

DIPLOMA IN LEISURE & BUSINESS FACILITIES MANAGEMENT (LBFM) (3-YEAR COURSE)

SCHOOL OF ENGINEERING
PROPERTY CLUSTER



Mega-malls, convention centres and five-star hotels must function like clockwork in a bustling city like Singapore. Learn how to make this happen with the **Diploma in Leisure & Business Facilities Management (LBFM)**. This diploma equips students with skills to effectively manage processes, places, people and technologies in any business organisation.

The first programme of its kind, the comprehensive LBFM course curriculum covers the study of a wide spectrum of facilities from residential, business and retail, hospitality and healthcare; to integrated resorts, and sports and leisure. It adopts a total facilities management approach that integrates the maintenance, operation and management of each unique facility.

The additional grounding in financial management, business continuity, disaster recovery and green building technologies, will give students the extra edge as a facilities manager.

Students with excellent performance can go on a six-month internship with organisations like Resorts World at Sentosa, Raffles City Hotels, Jones Lang LaSalle Property Consultants, United Premas, CPG Facilities Management, EM Services, Reuters and DBS Bank.

The Diploma is endorsed by the Building and Construction Authority of Singapore and recognised by the Civil Defence Academy. Yet another advantage for graduates is that they will be awarded the Fire Safety Manager Certificate, which allows them to become Qualified Fire Safety Managers.

ENTRY REQUIREMENTS

To be eligible for consideration, candidates must have the following GCE 'O' Level examination (or equivalent) results and fulfill the aggregate computation requirements:

Subject	'O' Level Grade
English Language	1-7**
Mathematics (Elementary/Additional)	1-6
Science (with Physics or Chemistry or Biology component) or Design & Technology or Computer Studies	1-6

The aggregate computation for selection is based on grades obtained for English, Mathematics, Science or Design & Technology or Computer Studies and two other subjects.

** Candidates with English as a second language must have attained a minimum grade of 6.

CAREER PROSPECTS

In Singapore, the demand for facilities managers is ever increasing with the constant change in our city landscape. New megamalls are springing up, the integrated resorts are being constructed, and major international events such as the Youth Olympic Games will be held in the near future. With an anticipated increase in tourists and visitors, there is a demand for more hotels, and subsequently, trained personnel to manage such facilities.

In addition to being a facilities manager, graduates will be able to work as an environmental consultant, project manager, property and workplace planner or business development manager.

With the Fire Safety Manager certification, graduates can get an additional allowance of about \$300.

ACCREDITATION FOR FURTHER STUDIES

Local and overseas universities offer advanced standing for entry into their bachelor's degree courses related to Facilities Management:

- **National University of Singapore**
One year advanced standing for Project & Facilities Management or Real Estate courses
- **University of Queensland (Australia)**
Up to one year advanced standing for a business degree with specialisation in Economics, Management or International Hotel & Tourism Management

COURSE CURRICULUM (INTERNSHIP / PDD)

Module Name	Credit Units
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YEAR 1

Level 1.1 (22 hours per week)

Mechanical Systems #	5
Principles of Accounting #	4
Environmental Health Management #	3
Computer-Aided Design #	3
Interior Design #	3
Creativity & Applied Thinking Skills^	2
Sports & Wellness^	2

Level 1.2 (23 hours per week)

Electrical Systems #	5
Theory of Economics #	5
Legal & Client Relationship Management	4
Lighting & Acoustics	3
Total Facilities Management	2
Communication Toolkit^	4

YEAR 2

Level 2.1 (24 hours per week)

Residential Property Management	5
Building Construction	5
Security Management & Business Recovery	4
Space & Asset Management	4
Industrial Facilities Management	2
Interdisciplinary Studies (IS) module^	2
Interdisciplinary Studies (IS) module^	2

Level 2.2 (25 hours per week)

Business & Retail Facilities Management	4
Intelligent Systems & Energy Management	5
Fire Engineering	5
Project Management #	4
Sports & Leisure Facilities Management	3
Innovation & Enterprise in Action^	4

Module Name	Credit Units
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YEAR 3

Level 3.1 (25 hours per week)

Integrated Resort Facilities Management	4
Financial Resource Management	4
Hospitality & Healthcare Facilities Management	3
Building Maintenance & Refurbishment	4
Fire Safety Management	3
Green Building Technologies	3
World Issues: A Singapore Perspective^	2
Interdisciplinary Studies (IS) module^	2

Level 3.2 (25 hours per week)

