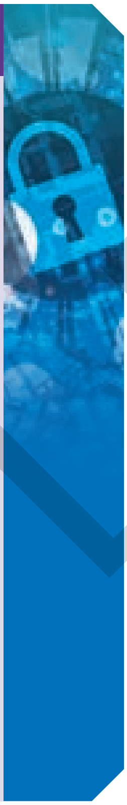
CTSO Event Prep provides information to use when preparing for competitive activities in career and technical student organization (CTSO) competitions.

BRIEF CONTENTS

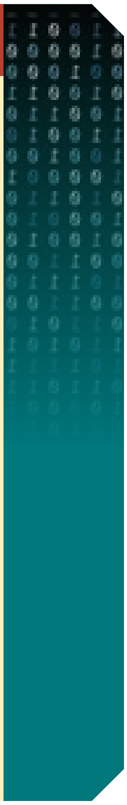
CONTENTS

FEATURE CONTENTS

CASE STUDY



ETHICAL ISSUE



QUICK LOOK

QUICK LOOK (continued)