

# SEE8116: BUILDING PERFORMANCE ASSESSMENT

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## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Building Performance Assessment

### Subject Code

SEE - School of Energy and Environment

### Course Number

8116

### Academic Unit

School of Energy and Environment (E2)

### College/School

School of Energy and Environment (E2)

### Course Duration

One Semester

### Credit Units

3

### Level

R8 - Research Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Nil

### Equivalent Courses

SEE6116 Building Performance Assessment

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course aims to provide students with basic knowledge of the design construction and operation of low energy and green buildings. The outcome is to furnish students with the skills to assess if a particular building is fulfilling its design targets and aspirations. Topics include building energy building science, indoor air quality, thermal comfort in buildings, international trends in building performance evaluation techniques, building energy simulation, building energy audit, retro-commissioning, and net-zero energy buildings.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Be able to identify why building performance assessment is crucial to a low-carbon society & sustainable development	20	x		x
2	Be able to assess the contribution of new materials, technologies and procedures to realise higher standards	20		x	
3	Be able to appreciate buildings' holistic performance and the role of computer simulations' real-time response in the assessment	20	x	x	x
4	Have a thorough understanding of the knowledge in indoor air quality in buildings and be able to link the interaction of government policy with business activities to achieve energy efficient and green building design and operation.	25	x	x	x
5	Be able to evaluate the relative merits of voluntary and mandatory means to prompt socially and environmentally responsible behaviour.	15	x	x	

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Learning and Teaching Activities (LTAs)

LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Lectures are used to describe and illustrate the basic concepts and the working principles.	1, 2, 3, 4, 5 2 hours per week

2	Tutorial	Tutorials are used to explain their suitable applications through practical examples, numerical exercises, real cases, class assignments and discussions.	1, 2, 3, 4, 5	0.5 hour per week
3	Project	The project aims to develop an understanding of the use of building simulation software to predict the performance of buildings.	3, 4	0.5 hour per week

**Assessment Tasks / Activities (ATs)**

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2, 3, 4, 5	10	-	Yes
2	Project	3, 4	20	-	Yes
3	Mid-term	1, 2, 3, 4, 5	30	-	No

**Continuous Assessment (%)**

60

**Examination (%)**

40

**Examination Duration (Hours)**

3

**Minimum Continuous Assessment Passing Requirement (%)**

30

**Minimum Examination Passing Requirement (%)**

30

**Assessment Rubrics (AR)****Assessment Task**

Assignment (for students admitted before Semester A 2022/23 and in Semester A 2024/25 &amp; thereafter)

**Criterion**

Ability to analyse, calculate and solve practical problems in Building Performance

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

Project (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to use building simulation software to predict the performance of buildings

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

Mid term exam (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to analyse, calculate and solve practical problems in Building Performance

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

Final exam (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to analyse, calculate and solve practical problems in Building Performance

**Excellent**

(A+, A, A-) High

**Good**

(B+, B, B-) Significant

**Fair**

(C+, C, C-) Moderate

**Marginal**

(D) Basic

**Failure**

(F) Not even reaching marginal levels

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**Assessment Task**

Assignment (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to analyse, calculate and solve practical problems in Building Performance

**Excellent**

(A+, A, A-) Excellent analysis and problem-solving skills and barely able to demonstrate an understanding of building performance.

**Good**

(B+, B) Good analysis and problem-solving skills and barely able to demonstrate an understanding of building performance.

**Marginal**

(B-, C+, C) Marginally acceptable analysis and problem-solving skills and barely able to demonstrate an understanding of building performance.

**Failure**

(F) Poor analysis and problem-solving skills and barely able to demonstrate an understanding of building performance.

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**Assessment Task**

Project (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to use building simulation software to predict the performance of buildings

**Excellent**

(A+, A, A-) Excellent report writing and no difficulties in using EnergyPlus software to assess the building performance.

**Good**

(B+, B) Good report writing and minor problems of using EnergyPlus software to assess the building performance.

**Marginal**

(B-, C+, C) Marginally acceptable report writing and numerous problems of using EnergyPlus software to assess the building performance.

**Failure**

(F) Poor report writing and little understanding of EnergyPlus software. Programs are unrelated to building performance assessment.

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**Assessment Task**

Mid term exam (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to analyse, calculate and solve practical problems in Building Performance

**Excellent**

(A+, A, A-) Excellent analysis and problem-solving skills to demonstrate in-depth understanding of building science, indoor air quality and thermal comfort.

**Good**

(B+, B) Good analysis and problem-solving skills to demonstrate good understanding of building science, indoor air quality and thermal comfort.

**Marginal**

(B-, C+, C) Marginally acceptable analysis and problem-solving skills to demonstrate some understanding of building science, indoor air quality and thermal comfort.

**Failure**

(F) Poor analysis and problem-solving skills and are barely able to demonstrate an understanding of building science, indoor air quality and thermal comfort.

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**Assessment Task**

Final exam (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to analyse, calculate and solve practical problems in Building Performance

**Excellent**

(A+, A, A-) Excellent analysis and problem-solving skills to demonstrate in-depth understanding of building performance assessment, including smart buildings, green buildings and net zero energy buildings.

**Good**

(B+, B) Good analysis and problem-solving skills to demonstrate good understanding of building performance assessment, including smart buildings, green buildings and net zero energy buildings.

**Marginal**

(B-, C+, C) Marginally acceptable analysis and problem-solving skills to demonstrate some understanding of building performance assessment, including smart buildings, green buildings and net zero energy buildings.

**Failure**

(F) Poor analysis and problem-solving skills and are barely able to demonstrate an understanding of building performance assessment, including smart buildings, green buildings and net zero energy buildings.

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## Part III Other Information

### Keyword Syllabus

- Building energy use and distribution.
- Green building design and features: green roof/wall, shading devices, building thermal insulation, smart glass, solar films, daylight utilization, natural ventilation, hybrid systems, green living quality, phase change materials applications.
- Indoor air quality: indoor carbon dioxide, indoor radon pollution, indoor aerosol science, particle removal and air cleaner performance evaluation, VOCs, indoor ozone pollution, combustion related pollutants, bio-aerosol and asbestos.
- Ventilation theory and IAQ Models.
- Thermals comfort in buildings.
- Environment assessment criteria: BEAM-Plus, LEED rating system, OTTV regulations.
- Advanced technological developments: advanced glazing systems, building integrated photovoltaic/thermal systems, LED lighting, zero-energy building features, Building energy management systems (BEMS), and retro commissioning.
- Building simulation tools.

### Reading List

#### Compulsory Readings

Title	
1	A Handbook of Sustainable Building Design & Performance, eds. Mumovic & Santamouris, Earthscan 2009
2	Zhang Y., Indoor Air Quality Engineering, CRC Press, c2005

#### Additional Readings

Title	
1	BEAM Society. BEAM2009NB: Building Environmental Assessment Method 2009 for New Buildings and Existing Buildings.
2	Bearg D.W., Indoor Air Quality and HVAC Systems, Lewis Publishers, 1993
3	American Society of Heating, Refrigerating and Air Conditioning Engineers, ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy and ASHRAE Standard 62.1-2013, Ventilation for Acceptable Indoor Air Quality.
4	Hong Kong Environmental Protection Department (HKEPD), Guidance Notes on IAQ Management in Office and Public Places, 2003.
5	Buildings Department. Building (Energy Efficiency) Regulation (Cap. 123)
6	Buildings Department. OTTV Criteria and Calculation Notes (2000)
7	EMSD. Performance-based Building Energy Code. (latest revision)