(Students to do one)	
Six-month Internship	25
Project Design & Development (PDD)	25

Across-Level Modules (Level 1.2 onwards) (6 hours per week)

School of Engineering (SoE) elective module*	3
School of Engineering (SoE) elective module*	3

COURSE CURRICULUM (NON-INTERNSHIP / NON-PDD)

Module Name	Credit Units
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YEAR 1

Level 1.1 (22 hours per week)

Mechanical Systems #	5
Principles of Accounting #	4
Environmental Health Management #	3
Computer-Aided Design #	3
Interior Design #	3
Creativity & Applied Thinking Skills^	2
Sports & Wellness^	2

Level 1.2 (23 hours per week)

Electrical Systems #	5
Theory of Economics #	5
Legal & Client Relationship Management	4
Lighting & Acoustics	3
Total Facilities Management	2
Communication Toolkit^	4

YEAR 2

Level 2.1 (24 hours per week)

Residential Property Management	5
Building Construction	5
Security Management & Business Recovery	4
Space & Asset Management	4
Industrial Facilities Management	2
Interdisciplinary Studies (IS) module^	2
Interdisciplinary Studies (IS) module^	2

Module Name	Credit Units
Level 2.2 (30 hours per week)	
Business & Retail Facilities Management	4
Intelligent Systems & Energy Management	5
Fire Engineering	5
Project Management #	4
Sports & Leisure Facilities Management	3
Innovation & Enterprise in Action^	4
Two-month Internship	5
YEAR 3	
Level 3.1 (23 hours per week)	
Integrated Resort Facilities Management	4
Financial Resource Management	4
Fire Safety Management	3
International Business#	2
Project 1	6
World Issues: A Singapore Perspective^	2
Interdisciplinary Studies (IS) module^	2
Level 3.2 (22 hours per week)	
Hospitality & Healthcare Facilities Management	3
Building Maintenance & Refurbishment	4
Green Building Technologies	3
Statistics	3
Project 2	9
Across-Level Modules (Level 1.2 onwards) (6 hours per week)	
School of Engineering (SoE) elective module*	3
School of Engineering (SoE) elective module*	3

Notes:

Common modules with other courses.

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

* For more details on School of Engineering elective modules, please refer to page 165.

IS Modules

The School of Interdisciplinary Studies (IS) delivers the interdisciplinary curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge-based economy. IS modules challenge boundaries and offer insights into Communication, Entrepreneurship, Life Skills, Media & the Arts, and Science & Technology.

School of Engineering (SoE) Elective Modules

The SoE elective modules fall under a wide range of clusters under both Engineering and Non-Engineering categories. The aim is to provide students with the opportunity to broaden their knowledge and deepen their discipline-specific areas. Each cluster comprises a minimum of three 3-hour modules. Students are required to take two modules in order to satisfy the minimum graduating requirement.

COURSE MODULES**LEVEL 1.1****Mechanical Systems**

Students will be given an overview of the mechanical services found in modern high-rise buildings. Topics covered include water supply, sanitary, drainage, gas supply and air-conditioning systems. This module places emphasis on real-life applications in the operation and maintenance of these facilities in buildings.

Principles of Accounting

This module provides students with the technical knowledge to prepare simple accounts for sole proprietors, partnerships, and non-profit organisations. Students will also learn how to prepare a cash budget and interpret financial reports.

Environmental Health Management

The module covers the general aspects of environmental health, including the study of epidemiology, vector control and food hygiene. Students will learn to apply these concepts and principles to health management, and workplace health and safety. Students will also be given an overview of indoor air pollution sources, types of pollutants and the corresponding health impacts. Current methods of treating and controlling poor indoor air quality and local guidelines on indoor air quality will also be introduced.

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 will also be trained to interpret and extract information from CAD drawings and prepare CAD drawings according to CP 83. Emphasis will be placed on preparing CAD drawings accurately so that information can be used electronically. AutoCAD is used in this module as it is widely adopted in the AEC industry.

Interior Design

This module introduces drafting and illustration techniques of developing and presenting design. Students will learn the various principles of design, planning and drawing. Students will be able to apply knowledge gained from this and other building modules to manage decoration and display for commercial and residential projects. They will be given the opportunity to apply computer aided design skills to demonstrate their creativity in studio sessions. Three-dimensional modeling and elements of Building Information Modeling (BIM) will also be introduced in this module to prepare students for advanced applications in a later module.

