

# Masterclass

## Energy Efficiency: Designing for Sustainability and Climate Change Mitigation

Presented by the Faculty of Engineering & Information Technology



### Overview

This masterclass will explore the importance of energy efficiency in designing sustainable buildings and infrastructure projects. The course will cover various topics, such as the impact of built environments on ecosystems, demand management strategies for sustainable design, decision-making pathways for sustainable building design, and practical knowledge for minimizing operational and embodied energy through design. Additionally, participants will learn about some of the new research trends in the built environment.

### Outline

Introduction:

- Importance of energy efficiency in sustainable building and infrastructure design
- Impacts of built environments on ecosystems

Demand Management Strategies for Sustainable Design:

- Understanding energy demand in buildings and infrastructure
- Strategies for demand-side management
- Case studies on successful demand management strategies (example of Phase change Materials for load shifting)

Energy Master Planning:

- Principles of energy master planning
- Techniques for designing energy-efficient buildings and infrastructure
- Case studies on successful energy master planning (example of application of geothermal energy for industrial use)

#### Practical Knowledge for Minimizing Operational and Embodied Energy through Design:

- Design strategies for minimizing operational energy use
- Strategies for minimizing embodied energy through design
- Case studies on pre-fabricated building

#### New Research Trends in the Built Environment:

- Overview of recent research trends in sustainable building and infrastructure design
- Discussion of how these trends impact design practices

#### **Learning Outcomes**

- Gain an understanding of the importance of energy efficiency in sustainable building and infrastructure design.
- Understand the impact of built environments on ecosystems and how to implement demand management strategies for sustainable design.
- Learn the principles of energy master planning and techniques for designing energy-efficient buildings and infrastructure.
- Learn practical knowledge for minimising operational and embodied energy through design.
- Understand some of the latest research trends in sustainable building and infrastructure design and how they impact design practices.