# DIPLOMA IN ARCHITECTURAL TECHNOLOGY & BUILDING SERVICES (T29)

## Course Overview

Infuse DIGITAL architecture, SMART systems design, along with a SUSTAINABILITY mindset and *voila*! — You get MULTI-DISCIPLINARY skill-sets and the best of technology & design to achieve a healthy and resilient built environment with net-zero emissions.

Be a part of Singapore's vision of becoming the world's leading "smart-sustainable" nation, by acquiring skill-sets to design integrated high-performance buildings using technology such as Building Information Modelling (BIM) for virtual design, software simulations for performance evaluation and smart systems for energy efficient management.

Upon graduation, make your mark in dynamic sustainable design-engineering based careers within the built environment sector or pursue a university course from a wide selection of local or overseas degree programmes.
Join us now!

To download a copy of our 4-page course brochure, click here.



**DIGITAL ARCHITECTURE**
Develop specialised software skills in virtual design such as Building Information Modelling (BIM) and bioclimatic simulation conceptualise designs by predicting building performance.

**ENERGY MANAGEMENT**

Equip yourself with skill-sets in Mechanical and Electrical (M&E) systems coupled with automation technologies for energy our dedicated Integrative Built Environment Centre (IBEC).



**SUSTAINABILITY**

In line with the Singapore Green Plan 2030, envision buildings that address issues on the nation's sustainable development such as climate change, carbon emissions and environmental degradation.

# Entry Requirements

To be eligible for consideration for admission, applicants must obtain 26 points or better for the net ELR2B2 aggregate score (i.e. English Language, 2 relevant subjects and best 2 other subjects, including CCA Bonus Points) and meet the minimum entry requirements of this course. CCA cannot be used to meet the minimum entry requirements.

| Subject | Grade |
|---|---|
| English Language (EL1)* | 1-7 |
| Mathematics (E or A) | 1-6 |
| Any one of the listed subjects^ | 1-6 |
| Any two other subjects, excluding CCA | - |
| **2022 Planned Intake** | **75** |
| **Net ELR2B2 aggregate range (2021 JAE)** | **6 - 18** |

Note: *Applicants should not be suffering from severe vision impairment.*

* SPM / UEC holders must have a minimum of grade 6 for the Bahasa Inggeris (English Language) subject.

^ List of acceptable subjects: Biology, Biotechnology, Chemistry, Combined Science, Computing/Computer Studies, Design & Technology, Electronics/Fundamentals of Electronics, Physics/Engineering Science, Science (Chemistry, Biology), Science (Physics, Biology), Science (Physics, Chemistry)/Physical Science.

# What You'll Learn

| **YEAR 1** | YEAR 2 | YEAR 3 | TPFUN |
|---|---|---|---|

Get an insightful and exciting experience of various aspects of the built environment through field trips to green buildings, overseas study trips and hands-on lab sessions. You will get a concrete understanding of basic design and engineering concepts.

## Core Subjects —

| Subject Code | Subject | Credit Units | |
|---|---|---|---|
| EEE1001 | **Circuit Analysis**<br>This subject provides a good foundation in DC and AC network analysis. You will learn the basic principles of electric circuitry and how to apply circuit theorems to analyse DC and AC networks. | 6 | ^ |
| ESE1006 | **Computer Programming for Problem Solving**<br>This subject covers the process of decomposing a problem into a sequence of smaller abstractions. The abstractions are implemented in software in a structured top-down approach. Software implementation includes the process of designing, writing, testing, and debugging program code. | 4 | ^ |
| EBD1005 | **Digital Modelling For Architecture 1**<br>The module introduces the principles of architectural drawing and visualisation using relevant building information modelling (BIM) tools for representation. You will learn to apply these tools to develop schematic building designs based on local building regulations, construct 3D-BIM models with architectural elements and prepare documentation for planning submissions. | 4 | ^ |

