

MEBS6020 Sustainable Building Design

<http://www.hku.hk/bse/MEBS6020/>

Exercise 01

(For self-evaluation, no need to submit)

(Please try to answer without referring to the lecture notes)

1. Sustainable Building Concepts

- 1.1 Briefly explain the meaning of sustainable development and the three dimensions of sustainability.
- 1.2 Discuss the typical problems of the built environment in Hong Kong. Describe three 'green features' proposed by the Green Building Joint Practice Notes in Hong Kong.
- 1.3 Briefly describe the key areas that a green building specialist will usually provide advice to the client.
- 1.4 Draw a diagram to describe the environmental criteria and factors commonly considered in green and sustainable buildings.
- 1.5 Describe the basic principles of sustainable urban design. Discuss the design strategies to achieve sustainable site.
- 1.6 Briefly explain the design strategies of energy efficiency in buildings. What are the three common methods to integrate solar energy in buildings?
- 1.7 What is the meaning of 'embodied energy'? Briefly describe the principles to specify green materials and products.
- 1.8 Briefly describe the design strategy for water efficiency. Give two examples of water conservation systems in buildings.
- 1.9 What are the four major areas of indoor environmental quality? Briefly describe the four principles of indoor air quality design.
- 1.10 Discuss why integrated building design is important for achieving sustainable building.

2. Sustainable Masterplanning

- 2.1 Briefly explain the masterplanning process for a large scale building development.
- 2.2 Discuss the main priorities and common themes for the "sustainable places" approach to planning.
- 2.3 Briefly describe the two evaluation tools for assessing sustainable communities and neighbourhood development.
- 2.4 Explain the meaning of greenfield and brownfield, and discuss the key considerations

for site selection.

- 2.5 Briefly explain the major issues for architectural massing and microclimate analysis.
- 2.6 Briefly describe and discuss the major impacts of urban development.
- 2.7 Explain the meaning of “smart growth” and its basic principles.
- 2.8 Briefly describe the attributes of site inventory for carrying site analysis.
- 2.9 Briefly describe the principles of sustainable landscape construction.
- 2.10 Explain the meaning of transit-oriented development (TOD). Describe one example of TOD in Hong Kong.

3. Energy and Environmental Design

- 3.1 Briefly describe the environmentally responsive design process for sustainable building projects.
- 3.2 Explain the meaning of ‘Charrette’ and describe the benefits of using it for promoting sustainable building design.
- 3.3 Explain the five basic types of predesign energy analyses. Which one is mainly used for existing buildings?
- 3.4 Briefly describe the free cooling methods in HVAC system. Explain the different definitions of zero energy building.
- 3.5 Briefly describe the energy reduction action plan and the strategy to achieve a low carbon future in the society.
- 3.6 Briefly explain the “cradle-to-grave” concept in life cycle assessment.
- 3.7 Briefly explain the four important components of life cycle assessment (LCA). Describe the common environmental performance indicators used in LCA.
- 3.8 Discuss the three phases of building material life cycle. Draw a diagram to show the relationship among them.
- 3.9 Explain the difference between life cycle assessment (LCA) and life cycle costing (LCC). Briefly explain the equation for life cycle costing (LCC) calculation.
- 3.10 Describe the typical steps of carbon audit according to the EPD guidelines. Briefly explain the scope of greenhouse gas (GHG) emissions.