Informatics B002: Introduction to Cutting Edge Technologies

COURSE OUTLINE

Catalogue Number	3168-0000
Category	Informatics
Prerequisite Course	Introduction to Technology

Lesson 1: Cutting Edge Technologies

This lesson deals with cutting edge technologies and their potential influences on our lives. The application of cutting edge technologies in the fields of medicine, communications, materials, manufacturing, and the military are examined.

After completing this lesson, students will be able to:

- Define the term “cutting edge technology.”
- Explain how the field of medical imaging has improved physicians’ diagnostic capabilities.
- Brainstorm new technological applications in medicine.
- Describe several methods for obtaining renewable energy.
- Explain why the acquisition of renewable energy is essential for the advancement of society.
- Compare and contrast the “Internet of Things” with the internet as we now know it.
- Discuss uses for 3D printing and 3D scanning.
- Define what a “smart material” is.
- Give examples of new technologies in e-commerce.
- List applications of technology in the military.

Lesson 2: Biotechnology

This lesson introduces students to the field of biotechnology. Students will learn what biotechnology is, what its origins are, and how it benefits society. Also included are topics on the applications of biotechnology and its various levels and categories.

After completing this lesson, students will be able to:

- Define the term biotechnology.
- Give examples of the use of biotech in the past and present.
- Discuss and differentiate between the levels and subcategories of biotechnology.
- Give examples of innovations in medical biotechnology.
- Describe how biotechnology can help a seemingly non-living industry such as mining.
- List examples of innovations in agricultural biotechnology.
- Discuss practices that employ the use of biotech on an ecosystem level.
- Debate the use of genetically modified organisms, especially with relation to food preparation.

Lesson 3: Nanotechnology

Nanotechnology utilizes materials, structures and devices on a very small scale. This lesson deals with the definition, history, applications, and risks of nanotechnology. After completing this lesson, students will be able to:

- List several advantages of being able to access the minutia of matter.
- Define the terms nanoscience and nanotechnology.
- Discuss the events that lead to the beginning of the nanotechnological age we live in today.
- Discuss the significance of advanced microscopy in the development of modern nanotechnology.
- List different types of nanomaterials and discuss the importance and potential of nanomaterials in general.
- List several applications of nanotech.
- Recognize the potential dangers of nanotechnology.

Lesson 4: Robotics

This lesson introduces students to the field of robotics, one of the most cutting edge fields in existence today. Students are introduced to the structure, components, and applications of robots, as well as advanced features and concepts like artificial intelligence and machine learning.

After completing this lesson, students will be able to:

- Describe the elements and characteristics of a robot.
- Discuss the history of robotics and how it led to the field of robotics as we know it today.
- List applications of robots in today's world.
- Create a rudimentary algorithm to control a robot's actions.
- Describe the concepts of artificial intelligence and machine learning and discuss how these technological concepts benefit mankind.

Lesson 5: Information Technology and Communication

This lesson introduces students to concepts in information technology and communication systems and related technologies. Students delve into new technologies such as augmented reality, cloud computing and the Internet of Things.

After completing the lesson, students will be able to:

- Explain and debate the beneficial and harmful effects that intellectual property laws can have on innovation.
- Discuss the way ICT systems in general, and social media in particular, have affected careers and life in general.
- Define the term ICT and explain what an ICT system is.
- List examples of ICT systems.
- Differentiate between the two cutting edge technologies VR and AR.
- Identify how cloud computing has affected our lives.