| EBD1006 | **Eco-Architecture Design 1** | 3 | ∧ |
|---|---|---|---|
| | This module will introduce "climate-responsive" building design including the adoption of passive design strategies such as building orientation and space layout to facilitate natural ventilation and daylighting, as well as vernacular architecture strategies, innovative bioclimatic architecture strategies and sustainable material selection. | | |
| EBT2009 | **Electrical Design & Installation** | 4 | ∧ |
| | This subject covers basic electrical design. It includes the principles and design of low-voltage electrical systems in compliance with the relevant local statutory requirements, as well as good engineering practices. It also covers the different types of electrical installation methods and indoor artificial lighting design for buildings. | | |
| EMA1003 | **Engineering Mathematics 1** | 4 | ∧ |
| | This subject teaches pre-calculus techniques required for an engineering course. It trains you in engineering problem-solving approaches using the appropriate mathematical tools. Topics such as simultaneous equations, matrices, trigonometric, exponential and logarithmic functions, complex numbers and vectors will be covered. | | |
| EMA1002 | **Engineering Mathematics 2** | 4 | ∧ |
| | This subject introduces the basic concepts of calculus and statistical method to test a hypothesis. Basic concepts in calculus include limits, derivatives and integrals. Applications of the derivative and integrals in engineering will be discussed. Basic statistical method in hypothesis testing includes normal distribution, confidence interval of population mean and procedure to test hypothesis for a claim made about a population mean. | | |
| ESC1004 | **Engineering Physics** | 3 | ∧ |
| | This subject covers a spectrum of fundamental physics laws and concepts applicable to the scope of engineering physics. It covers a few core areas including Mechanics, Energy, Thermal Physics, Electromagnetism, Waves & Optics and Materials. This subject provides a foundation for a further in depth study of the various engineering disciplines. | | |
| EGB1001 | **Introduction to Built Environment** | 4 | ∧ |
| | This subject covers the fundamentals of the built environment, focusing specifically on the local building sector. Topics covered include building components, building services commonly found in a building, basics of space planning and the Green Mark scheme that governs the environmental design and performance of buildings. | | |

YEAR 1     **YEAR 2**     YEAR 3     TPFUN

Be trained by our lecturers who are professional architects, engineers or energy and facility managers to develop design and technical competence. You can also engage in realistic projects involving Sustainability @TP and get to use our dedicated Integrative Built Environment Centre (IBEC).

| Core Subjects | — |
|---|---|

| Subject Code | Subject | Credit Units | |
|---|---|---|---|
| EGB2002 | **Air Conditioning & Mechanical Ventilation** | 4 | ∧ |
| | The Air Conditioning and Mechanical Ventilation (ACMV) system is one of the most important systems of a building and represents a significant portion of its total energy consumption. Hence, an understanding of the operating principles of a typical ACMV system is critical to maximizing the overall energy efficiency of a building. | | |
| EBM2006 | **Building Management System** | 4 | ∧ |
| | This subject covers the fundamental knowledge required in the design and operation of a Building Management System (BMS). The concept of controls and monitoring with sensors and Direct Digital Controllers (DDC) will be introduced. Control strategies for air-conditioning, BMS software features for facility management and energy management will also be covered. | | |
| EBD3006 | **Building Performance Modelling** | 4 | ∧ |
| | This module covers the basics concepts of energy modelling methodology using an energy | | |

modelling software.  It will help you to understand how various building design strategies help to reduce the building's energy consumption. Submission requirements for the "Green Mark" certification for both passive and active building design, as well as an evaluation and analysis of a building's performance, will also be covered.

| Subject Code | Subject | Credit Units | |
|---|---|---|---|
| EBT2008 | **Building Systems Modelling** | 4 | ^ |

Building Information Modelling (BIM) is an intelligent 3D model-based process that allows collaboration among building professionals so that they can efficiently plan, design, construct, and manage buildings and infrastructure. This subject equips you with the practical BIM modelling skills for creating the virtual models of mechanical, electrical and plumbing systems. In addition, essential knowledge about these systems, such as its working principles, system diagrams interpretation and the energy optimisation techniques will also be covered.

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| EBD2010 | **Digital Modelling For Architecture 2** | 4 | ^ |

This module advances the use of building information modelling (BIM) tools in building design and project coordination.  You will apply your knowledge in the design development stage of your design project according to the local code of practice, and prepare documentation of drawings for the purpose of project coordination.

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| EGB2005 | **Eco-Architecture Design 2** | 4 | ^ |

This subject provides in-depth knowledge about modelling and simulation concepts in green buildings. Starting with climate analysis and the passive design aspects of a green building, you will be taken through hands-on stage-by-stage simulation tasks to demonstrate the impact of solar geometry on a building's façade and its indoor spaces. The simulation includes site analysis, solar radiation analysis, shading design, overshadowing, airflow and the envelope thermal transmittance value (ETTV) of a building's facade. You will also study about ventilation using the computational fluid dynamics (CFD) software.

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| EBM3005 | **Energy Management & Audit** | 4 | ^ |

This subject covers two main areas: energy management and energy audit. For the former, the subject illustrates the intrinsic value and concept of energy management and the implementation consideration and steps involved. On Energy Audit, the emphasis is on energy audit methodology and procedures; and methods used to evaluate energy performance of buildings and its sub-systems. These will include use of energy performance benchmarks and comparison with acceptable practices and prevailing codes and regulations. Finally, the subject discusses the application of life cycle cost concept to evaluate the economic viability of proposals on improving energy performance.

