MASTER OF ENGINEERING TECHNOLOGY
AND BACHELOR OF ENGINEERING WITH HONOURS IN
SUSTAINABLE INFRASTRUCTURE
ENGINEERING (BUILDING SERVICES)
PROGRAMME INFORMATION

The Sustainable Infrastructure Engineering (SIE) (Building Services) programme is the first of its kind to be offered by an autonomous university in Singapore. The programme encompasses all the necessary engineering disciplines that are required for the building services industries in Singapore and is developed in consultation with the Building and Construction Authority (BCA) Singapore.

The SIE programme aims to groom students to be both practice-oriented and industry-ready. They will be trained in the areas of Efficient Energy Management, Heating, Ventilation and Air Conditioning (HVAC), Indoor Environmental Quality, Human Health and Comfort, Sustainable Building Engineering, and Building Information Modelling (BIM). Also, in line with the government’s initiatives on clean energy and safety at work place, students will have the opportunity to obtain professional certifications in Green Mark Certification, Fire Services Safety Management, and Work Place Safety and Health.

Students will have the option to either graduate with a BEng (Hons) (based on six trimesters of study and minimum two trimesters of IWSP) or a MEngTech (based on eight trimesters of study and minimum two trimesters of IWSP). Graduates with the MEngTech qualification will be eligible for future registration as Professional Engineer (PE) (Singapore) or Chartered Engineer (UK and Commonwealth countries). The PE registration is essential for engineers to practise and design mechanical and electrical systems in the Building Services Industries in Singapore.

CURRICULUM STRUCTURE

The objective of the SIE Building Services (BS) programme is to train specialists for the building services industries. The programme will produce:

- Engineers who are specialised in HVAC, Sustainable Building Engineering and BIM
- Green Mark certified engineers [via the Integrated Work Study Programme (IWSP)]
- Engineers who meet the industry standard in Fire Services Management and Work Place Safety and Health
- Specialists with knowledge in energy optimisation, project management, change management and systems engineering (at the MEngTech level)

| YEAR 1 | TRIMESTER 1 | 1. Mechanics of Engineering Materials
| YEAR 1 | 2. Engineering Math I
| YEAR 1 | 3. C Programming
| YEAR 1 | 4. Measurements and Sensor Technology
| YEAR 1 | 5. Effective Communication
| YEAR 2 | TRIMESTER 2 | 1. Dynamics of Machines
| YEAR 2 | 2. Engineering Math IIA
| YEAR 2 | 3. Heat Exchanger and Heat Pump
| YEAR 2 | 4. Construction Drawing for Building Services
| YEAR 2 | 5. Materials Selection for Engineering Structure
| YEAR 2 | TRIMESTER 3 | Break
| TRIMESTER 1 | 1. Engineering Math IIB  
2. Fluid Mechanics  
3. Electrical Systems  
4. Water System Engineering in Built Environment  
5. Energy Distribution Management in Buildings |
|-------------|----------------------------------|
| TRIMESTER 2 | 1. Engineering Math III  
2. Land Transport Discovery  
3. Aerospace Engineering Discovery  
4. Building Services Engineering Discovery  
5. Career and Professional Development |
| TRIMESTER 3 | 1. HVAC I  
2. HVAC II  
3. BIM for M&E  
4. Building Energy Simulations and Assessment  
5. Facility Management using BIM  
6. Group Design Project I  
(e.g. Energy Conservation in Buildings or a BIM project) |

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| TRIMESTER 1 | 1. Fire Engineering Fundamentals  
2. Fire Safety Management  
3. Automation and Control in Building  
4. Work Place Safety and Health  
5. Group Design Project II  
(e.g. Energy Conservation in Buildings or a BIM project) |
|-------------|----------------------------------|
| TRIMESTER 2 | **Energy Optimisation Focus**  
1. Capstone Project I  
2. Acoustic Engineering  
3. Wind Energy and Industrial Aerodynamics  
4. Indoor Environmental Quality Engineering  
5. Lighting Technology for Building Services  
6. Renewable Energy |
| TRIMESTER 3 | **Human Factors and Systems Engineering Focus**  
1. Capstone Project II  
2. Choose any four subjects from below:  
   - Human Factors and Error Management  
   - Systems Engineering  
   - Logistics Management  
   - Change Management |
PROGRAMME HIGHLIGHTS

Heating, Ventilating and Air-Conditioning (HVAC) is an important technology to ensure indoor, as well as outdoor environmental comfort. This is particularly important in tropical countries like Singapore. Students will be trained in all the HVAC fundamentals, as well as important technical skills to design these systems.

