MEBS6005 Building Automation Systems

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Assignment 02 – Design and Operation of Building Automation Systems (2023-2024)

1. HVAC Systems

1.1 Describe the typical steps for designing HVAC direct digital control (DDC) systems. Illustrate with diagrams and practical examples.

(9 marks)

1.2 Explain the two common methods to classify the different types of direct digital control (DDC) controllers. Draw a diagram to illustrate the main components of a DDC controller used in HVAC systems.

(8 marks)

2. Lighting Controls

2.1 Explain the five basic methods of lighting control and discuss the benefits of applying the advanced functions of lighting control for building automation system.

(10 marks)

2.2 Briefly explain what Digital Addressable Lighting Interface (DALI) is and how it can facilitate smart lighting systems for enhancing building automation.

(7 marks)

3. Fire and Security Systems

3.1 Discuss the basic principles and important considerations for applying building automation system (BAS) to control fire alarm and security systems in buildings. What are the major benefits and risks of applying BAS in this situation?

(9 marks)

3.2 Describe the typical methods and basic components of access control systems in commercial buildings. Explain how building automation system (BAS) can integrate with access control systems to enhance the overall performance.

(8 marks)

4. Building Energy Management

4.1 Briefly describe the building energy management functions that can be provided by building automation system (BAS). Illustrate with diagrams and practical examples.

(8 marks)

4.2 Building energy management is a long-term strategy dedicated to continuous improvement and energy efficiency. Explain the systematic approach to building energy management and discuss the effective strategies to achieve successful outcomes.

(9 marks)

5. Internet Technologies

5.1 Briefly explain the key technologies that allow the building automation system (BAS) to achieve a more seamless and efficient management of building systems and facilities.

(8 marks)

5.2 Discuss how Internet of Things (IoT) can enable smart building automation. Illustrate with practical examples.

(8 marks)

6. Intelligent and Smart Buildings

6.1 Explain the meaning of the intelligent building pyramid which shows the evolution of modern building automation systems.

(8 marks)

6.2 Discuss the commonality and main features of smart and green buildings. Give examples to illustrate how building automation systems can contribute to the achievement of the goals for smart and green buildings.

(8 marks)