LEVEL 1.2**Electrical Systems**

This module covers the different electrical facilities found in high-rise buildings. Topics covered include the electrical supply system, lifts and escalators, and communication systems. Emphasis will be placed on real-life applications in the operation and maintenance of these facilities in buildings.

Theory of Economics

This module equips students with basic knowledge of economic theory on individual decision-making (micro-economics) and social policy formulation (macro-economics). Microeconomics examines how individuals, households and firms make economic decisions, how they interact to determine the quantity and price of goods and factors of production, and the allocation of resources. Macroeconomics explores the determination of real income, employment, price level and inflation in an economy, and the conduct of macro-economic policy.

Legal & Client Relationship Management

This module focuses on the social and legal aspects of customer relationship. The former will cover the principles and concepts of customer relationship management and includes the definition of customer/client service, understanding client needs, solutions to facilities management challenges and client relationship management (CRM) implementation. The latter will cover the creation and discharge of legal relations and the remedies for breach of legal obligations. Students will be taught the appropriate tools to respond effectively to customers and stakeholders, and understand their rights and obligations when entering into a legal relation.

Lighting & Acoustics

In this module, emphasis will be placed on the functional and aesthetic aspects of lighting design, lighting sources, lighting control and maintenance of lighting systems. The acoustics segment covers the basic principles of sound and hearing, sound absorption and noise reduction, sound isolation and noise criteria, control of system noise and auditorium acoustics.

Total Facilities Management

This module serves as a preview to the LBFM course. This helps students appreciate the significance of each module offered and how they are related to each other. It gives an overview of facilities management and shows how life cycle planning for facilities, new technologies, mechanical and electrical services, and energy and environmental management strategies are integrated to support the operations for business, retail, industrial, integrated resort and leisure facilities.

LEVEL 2.1

Residential Property Management

In this module, students will study the practices and laws governing the management of residential properties. Students will acquire supervisory management, legal knowledge and problem solving skills to manage private and public housing. A considerable portion of the module is devoted to legislation governing the maintenance and management of strata developments, tenancy laws, easement and property development regulations. Landscape management and operation of mechanical and electrical systems will also be covered in this module.

Building Construction

In this module, students will study the various building elements of substructure, superstructure, floors, walls, roofs, building finishes and its components. They will also be taught the principles and methods of simple building construction including the discussion of relevant case studies. Practical work includes laboratory-based assignments and hands-on construction of building models.

Security Management & Business Recovery

This module covers the features and operation of security systems in modern buildings and the process of disaster recovery. Topics covered include the features of modern security systems, security system operations, disaster planning and recovery of data, evacuation planning, and risk management. The knowledge gained in this module will enable students to address the increasing need for security and disaster recovery in modern facilities.

Space & Asset Management

This module covers the management of space in facilities as an asset. Topics covered include space definition and planning, tagging and tracking of space usage, forecasting and allocation of space, management of furniture and equipment, life cycle costing and benchmarking. Students will be able to acquire a working knowledge of computer-aided facilities management (CAFM) products as a planning and management tool.

Industrial Facilities Management

Students will learn about the various categories of industrial facilities operations ranging from data centres, call centres, pharmaceutical and electronic manufacturing facilities, to automated warehouses. Particular focus will be given to the management of workplace safety and health, which is important for attaining a high level of worker satisfaction and productivity with minimum risks. Other topics covered in this module include clean-rooms management, solid and wastewater management and noise pollution control.



LEVEL 2.2

Business & Retail Facilities Management

Students will learn how the effective and efficient management and operation of business and retail facilities can assist in the reduction of operating costs and in the management of lease agreements to increase the value of the property. They will acquire the legal and supervisory knowledge to deal with tenancy issues, and the technical and supervisory knowledge to handle facilities such as central air-conditioning systems, cleaning services, signage and car park management systems, which are pertinent to such properties.



Intelligent Systems & Energy Management

This module covers intelligent systems of modern buildings such as building automation, structural cables, broadband networks and energy audit. In addition to the functions and applications, it also focuses on how these advanced features improve the productivity of occupants and add value to the business. An overall view of the underlying technologies, services and schemes that provide comprehensive energy management in helping businesses reduce operation costs, will be covered. Energy management applications of Building Information Modeling will also be taught in this module.

Fire Engineering

This module covers the active and passive fire protection systems in buildings and equips students to be fire safety managers. Topics covered include fire extinguishers, wet and dry rising mains, fire sprinkler systems, fire alarm systems and the protection of means of escape. Case studies will be used to illustrate the importance of fire protection systems. This module is supported by practical work in the laboratory and a computer fire simulation project.

