POINTFUL EDUCATION

Smart Cities Technology & Applications Syllabus

» Course Overview

This course will provide students with an overview of smart cities. The course will begin by providing a foundational explanation of what constitutes a smart city and why they are beginning to pop up around the globe. With a firm understanding of what a smart city is, the majority of the course will focus on various aspects of them such as energy, transportation, data, infrastructure, mobility, and IOT devices. The course will conclude with an analysis of careers related to smart cities.

» Course Outline by Module

Module 1	Introduction to Smart Cities	**Module 5**	Smart Infrastructure
Module 2	Smart Energy	**Module 6**	Smart Mobility
Module 3	Smart Transportation	**Module 7**	Smart Objects
Module 4	Smart Data	**Module 8**	Smart Government

» Module Overview and Learning Objectives

Module 1. Introduction to Smart Cities

Smart cities are about more than the technology they utilize. They are about making city life more harmonious and sustainable for its citizens. This module starts by exploring the history of smart cities and how the foundations of the concepts behind smart cities. Next, it provides an overview of the components that make up a smart city. With a basic understanding of what a smart city is, the module then provides some real-world examples of cities taking observable steps toward becoming smart cities. Finally, the module will look at both the financial and environmental costs of creating smart cities.

***Learning Objectives*:** In this module, students will:

- Construct a timeline of the history of smart cities
- Identify the primary components that make up a smart city
- Compare and contrast the differences between two smart cities
- Evaluate the typical cost of a smart city based on population
- Analyze the environmental impacts of a Smart City

Module 2. Smart Energy

In this module, students will establish a foundational understanding of smart energy. Once an understanding of the concept is established, the module will explain the key components of smart energy. Next, it will evaluate the environmental impact of smart energy. The module will conclude with a look at smart energy across the world

***Learning Objectives*:** In this module, students will:

- Understand the definition and history of smart energy
- Evaluate the minimum requirements to classify a city as having smart energy
- Identify the key features of smart energy in a smart city
- Evaluate the environmental impact of smart energy
- Analyze the use of smart energy across the globe

Module 3. Smart Transportation

This module looks at how smart technology can improve the transportation sector. First, students will understand the definition and history of smart transportation. With this understanding, the module will then evaluate the minimum requirements to classify a city as having smart transportation. Next, it will identify the various types of smart transportation. Then the module looks at smart transportation from an environmental standpoint. Finally, the module will conclude with examples of smart transportation throughout the world.

***Learning Objectives*:** In this module, students will:

- Understand the definition and history of Smart Transportation
- Evaluate the minimum requirements to classify a city as having Smart Transportation
- Identify the various types of Smart Transportation
- Identify the various types of Smart Transportation
- Analyze the use of Smart Transportation across the globe

Module 4. Smart Data

This module on smart data will begin with a thorough understanding of how smart data is related to and different from regular data and Big Data. Next, it will evaluate the requirements for qualifying as smart data as well as the components of smart data. Ethical and moral concerns will also be addressed, and the module will conclude with a look at real-world applications of smart data across the globe.

***Learning Objectives*:** In this module, students will:

- Define Smart Data
- Evaluate the minimum requirements to classify data as Smart Data
- Identify the various components of Smart Data
- Investigate the ethical and moral concerns surrounding Smart Data
- Analyze the use of Smart Data across the globe

Module 5. Smart Infrastructure

This module on smart infrastructure begins with an overview of ICT and smart infrastructure. Next, the module will evaluate the minimum requirements to classify an infrastructure as a smart infrastructure. It will then explain the various components of smart infrastructure. The relationship between smart infrastructure and a culture of innovation will be evaluated. Finally, the module will conclude with a look at the use of smart infrastructure across the globe.

***Learning Objectives*:** In this module, students will:

- Define ICT and smart infrastructure
- Evaluate the minimum requirements to classify an infrastructure as a smart infrastructure
- Identify the various components of a smart infrastructure
- Evaluate the relationship between smart infrastructure and a culture of innovation
- Analyze the use of Smart Infrastructure across the globe

Module 6. Smart Mobility

This module addresses smart mobility. It begins by defining smart mobility and how it is different from traditional mobility methods. The various types and examples of smart mobility will be discussed as well as a look at smart mobility applications across the world. The module will also consider the environmental impact of smart mobility. Finally, the module will look at the impact of smart mobility on communities.

***Learning Objectives*:** In this module, students will:

- Define Smart Mobility
- Examine the various types of Smart Mobility
- Identify the types of Smart Mobility used in various Smart Cities
- Evaluate the environmental impact of Smart Mobility
- Analyze the community benefits to Smart Mobility in a Smart City

Module 7. Smart Objects

Smart objects are the backbone of any smart city. In this module, we are going to examine the internet of things (IoT). The module will begin with a description of what it is, then move on to a basic overview of how it works. Next, the module will provide an overview of how smart cities use IoT to create solutions to major problems. With an idea of some of the benefits that the IoT brings, the module will then move to a discussion of ransomware- what it is, why it's a problem, and measures that protect against such threats. Finally, the module will explore careers related to IoT and smart cities.

***Learning Objectives*:** In this module, students will:

- Define key terms related to the Internet of Things (IoT)
- Describe the hardware, sensors, actuators, and software that make up the IoT
- Evaluate how IoT devices and applications contribute to creating smart cities
- Identify the risks associated with ransomware attacks on the IoT
- Identify career opportunities in the IoT and Smart Cities and educational paths to enter those careers

Module 8. Smart Government

One of the most crucial components in creating a smart city is the government. This module will examine Smart Government and eGovernance and look at how smart solutions improve government and citizens' experiences. Next the module considers the cost of implementing smart solutions and different financing and funding methods. The module will analyze the benefits of increased security against the detriments of decreased privacy. Finally, the module concludes with the examination of how companies and governments address risks and concerns of the Internet of Things and Smart Cities, particularly the cybersecurity risks.

***Learning Objectives*:** In this module, students will:

- Describe Smart Government and eGovernance
- Describe how Smart Cities technology can improve government and better deliver services to citizens
- Analyze the potential impact on government budgets as a result of implementing Smart City technology
- Compare the enhanced security provided by Smart City technology with the decreased privacy from greater surveillance and tracking
- Examine efforts by companies and governments to address risks and concerns of the Internet of Things and Smart Cities