

Unit IV: Looking Forward: Careers & Technology

Chapter 19: Emerging Technology

19.1: Goal

In this chapter, you will explore the technologies that are shaping the future of society, including advances in artificial intelligence, robotics, connected devices, and immersive technologies. You will consider how innovation continues to transform the way we live and work while reflecting on the importance of adaptability, ethical decision-making, and lifelong learning in an ever-changing technological world.

19.2: Objectives

- Describe several emerging technologies that are transforming society and the workplace.
- Explain how artificial intelligence, connected devices, extended reality, robotics, and quantum computing are being used today.
- Discuss how emerging technologies affect education, healthcare, business, communication, and everyday life.
- Identify ethical, privacy, security, accessibility, and environmental issues associated with emerging technologies.>
- Explain the importance of digital literacy, critical thinking, and lifelong learning in a rapidly changing technological world.
- Evaluate both the opportunities and challenges that emerging technologies present for individuals and society.

19.3: Think About It

Imagine that you wake up ten years from now. Your home adjusts the temperature before you get out of bed. Your car drives you to work while suggesting an alternate route to avoid traffic. Your doctor reviews health information collected by wearable devices before your appointment. At work, you collaborate with artificial intelligence to complete projects more efficiently.

Later that evening, you attend a virtual class with students from around the world using immersive technology. Which of these technologies seems exciting? Which ones raise questions or concerns? How might they change the way we live, learn, work, and interact with one another?

19.4: Opening Scenario

Maya has just accepted her first full-time job after graduating from community college. During her first week, she discovers that the company uses artificial intelligence to summarize meetings, wearable devices to improve workplace safety, cloud computing to support employees working from home, and collaborative robots to assist workers in the warehouse.

Although Maya learned about these technologies in college, she quickly realizes that the technology itself is only part of the story. Her employer also discusses protecting customer privacy, reducing bias in AI systems, improving accessibility for employees with disabilities, and minimizing the company's environmental impact.

Maya understands that success in today's workplace requires more than technical skills. It requires curiosity, adaptability, ethical decision-making, and a willingness to continue learning throughout her career.

19.5: Why This Chapter Matters

Technology has always changed the way people live and work, but the pace of change has never been faster. New discoveries in artificial intelligence, robotics, cloud computing, biotechnology, and communication continue to reshape industries and create new opportunities.

These innovations also raise important questions. How should artificial intelligence be used responsibly? Who owns the data collected by smart devices? How can society balance innovation with privacy and security?

How can technology become more accessible and environmentally sustainable?

Understanding emerging technologies means more than learning about new devices or software. It means understanding how these innovations affect people, organizations, and communities. As technology continues to evolve, your ability to think critically, make ethical decisions, and adapt to change will become one of your greatest strengths.

19.6: The Pace of Technological Change

Looking Ahead

Imagine that a technology you use every day is replaced by something completely different within the next five years. How would you learn to use it? What strategies could help you adapt to future technological changes throughout your career?

Think About It

- What technology have you learned to use in the past few years?
- Why might adaptability become one of the most valuable workplace skills?

19.7: Artificial Intelligence: The Next Generation

Looking Ahead

Artificial intelligence may become a personal assistant that helps people learn, manage schedules, translate languages, and solve everyday problems. As AI becomes more capable, what decisions should always remain under human control?

Think About It

- Which tasks would you trust AI to perform?
- Which tasks should always involve human judgment?

19.8: Connected Technologies (IoT)**Looking Ahead**

Imagine living in a city where traffic lights, buses, emergency vehicles, utilities, and public buildings continuously share information to improve transportation and conserve energy.

Think About It

- What benefits could smart cities provide?
- What privacy concerns might arise?

19.9: Extended Reality, Robotics, and Automation**Looking Ahead**

Future students may participate in science laboratories using virtual reality while working alongside classmates located around the world. Robots may assist workers with dangerous or repetitive tasks rather than replacing them.

Think About It

- Which jobs are likely to benefit from robots working alongside people?
- What human skills will remain especially valuable?