Project Management

This module introduces students to the basics of modern construction project management. The module covers the principles of Project Management in the construction business at the various stages of planning. Elements of contract administration, as well as construction and engineering economics and finance will also be taught.

Sports & Leisure Facilities Management

The importance of proper management and upkeep of Sports and Leisure Facilities such as stadiums, aquatic centres, multi-purpose arenas, water sports centres, and museums and their equipment to ensure their continued use and patronage will be taught in this module. The concepts of queue management and evacuation modelling will also be covered. Students will also learn about Public-Private Partnership which is gaining popularity in many government funded projects, and how these initiatives affect the operations and maintenance of such facilities.

Two-month Internship (Non-Internship/Non-PDD Pathway)

In this module, students will be attached to organisations for a period of eight weeks to gain practical experience related to their course of study. This allows students to adapt themselves to the work environment in preparation for future employment. During their internship, they will undertake projects and tasks assigned by the organisation.

LEVEL 3.1 AND 3.2

COMMON MODULES

Building Maintenance and Refurbishment

This module covers the causes of building defects and their corresponding rectification methods. Topics covered include defects relating to foundations, concrete structures, roofs, floor and wall finishes. In addition, students will learn how to investigate building problems and handle maintenance repair works related to the building fabric. Real-life case studies and laboratory work involving non-destructive testing of concrete are also included. It also covers the options available to the owner of a building that suffers from obsolescence. Possibilities of refurbishing the building will be explored.

Green Building Technologies

In this module, students will learn about government and industry initiatives to introduce green building technologies such as solar energy, wind energy, biofuels, fuel cells and rain water harvesting. Topics covered include the Green Mark Listing Scheme as well as the operating and sustainability issues of green technologies concerning buildings.

Hospitality and Healthcare Facilities Management

With the development of Singapore as a Hospitality and Healthcare Hub (hotels, resorts, spas, hospices and hospitals), students will study the impact of "Customer First" and "Barrier Free Accessibility" policies in the management of such facilities. The operation and maintenance of specialised facilities such as hot water and heat pump systems will also be covered in this module.

Integrated Resort Facilities Management

This module will provide students with an understanding of the various installations and amenities that are found within Integrated Resorts such as hotels, resorts, theme parks, casinos and theatres. Students will also learn about the importance of cost-effectiveness in the management of such facilities and the creation of a positive ambience to attract visitors. Emphasis will be placed on the unique configurations of the building services owing to the sheer size of the facilities.

Financial Resource Management

This module covers the management of financial resources as part of the facilities management function. All facilities including buildings are viewed as part of a business' financial assets with the objective of maximising total returns. Topics covered include financial management tools such as cash flow projection, net present value, internal rate of return, discounted cash flow model, and long and short term financing.

Fire Safety Management

This module covers the Fire Safety Managers' scope of work and prepares students to be fire safety managers. Topics covered include a study of the requirements contained in the Fire Safety Act, fire command centre operations, evacuation procedures, fire safety planning and fire investigation.

INTERNSHIP/PDD PATHWAY

Six-month Internship

In this module, students will be attached to organisations for a period of six months. This is to prepare them for future employment in their particular discipline of study. During their internship, they will undertake projects and tasks assigned by the organisations. This allows them the opportunity to take initiatives as well as to develop their self-confidence, interpersonal and adaptation skills.

Project Design & Development (PDD)

In this module, students will work in teams on a project in their particular discipline of study for a period of six months. The project will require them to research, experiment, analyse, critique and make recommendations on the subject of study. In addition to stretching the students' self-learning ability, the process will hone essential traits like leadership, team spirit, independence, innovative spirit, and their presentation and management skills.

NON-INTERNSHIP/NON-PDD PATHWAY

International Business

Students will learn the various types of business models, marketing and risk management for overseas projects. The focus is on critical success factors such as understanding cultural differences, project financing and human resource management in different countries.

Project 1

In this module, students are expected to integrate the knowledge they gained during the first two years of study and undertake a year-long project on a topic in the field of facilities management. This could be done as a case study, fabrication or computer-application project.

Project 2

This module is a continuation of Project 1 where students undertake a year-long project on a topic in the field of facilities management.

Statistics

Students will be taught basic statistics and statistical techniques to solve problems. They will be given an overview of descriptive and inferential statistics with an emphasis on statistical tools and models for decision making. Students will also learn how to analyse data and interpret results using a software package.

