

SUSTAINABLE URBAN DESIGN & ENGINEERING COURSE MODULES

With a global shift towards more eco-friendly cities, you could be the next architect or civil engineer to help shape Singapore's future landscape, while improving the quality of urban living. Get a step closer to turning dreams into reality with the Diploma in Sustainable Urban Design & Engineering [SDE]!

In the foundation year, you will be immersed in studio-based learning, picking up conceptual thinking, drawing and modelling skills. You will also develop an appreciation of urban planning, building systems, structures and sustainable design to allow an integrated approach in architecture and civil engineering.

You will cultivate an understanding of the intersection of architecture and civil engineering with a view to specialise in either field in the second year.

Architecture Specialisation

Investigate, experiment and explore with different aspects of the architectural design considerations from the conceptual to contextual, physical, social and cultural perspectives through a series of small to large scale design projects. You will be committed to architectural design studio classes to steer your acumen towards creative thinking, to enhance your knowledge on spatial and experiential planning, architectural formation and sustainable design.

You will develop critical design solutions with compliance to statutory requirements for architecture and urban interventions.

Civil Engineering Specialisation

Learn about current Code of Practice for the analysis and design of structural elements in reinforced concrete structures, steel structures and detailed design of various structural elements. Embark on local and overseas study trips to deepen your structural and civil engineering design capabilities as well as the design of eco-friendly buildings. Develop comprehensive awareness of industry trends shared by guest speakers from the industry.

You will explore the latest technologies in Building Information Modelling to produce sustainable architectural and engineering solutions. You will also get a chance to attend off-campus learning as well as to explore through study trips to world renowned architectural festivals, sustainable cities and heritage sites.

Finally, you will round off your third year with a six-month internship, or a three-month internship with final year project to apply what you have learnt in the real world.

LEVEL 1.1

Architectural Design

This module equips students with a fundamental set of skills for architectural presentation and representation, providing a firm grounding for the practice of architectural design. It explores how architecture is presented through the use of various modes of drawing and design techniques together with design thinking process. Students will also develop competence in physical model-making as a vital means of exploring and resolving 3D spatial design.

Building Behaviour Studies 1

Strength and stability are important aspects of structural elements that make up buildings and other infrastructures. This module explores the fundamentals of statics, moments, reactions, stresses and strains in structural elements, and how they arise due to different designs and loading criteria. These basic concepts are then used to analyse the behaviour of simple structures.

Career & Professional Preparation I

This first-year module helps to give students a foundational introduction to their three-year diploma course curriculum and how it prepares them for industry. It will help them to embark on their three year course with the end in mind, through guided reflection of their personal characteristics, and producing an overall game plan for their future education and career goals. The module aims to deepen students' commitment to the sector that the course prepares them for.

Engineering Mathematics 1

This module provides students with mathematical skills for solving basic engineering problems. Topics are organised to keep pace with applications in the engineering modules. They include algebra, trigonometry, logarithms, matrices and complex numbers. A Computer Algebra System will be used where appropriate.

Introduction to Architecture and Civil Engineering

In a design studio-based learning environment, this module facilitates the development of critical thinking and fundamental design principles relating to Architecture and Civil Engineering. An understanding of Architecture and Civil Engineering provides a platform for issues to be addressed including spatial design fundamentals, design process, spatial experience, scale, proportion, anthropometry, design exploration and structural systems. Students learn to articulate architectural design ideas with structural integrity and to translate them into physical and material investigations through design primers and workshops.

Sustainable City Planning

This module provides students the fundamental knowledge to sustainable city planning and urbanism. It outlines the framework for urban planning, urban design and development in the global context and Singapore. Detailed case study of sustainable master planning applications are included for students to learn the infrastructure principles and concepts. Students are tasked to apply basic urban design and planning with considerations to urban guidelines to formulate architectural and urban ideas in creating a socially, ecologically and economically sustainable city and to develop critical design solutions for urban design interventions.

LEVEL 1.2

Building Behaviour Studies 2

This is a continuation of Building Behaviour Studies 1. Students will perform structural analysis for various concrete and steel designs. They will learn to analyse and compute forces, deflections, shear forces and bending moments developed in structural members due to different loading criteria for both statically determinate and indeterminate structures.

Computer Aided Design

This module provides students with the principles and techniques of preparing computer-aided design (CAD) drawings in Architectural, Engineering and Construction (AEC) projects. Students learn to apply CAD standards pertaining to architectural symbols, drawing conventions, line colour and layering systems. Students will also be trained to interpret and extract information from CAD drawings and to prepare CAD drawings according to Code of Practice and Standards.

Engineering Mathematics 2

This module equips students with further mathematical skills to solve engineering problems. Topics include further trigonometry, trigonometric graphs, plane analytic geometry, differentiation with applications, and integration with applications.

Sustainable Design Studio

This module facilitates the development of critical thinking to formulate architectural design ideas that cover the basic tenets of sustainable environment. Students will learn how to apply and integrate their creativity, knowledge and skills on a project from design process to design development in the context of environmentally friendly and sustainable design. Supplemented with green building performance analysis software, site visits and case studies of exemplary Green Mark buildings, a series of studio design exercise and environmental design studies will prepare students to address sustainability approaches for the final carbon-neutral architectural design project.

Structure & Fabric

In this module, students will study the basic principles and construction techniques for the main building elements of low-rise buildings. The properties and applications of common building materials and functional requirements of various building elements are also examined. This module prepares students for the study of more complex structures and methods applicable to multi-storey buildings and infrastructure construction in the Infrastructure Works module during the second year.

COURSE CURRICULUM

Module Name	Credit Units
YEAR 1	
Level 1.1 (27.5 hours per week)	
Architectural Design	4
Building Behaviour Studies 1	5
Career & Professional Preparation I	1.5

Engineering Mathematics 1	5
Introduction to Architecture & Civil Engineering	3
Sustainable City Planning	3
Innovation Toolkit ^	4
Sports & Wellness ^	2

Level 1.2 (25 hours per week)

Building Behaviour Studies 2	4
Computer Aided Design	3
Engineering Mathematics 2	4
Structure & Fabric	4
Sustainable Design Studio	5
Communication & Contemporary Issues ^	4

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is/

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.