SPD5132 Indoor Environment and HVAC Systems

http://ibse.hk/SPD5132/

Mini Project:
System Selection and Design Evaluation of HVAC Systems for BSE Labs

Two new laboratories for the Building Services Engineering (BSE) programmes will be set up on 6/F of the THEi Building at Tsing Yi Campus to support the practical and project works of the BSE students. The BSE Labs are located next to the BSE academic staff room and include two major components (as shown in Figure 1):

- Room 614 Electrical Services and Fire Lab (76 m^2) (capacity: 28 persons)
- Room 615 HVAC and Piped Services Lab (86 m^2) (capacity: 28 persons)

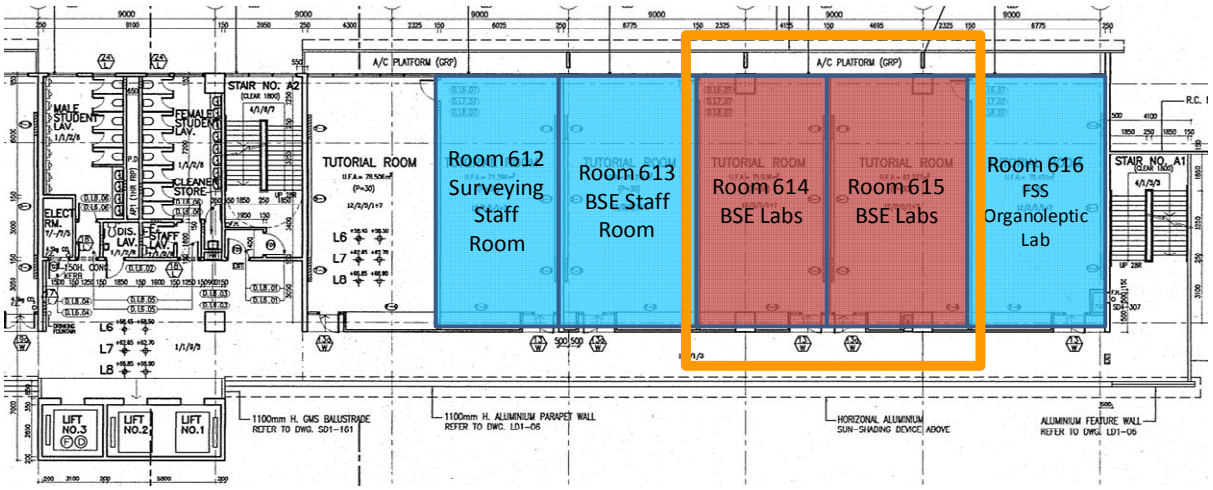

Figure 1. New BSE Labs located on 6/F of the THEi Building

The construction/renovation work for the BSE Labs should commence as soon as possible so that the laboratories can be used for the student works in 2017.

Objectives:

The main objective of this mini project is to select a proper HVAC system for the new BSE Labs and evaluate the performance of the system on indoor air quality (IAQ), building functions and energy efficiency. The students should study the important factors and limitations affecting the planning and design of the HVAC and other related building services systems.

Methodology

This mini project is intended to strengthen what you have learned during the lectures, by conducting system design and developing practical experience with the HVAC and IAQ analysis processes. In order to develop the technical skills for HVAC system design and IAQ analysis, students shall form a team of 3 to 4 persons to carry out the mini project and develop the design and analysis information.

Major Tasks

The major tasks for the mini project are shown below to give clear guidance for students to develop their design and analysis information in a systematic way. The students may also suggest other issues and they should discuss with the teaching staff to confirm.

1. Design appraisal

1.1 Study of client requirements and objectives of the laboratories

1.2 Evaluation of constraints, feasibility and options

2. System selection and performance evaluation

2.1 Identification and comparison of design options for the HVAC systems

2.2 Selection and recommendation of suitable systems and sub-systems

2.3 Evaluation of potential performance on building functions and energy efficiency

3. Assessment and analysis of indoor air quality (IAQ)

3.1 Examination of possible IAQ problems and issues

3.2 Development of design criteria and assessment techniques

3.3 Recommendations on IAQ strategies and HVAC design practice

When considering and selecting the HVAC systems and sub-systems, the students should investigate the following issues.

- Suitable types of HVAC systems and sub-systems
- Heat rejection methods
- HVAC system control and operation
- Heating systems (if needed)
- Energy recovery systems
- Ventilation rates and indoor environmental quality

Assessment Methods

Assessment of the mini project will be based on the following components:

(a) Oral presentation (20%) (to be held on 24 Apr 2017)

(b) Technical report (80%)

Each student group should prepare an oral presentation and write up a technical report based on the information generated and learnt during the mini project. The report shall not exceed forty (40) A4 pages (including report body and appendices) and should be submitted as an electronic copy through the Moodle system.

Submissions of reports should be punctual. Late submission may receive reduction in marks. The general assessment criteria include quality of the content, organization, clarity of thought, teamwork skills, communication skills (oral, graphic and written), and report writing skills.

The report should be neat and properly formatted, organised so that a reader with little time can find things readily. Proper credit and referencing should be provided to the information sources. Students making direct copy of the information in other publications (plagiarism), if found, will be disqualified.

References

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