ACROSS-LEVEL MODULES (LEVEL 1.2 ONWARDS)

School of Engineering Elective Modules and the Diploma Plus Programme

Students take two modules from a wide range of clusters under the engineering and non-engineering elective clusters to complete their diploma. Furthermore, students can qualify for a diploma plus by simply topping up with two additional modules from the same cluster as one of the electives. The Diploma Plus Certificate helps students if they wish to pursue a university degree or increase their employability in discipline-specific areas. Students can choose electives from the range listed below.

Engineering Clusters

- Advanced Engineering Mathematics*
- Applied Physics*
- Mechanical Technology

Non-engineering Clusters

- Economics & Financial Applications
- Green Development
- Leisure & Retail Management

Other Available Diploma Plus Certificates

- Business
- Innovation Management
- Languages (Japanese)

* Designed in collaboration with the Department of Electrical and Computer Engineering, National University of Singapore (NUS). The syllabus is based on the first-year engineering mathematics and science curricula of NUS.

For detailed module descriptions under each cluster, please refer to page 165.

DIPLOMA IN REAL ESTATE BUSINESS (REB) (3-YEAR COURSE)

SCHOOL OF ENGINEERING
PROPERTY CLUSTER



Singapore may have a shortage of land, but its billion-dollar property market is buzzing with excitement with developments such as the integrated resorts in Marina Bay and Sentosa, as well as the rejuvenation of the Central Business District and the Orchard Shopping Belt. The **Diploma in Real Estate Business (REB)** prepares students for a rosy future in this burgeoning industry.

As the first and only full-fledged real estate diploma course, REB provides a comprehensive and up-to-date curriculum. From planning and development, to managing, valuating and marketing real estate projects, you will gain a full understanding of the real estate business. In addition, you will learn the intricacies of investing in innovative real estate related financial products such as Real Estate Investment Trusts (REITs).

Overseas training opportunities are available in the major cities of China, India and Australia, as well as with prominent local companies.

Graduates will be competent in helping estate owners, investors and tenants maximise their land use to achieve the highest financial returns. They will also be able to lend a hand in the strategic marketing and management of shopping centres, integrated resorts and theme parks, as well as the valuation of luxury condominiums, office and retail properties.

ENTRY REQUIREMENTS

To be eligible for consideration, candidates must have the following GCE 'O' Level examination (or equivalent) results and fulfill the aggregate computation requirements:

Subject	'O' Level Grade
English Language	1-7**
Mathematics (Elementary/Additional)	1-6
Science (with Physics or Chemistry or Biology component) or Design & Technology or Computer Studies	1-6

The aggregate computation for selection is based on grades obtained for English, Mathematics, Science or Design & Technology or Computer Studies and two other subjects.

** Candidates with English as a second language must have attained a minimum grade of 6.

CAREER PROSPECTS

REB graduates are readily employed in various sectors of the real estate market and building industry, as well as in sectors that deal with property assets. Roles that will be a good fit include positions as project supervisors; executives overseeing investment, marketing, planning and development; officers overseeing finance and loans, valuation, contracts and property; research assistants; and assistant quantity surveyors.

There is also a demand for REB graduates to provide valuation analysis for residential, office and retail properties for banks, owners and purchasers. They may also be engaged in helping owners unlock the

value of their property. Experienced graduates can apply for the House Agent's Licence issued by the Inland Revenue Authority of Singapore.

Potential employers include government departments and statutory boards, property developers, banks, investment companies, real estate consultancy firms, management corporations, town councils, construction companies, and chartered surveying practices.

ACCREDITATION FOR FURTHER STUDIES

Local and overseas universities accept REB graduates into related bachelor's degree programmes with appropriate exemptions and advanced standing:

- **National University of Singapore**
One year advanced standing for Real Estate and Projects & Facilities Management course or part-time bachelor's degree courses for graduates with working experience
- **University of Reading (UK)**
Up to one year exemption for real estate courses
- **Heriot-Watt University (UK)**
Up to two years exemption for real estate courses
- **University of Queensland (Australia)**
Up to one year exemption for business degrees with specialisation in International Business, Real Estate & Development, Management of Events, Hospitality, Sports & Leisure Ventures, Travel & Tourism Management and Marketing

The Diploma in Real Estate Business is recognised by the Inland Revenue Authority of Singapore. Graduates with some years of working experience can apply for a House Agent's Licence without having to take the Common Examinations for House Agents (CEHA).

