MEBS6005 Building Automation Systems

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Assignment 01 – Basic Principles of Building Automation Systems (2023-2024)

Building Automation Systems (BAS) are centralized, interlinked networks of hardware and software, which monitor and control the environment in commercial, residential, industrial and institutional buildings. They can help to automate and streamline maintenance, energy usage, security and asset management of the buildings.

Objective

To develop a better understanding of the basic principles and technical requirements of building automation systems.

Methodology

This assignment is intended to strengthen what you have learned during the lectures, by investigating the related topics further and by relating your learning to practical situations. Students are recommended to apply the knowledge and information obtained from the lectures to critically assess the applications in real life.

Acting as the engineering consultant of a commercial office building project in Hong Kong, you are required to study the planning and design of the BAS to be applied to the project. You should provide professional advice to the client on the configuration, specification and selection of the BAS with clear indication of the important requirements and key considerations. Essential assumptions can be made for the project to develop the necessary information and facilitate the design of an appropriate BAS for integrated control of the building services systems.

Report Submission

Each student shall prepare a technical report of not more than twenty (20) A4 pages to explain the findings of the investigation in a systematic and logical manner. The contents of the report shall address the following aspects. Other important issues may also be included.

(a) Proposed configuration and concept of the BAS and its related components
(b) System architecture and major components of the BAS
(c) Technical requirements on networking and communication protocols
(d) Key control strategies and design features proposed for the BAS
(e) Important considerations for planning, design and operation of the BAS

Detailed calculations and technical information are not required, but essential data, diagrams and illustration are useful to effectively present the findings and enhance the understanding. If appropriate, a list of references and proper citations should be provided to avoid plagiarism.

The report shall be submitted in electronic PDF format. The assessment criteria of the report include quality of the content, organization, clarity of thought, and report writing skills. The report will be evaluated on synthesis of information during the course and from your own reading/study, and evidence that you have thought about the subject and the lecture topics in some depth. A clear structure and a logical argument is important and you should provide evidence of critical thinking, originality and effective writing.

Useful References

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Domingues P., Carreira P., Vieira R. & Kastner W., 2016. Building automation systems: Concepts and technology review, *Computer Standards and Interfaces*, 45: 1-12. http://dx.doi.org/10.1016/j.csi.2015.11.005

Habibi S., 2020. *Building Automation and Digital Technologies*, Woodhead Publishing, Cambridge, MA & Kidlington, UK.

Honeywell, 1997. *Engineering Manual of Automatic Control for Commercial Buildings - Heating, Ventilating, Air Conditioning*, SI Edition., Honeywell, Inc., Minneapolis, MN.

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Merz H., Hansemann T. & Hübner C., 2018. *Building Automation: Communication systems with EIB/KNX, LON and BACnet*, Second edition, Springer, Cham, Switzerland.

Steel C., 2019. *Code of Practice: Building Automation and Control Systems*, Institution of Engineering and Technology, London.