Sustainable Building Engineering training provides knowledge on sustainable energy master planning, integrative design strategies, how issues related to carbon emissions affect building design and operational decisions, strategies for greening and maintaining new and existing buildings, and green building ratings systems and standards.

Building Information Modeling (BIM) is a process that enhances the design, construction, and management of buildings. Students will not only be trained to plan, design, construct, operate and maintain various buildings and infrastructures via BIM, but will also study all the theories and principles used in BIM.

PROFESSIONAL CERTIFICATIONS

Green Mark Certification
The Green Mark certification will be required for all the buildings in Singapore by 2020. This implies a need for many well-qualified engineers for building examination and authorisation. Retrofitting some of the existing buildings is also expected in order to achieve Green Mark certification needs by year 2030.

Construction Safety Course for Project Managers (CSCPM)
Students will be trained in the skill sets required for the Construction Safety Course for Project Managers (CSCPM) from the Ministry of Manpower (MOM). They will also learn how to plan and implement occupational health programmes and risk management programmes for construction sites. Incident reporting and accident investigations are also included.

Fire Safety Specialist Course
The Fire Safety Specialist Course from the Singapore Civil Defence Force Academy is designed to train selected personnel in the technical areas of fire safety, and carry out plans processing and building inspection works. Students will learn about the working principles of various fire protection systems and the procedures for carrying out fire safety inspections.

INTEGRATED WORK STUDY PROGRAMME (IWSP)

IWSP, which is held over a span of eight to 12 months, will provide undergraduates with the opportunity to gain industry experience, integrate theory with practice, and develop deep specialist skills in their chosen field.

Students will also be involved in day-to-day operations and confront challenges just like an employee of the host organisation.

REGIONAL IMMERSION IN SUSTAINABLE ENGINEERING (RISE)

RISE will provide opportunities for students to visit key infrastructure facilities and projects in the region. Students will gain first-hand experience in communicating with engineers, designers and operators who are working on various phases of a project such as those in design and construction. Meticulous maintenance schedules that can eliminate any incipient breakdown of the systems will also be explored. RISE is an eye-opener that will enrich students’ learning experiences.
ADMISSION REQUIREMENTS

Students with relevant engineering background, i.e. Diploma in Aerospace, Mechanical, Mechatronics, Civil, Environmental and Electrical Engineering, may apply for exemption from modules of up to a maximum of two trimesters.

For students with non-relevant engineering background, i.e. Diploma from other engineering disciplines, exemption from modules will be considered on a case-by-case basis.

CAREER OPPORTUNITIES

Statistics from government agencies and employment trends point to great demand for graduates trained in Building Services, focussing on green buildings, HVAC and BIM. Graduates of this degree programme will be well-equipped with the necessary knowledge and skills to assimilate with ease into the building construction and services industries.

INDUSTRY ADVISORY COMMITTEE

The Industry Advisory Committee members for this programme are:

**Mr TAN Cheng Guan (Chairperson)**  
Executive Vice President and Head Group Business Development and Commercial  
Sembcorp Industries Ltd

**Mr ANG Kian Seng**  
Group Director, Technology Development  
Building Construction Authority

**Dr Samuel CHAN Wai**  
Director of Systems  
Systems and Rail Assets Group  
Land Transport Authority

**Mr LEONG Yim Sing**  
Senior Vice President, Rail Engineering  
SBS Transit Ltd

**Mr LOOI Teik Soon**  
Dean, LTA Academy  
Land Transport Authority

**Mr LOW Loke Kiong (Vincent)**  
Vice President and Business Development Director  
G-Energy Global Pte Ltd

**Mr MAH Chi Jui**  
Senior Vice President and Chief Engineering Management Officer  
ST Kinetics Ltd

**Mr Vincent TAN Peng Hock**  
Senior Vice President  
Corporate Services and Rail Operations  
SMRT Corporation Ltd

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