19.10: Quantum Computing**Looking Ahead**

Quantum computers could someday solve scientific problems that would take today's computers thousands of years to complete.

Think About It

- Which fields could benefit most from this technology?
- What new challenges might powerful computers create for cybersecurity and privacy?

19.11: Technology and Society**Looking Ahead**

Imagine your daily life ten years from now. You may use AI assistants, wearable health devices, autonomous transportation, and smart appliances without giving them much thought.

Think About It

- Which technologies would improve your quality of life?
- Which technologies would you choose not to use?
- How should society balance innovation with privacy, security, accessibility, and fairness?

19.12: Preparing for the Future**Looking Ahead**

No one can predict exactly what technologies will exist twenty years from now. However, people who remain curious, adaptable, ethical, and willing to learn will be well prepared for whatever comes next.

Think About It

- Which technology would you like to learn more about after this course?

What skills do you think will still be valuable regardless of how technology changes?

19.13: Final Reflection**Looking Ahead: Beyond the Classroom**

When you began this course, you may have thought computers were simply devices used for school, work, or entertainment. Throughout this book, you have explored the history of computing, hardware, software, operating systems, artificial intelligence, cybersecurity, programming, careers in technology, and emerging innovations.

Technology will continue to evolve throughout your lifetime. New tools will appear, old ones will disappear, and careers will continue to change. The knowledge you have gained in this course provides a strong foundation, but your greatest strength will be your ability to continue learning, ask thoughtful questions, evaluate information critically, and use technology responsibly.

As you move forward in your education and career, remember that technology is most powerful when it helps people solve problems, communicate, create, and improve the world around them.

19.14: A Letter to the Future Technology User

When you started this book, you may have thought technology was simply about computers, smartphones, software, or the Internet. As you've worked through these chapters, you've discovered that technology is much more than machines and devices. It is about people, ideas, creativity, communication, problem-solving, and the ways we improve our lives and the world around us.

You have explored how computers process information, how operating systems manage resources, how networks connect people across the globe, and how artificial intelligence is changing the way we learn, work, and create. You have learned about cybersecurity, ethics, digital citizenship, programming concepts, technology careers, and the innovations that continue to reshape our society.

By the time you read this letter, some of the technologies described in this book may already be changing. New devices will be invented. New software will be released. New careers will emerge, and others will evolve. That has always been the story of technology.

The good news is that your success will never depend on memorizing every new application or owning the latest device. Instead, it will depend on something much more important: your willingness to keep learning.

Stay curious. Ask questions. Explore new ideas. Don't be afraid to try unfamiliar technologies or make mistakes while learning. Every expert was once a beginner.

As technology becomes more powerful, your choices will matter more than ever. Think critically about the information you encounter online. Protect your privacy and respect the privacy of others. Consider how technology affects people with different backgrounds, experiences, and abilities. Remember that ethical decisions are just as important as technical skills.

Technology has the power to connect communities, improve healthcare, advance education, protect the environment, create opportunities, and solve problems that once seemed impossible. It can also spread misinformation, invade privacy, widen inequality, or be used irresponsibly. The future is not determined by technology alone: it is shaped by the people who design it, use it, and make decisions about it.

Whether you become a healthcare professional, teacher, business owner, artist, engineer, public servant, skilled tradesperson, entrepreneur, or work in another field entirely, technology will remain an important part of your life. The digital skills, critical thinking, and ethical reasoning you have developed in this course will help you adapt to new challenges and opportunities throughout your career.

Perhaps one day you will help design an application that improves lives, develop policies that protect people's rights, create innovations that make communities more sustainable, or simply use technology in thoughtful ways to help those around you. Every contribution matters.

The future has not been written yet.

It will be shaped by people who are willing to learn, collaborate, solve problems, and lead with integrity.

We hope this book has given you not only a foundation in computer concepts, but also the confidence to continue exploring, questioning, and growing in a world where technology is constantly changing.

Your journey with technology is just beginning.

We wish you curiosity, wisdom, and success wherever it leads.