Module Name	Credit Units
Project Management #	4
Real Estate Finance	4
Environmental Health Management #	3
Interdisciplinary Studies (IS) module^	2
Interdisciplinary Studies (IS) module^	2
Level 2.2 (24 hours per week)	
Property Valuation	5
Real Estate Law	5
Advanced Building Technology	5
Urban Planning & Economics	4
Innovation & Enterprise in Action^	4
YEAR 3	
Level 3.1 (23 hours per week)	
Building Maintenance & Diagnostics#	4
Building Refurbishment#	3
Client Relationship Management	4
Real Estate Investment	5
Building Quantities & Costing	4
World Issues: A Singapore Perspective^	2
Interdisciplinary Studies (IS) module^	2
Level 3.2 (25 hours per week)	
(Student to do one)	
Six-month Internship	25
Project Design & Development (PDD)	25
Across-Level Modules (Level 1.2 onwards)	
(6 hours per week)	
School of Engineering (SoE) elective module*	3
School of Engineering (SoE) elective module*	3

COURSE CURRICULUM (INTERNSHIP / PDD)

Module Name	Credit Units
YEAR 1	
Level 1.1 (24 hours per week)	
Theory of Economics #	5
Mechanical Systems #	5
Principles of Accounting #	4
Computer-Aided Design #	3
Interior Design #	3
Creativity & Applied Thinking Skills^	2
Sports & Wellness^	2
Level 1.2 (23 hours per week)	
Electrical Systems #	5
Principles of Law	5
Building Technology	5
Real Estate Market Research	4
Communication Toolkit^	4
YEAR 2	
Level 2.1 (25 hours per week)	
Property Management	5
Real Estate Marketing	5

COURSE CURRICULUM (NON-INTERNSHIP / NON-PPD)

Module Name	Credit Units
YEAR 1	
Level 1.1 (24 hours per week)	
Theory of Economics #	5
Mechanical Systems #	5
Principles of Accounting #	4
Computer-Aided Design #	3
Interior Design #	3
Creativity & Applied Thinking Skills^	2
Sports & Wellness^	2
Level 1.2 (23 hours per week)	
Electrical Systems #	5
Principles of Law	5
Building Technology	5
Real Estate Market Research	4
Communication Toolkit^	4

Module Name	Credit Units
YEAR 2	
Level 2.1 (25 hours per week)	
Property Management	5
Real Estate Marketing	5
Project Management [#]	4
Real Estate Finance	4
Environmental Health Management [#]	3
Interdisciplinary Studies (IS) module [^]	2
Interdisciplinary Studies (IS) module [^]	2
Level 2.2 (29 hours per week)	
Property Valuation	5
Real Estate Law	5
Advanced Building Technology	5
Urban Planning & Economics	4
Innovation & Enterprise in Action [^]	4
Two-month Internship	5
YEAR 3	
Level 3.1 (20 hours per week)	
Building Maintenance & Diagnostics	4
Building Refurbishment	3
Hospitality Management	3
Project 1	6
World Issues: A Singapore Perspective [^]	2
Interdisciplinary Studies (IS) module [^]	2
Level 3.2 (23 hours per week)	
Client Relationship Management	4
Real Estate Investment	5
Building Quantities & Costing	4
International Business [#]	2
Project 2	9
Across-Level Modules (Level 1.2 onwards) (6 hours per week)	
School of Engineering (SoE) elective module [*]	3
School of Engineering (SoE) elective module [*]	3

Notes:

[#] Common modules with other courses.

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

^{*} For more details on School of Engineering elective modules, please refer to page 165.

IS Modules

The School of Interdisciplinary Studies (IS) delivers the interdisciplinary curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge-based economy. IS modules challenge boundaries and offer insights into Communication, Entrepreneurship, Life Skills, Media & the Arts, and Science & Technology.

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COURSE MODULES**LEVEL 1.1****Theory of Economics**

This module equips students with basic knowledge of economic theory on individual decision-making (microeconomics) and social policy formulation (macroeconomics). Microeconomics examines how individuals, households and firms make economic decisions, how they interact to determine the quantity and price of goods and factors of production, and the allocation of resources. Macroeconomics explores the determination of real income, employment, price level and inflation in an economy, and the conduct of macro-economic policy.

Mechanical Systems

Students will be given an overview of the mechanical services found in modern high-rise buildings. Topics covered include water supply, sanitary, drainage, gas supply and air-conditioning systems. This module places emphasis on real-life applications in the operation and maintenance of these facilities in buildings.

Principles of Accounting

This module provides students with the technical knowledge to prepare simple accounts for sole proprietors, partnerships, and non-profit organisations. Students will also learn how to prepare a cash budget and interpret financial reports.

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 will also be trained to interpret and extract information from CAD drawings and prepare CAD drawings according to CP 83. Emphasis will be placed on preparing CAD drawings accurately so that information can be used electronically. AutoCAD is used in this module as it is widely adopted in the AEC industry.

Interior Design

This module introduces drafting and illustration techniques of developing and presenting design. Students will learn the various principles of design, planning and drawing. Students will be able to apply knowledge gained from this and other building modules to manage decoration and display for commercial and residential projects. They will be given the opportunity to apply computer aided design skills to demonstrate their creativity in studio sessions.

LEVEL 1.2**Electrical Systems**

This module covers the different electrical facilities found in high-rise buildings. Topics covered include the electrical supply system, lifts and escalators, and communication systems. Emphasis will be placed on real-life applications in the operation and maintenance of these facilities in buildings.

Principles of Law

The module introduces the legal system of Singapore, the law of contract and commercial law, and the law of torts. Real-life examples, particularly those relating to buildings and real estate, are used to illustrate the application of legal principles. In addition, students will study the legal approach of critical analysis, logical reasoning and issue resolution.

Building Technology

In this module, students will study the basic principles and construction techniques for the main building elements of light structural forms including low-rise buildings. The properties of common materials and functional requirements of various building elements are also examined. This module prepares students for the study of more complex structures and multistory buildings in the module of Advanced Building Technology taught in the second year.

Real Estate Market Research

This module provides students with an understanding and working knowledge of research methodology for real estate market studies. Students are introduced to the purpose and value of research, methods of gathering and analysing data, and the presentation of results.

LEVEL 2.1

Property Management

In this module, students will study the management practices for buildings of different uses. Students will acquire sufficient supervisory management knowledge and problem-solving skills to manage private and public housings, as well as retail outlets, offices and industrial spaces. A considerable portion of the module is devoted to legislation governing the maintenance and management of strata developments.

Real Estate Marketing

This module presents real estate from a business perspective and provides students with an understanding of the fundamentals of marketing and real estate agency practices. Students are exposed to real estate marketing techniques and will learn to identify problems and to apply problem-solving skills to face the challenges of the real estate marketing profession. Current and relevant case studies will be highlighted during lectures and discussed during smaller tutorial group settings.

Project Management

This module introduces students to the rudiments of modern construction project management. The module covers the principles of Project Management in the construction business at the various stages of planning. Elements of contract administration, construction and engineering economics and finance will be taught.

Real Estate Finance

This module will provide students with an understanding of real estate financing issues. Topics include financial markets and institutions, financing instruments and financial risks. Students will have the opportunity to apply their knowledge in real estate market research, collect and collate property data and with the aid of computer software, generate spreadsheets for decision-making and scenario analysis.

Environmental Health Management

The module covers the general aspects of environmental health including the study of epidemiology, vector control and food hygiene. Students

will learn to apply these concepts and principles to health management, and workplace health and safety. Students will also be given an overview of indoor air pollution sources, types of pollutants and the corresponding health impacts. Current methods of treating and controlling poor indoor air quality and local guidelines on indoor air quality will also be introduced.

LEVEL 2.2

Property Valuation

This module covers the basic concepts and principles of property valuation, the purposes for which valuation is requested, the six functions of \$1, and the various methods used locally for the valuation of both public and private properties. Students will be given a good working knowledge of the valuation of real estate interests for the purposes of sale and purchase, investment, mortgage, development charge, and property tax.

Real Estate Law

Students will study the area of law relating to the various types of interest in land, the rights and duties attached to these interests, and the legal consequences for infringing these rights. The Law of Real Property includes the study of land law concepts, landlord and tenant law, interests in land, and property registration. Topics covered under Public Administration and Control of Land include law of taxation relating to property, legislation governing sale of residential and commercial properties, and restriction on foreign ownership of residential properties. The Principles of Law module is a pre-requisite for this module.

Advanced Building Technology

This module is an extension of the module of Building Technology. It examines the more complex forms of construction used in high-rise buildings and large-span structures. The knowledge gained prepares students for third-year modules in Building Maintenance & Diagnostics and Building Refurbishment.

Urban Planning & Economics

This module complements the modules of Property Valuation and Real Estate Marketing. The topics covered in this module include a study of the concept of land as an economic resource, the real estate market and planning system in Singapore. This module will provide students with an adequate knowledge of urban planning and urban economics.

Two-month Internship (Non-Internship/Non-PDD Pathway only)

In this module, students will be attached to organisations for a period of eight weeks to gain practical experience related to their course of study. This allows students to adapt themselves to the work environment in preparation for future employment. During their internship, they will undertake projects and tasks assigned by the organisation.

LEVELS 3.1 AND 3.2

COMMON MODULES

Building Maintenance & Diagnostics

This module covers the causes of building defects and their corresponding rectification methods. Topics covered include defects related to foundations, concrete structures, roofs, floor and wall finishes. In addition,

students will learn how to investigate building problems and handle maintenance repair works related to the building fabric. Real-life case studies and laboratory work involving nondestructive testing of concrete are also included.

Building Refurbishment

This module covers the options available to the owner of a building that suffers from obsolescence. Possibilities of refurbishing the building will be explored.

Client Relationship Management

This module introduces the principles and concepts of customer relationship management (CRM) skills. Students will learn the appropriate tools to respond effectively to customers and stakeholders within the real estate and facilities management industry. Topics covered include the definition of customer/client service, understanding client needs, solutions to real estate challenges and implementation of client relationship management. Case studies and mini projects equip students with the ability to view CRM as an asset to the organisation and leverage on this to add value to the organisation.

Real Estate Investment

Students will be given an understanding of the real estate investment decision-making process in this module. It focuses on the fundamental concepts and principles of investment and the practical skills needed for making real estate investment decisions. Topics covered include market studies, financial analysis, risk-return relationship, sensitivity analysis and decision-making criteria.

Building Quantities & Costing

This module draws on the students' knowledge of Building Technology and Advanced Building Technology taught in Level 1 and 2 respectively. In this module, students will study the various models for building cost estimation and techniques on measurement of quantities from given drawings. They will learn how to prepare cost estimates for new constructions or improvement works during the service life of a building. Students will also be given hands-on practice on computer software for automated taking-off and billing.

INTERNSHIP/PDD PATHWAY

Six-month Internship

In this module, students will be attached to organisations for a period of six months. This is to prepare them for future employment in their particular discipline of study. During their internship, they will undertake projects and tasks assigned by the organisations. This allows them the opportunity to take initiatives as well as to develop their self-confidence, interpersonal and adaptation skills.

Project Design & Development (PDD)

In this module, students will work in teams on a project in their particular discipline of study for a period of six months. The project will require them to research, experiment, analyse, critique and make recommendations on the subject of study. In addition to stretching the students' self-learning ability, the process will hone essential traits like leadership, team spirit, independence, innovative spirit, and their presentation and management skills.

NON-INTERNSHIP/NON-PDD PATHWAY

Hospitality Management

This module provides students with an understanding of the importance of managing real estate in the hospitality industry. Students will appreciate the relevance and connectivity of how the functions of property and facilities management contribute to enhance the value of hotels, serviced apartments, lofts, resorts and the like. Emphasis is placed on effective operations and preventive maintenance programs, that in the long run, will save costs in operations and increase the property value of these hospitality establishments.

Project 1

In this module, students are expected to integrate the knowledge they gained during the first two years of study and undertake a year-long project on a topic in the field of real estate or building. This could be done as a case-study, fabrication or computer-application project.

International Business

Students will learn the various types of business models, marketing and risk management for overseas projects. The focus is on critical success factors such as understanding cultural differences, project financing and human resource management in different countries.

Project 2

This module is a continuation of Project 1 where students undertake a year-long project on a topic in the field of real estate or building.

ACROSS-LEVEL MODULES (LEVEL 1.2 ONWARDS)

School of Engineering Elective Modules and the Diploma Plus Programme

Students take two modules from a wide range of clusters under the engineering and non-engineering elective clusters to complete their diploma. Furthermore, students can qualify for a diploma plus by simply topping up with two additional modules from the same cluster as one of the electives. The Diploma Plus Certificate helps students if they wish to pursue a university degree or increase their employability in discipline-specific areas. Students can choose electives from the range listed below.

Engineering Clusters

- Advanced Engineering Mathematics*
- Applied Physics*
- Mechanical Technology

Non-Engineering Clusters

- Economics & Financial Applications
- Green Development
- Leisure & Retail Management

Other Available Diploma Plus Certificates

- Business
- Innovation Management
- Languages (Japanese)

* Designed in collaboration with the Department of Electrical and Computer Engineering, National University of Singapore (NUS). The syllabus is based on the first-year engineering mathematics and science curricula of NUS.

For detailed module descriptions under each cluster, please refer to page 165.