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| EGB3004 | **Integrated Design Studio** | 5 | ^ |

This is a project-based subject in which you will learn about the integration of architectural design and various building engineering systems throughout the lifecycle of a building – from conceptualisation, design development and construction, to the operation of the building.  You will also learn about the compliance with the different building codes, the "Green Building" rating systems and estimated project cost.  This module will give you an understanding of how to link the different aspects of a project together and to communicate with the different role players, thereby giving you a clear perspective of both theory and practice in the built environment industry.

YEAR 1          YEAR 2          **YEAR 3**          TPFUN

Graduate as an all-rounded professional with relevant management skills. You can also boost your portfolio and resume by specialising in an area of interest and showcase your skill-sets through projects, competitions and practical industry immersion.

## Core Subjects —

| Subject Code | Subject | Credit Units | |
|---|---|---|---|
| EMP3002 | **Major Project** | 8 | ^ |

In this subject, you will work in teams to integrate and apply your skills and knowledge to implement your projects in a practical work-and-learn environment. Besides research, design, analytics, project management, communication and problem solving skills, the emphasis will also be on innovation, teamwork and self-learning.

| Subject Code | Subject | Credit Units | |
|---|---|---|---|
| ESE1008 | **Data Visualisation & Analytics** | 3 | ∧ |
| | This subject covers the data analytics lifecycle, including gathering, cleaning, processing and visualising of data.  Exploratory data analysis methods, descriptive and predictive analytics, and the presentation of insights, will also be covered. | | |
| EBM2005 | **Fire & Life Safety Management** | 4 | ∧ |
| | This subject introduces the roles and responsibilities of a Fire Safety Manager for both commercial buildings and industrial premises. You will be exposed to the procedure adopted in running a fire command centre, the use of detection, protection and control systems, fire investigation and formulation of a fire emergency plan. | | |

## Special Electives

Students can opt to take Special Electives when offered. These optional subjects aim to stretch the students' potential to enable them to meet their aspirations.

| Special Electives | | | — |
|---|---|---|---|
| **Subject Code** | **Subject** | **Credit Units** | |
| EED3009 | **Special Project 1** | 2 | ∧ |
| | The focus of this subject is on the application of students' existing domain knowledge to develop a deliverable.  The subject will introduce new skills and knowledge specific to the project, as and when required. | | |
| EED3010 | **Special Project 2** | 2 | ∧ |
| | This subject provides opportunities for students to apply the acquired knowledge and skills, along with their fundamental and in-depth knowledge from different subjects to designing, developing, and implementing a well-engineered project solution. | | |
| EED3011 | **Higher Engineering Skills 1** | 2 | ∧ |
| | Higher Engineering Skills 1 and 2 aim to impart some special design and hands-on skills that allow you to acquire knowledge and skills that are not normally incorporated into a diploma programme. These Special Elective subjects will equip you with the skills and knowledge to participate in competitions and enable you to tackle real challenges. | | |
| EED3012 | **Higher Engineering Skills 2** | 2 | ∧ |
| | Higher Engineering Skills 1 and 2 aim to impart some special design and hands-on skills that allow you to acquire knowledge and skills that are not normally incorporated into a diploma programme. These Special Elective subjects will equip you with the skills and knowledge to participate in competitions and enable you to tackle real challenges. | | |

| YEAR 1 | YEAR 2 | YEAR 3 | **TPFUN** |
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You will also undergo TP Fundamentals (TPFun) – a set of subjects that equips you with the crucial life skills you need to navigate the modern world as an agile and forward-thinking individual, and team player.

| TP Fundamentals (TPFun) Subjects | | | — |
|---|---|---|---|
| **Subject Code** | **Subject** | **Credit Units** | |
| GTP1301 | **Current Issues & Critical Thinking** | 3 | ∧ |
| | This subject covers current issues, including diverse local and global concerns, that will impact lives and may have critical implications for Singapore. There will be opportunities to build competence through self-directed learning, communicate and collaborate in active discussions and objectively analyse issues using digital and information literacy skills and critical thinking scaffolds.<br><br>This subject aims to provide students with the knowledge and skills to:<br>• apply critical thinking tools to examine current issues.<br>• effectively search for relevant information from a variety of sources.<br>• evaluate research information. | | |

- cite sources to support their views.
- articulate an informed opinion about current issues.

| ETX1001 | **Effective Communication** | 3 | ︿ |

This subject introduces the fundamentals of effective communication. It also covers how to communicate with and convince an audience through writing and speaking tasks. The skills in this subject will include the application of strategies for communication, appropriate vocabulary, language features, visual aids, tone and style. The **M**essage, **A**udience, **P**urpose and **S**trategy (**MAPS**) framework will also be applied when planning and engaging in written and verbal communication. There will be opportunities to communicate and collaborate through active learning activities, apply digital and information literacy skills and build competence through self-directed learning.

This subject aims to equip students with the knowledge and skills to:
- apply the factors that influence effective communication.
- structure a compelling point of view through a writing task.
- express their ideas convincingly to an audience in an oral presentation.

| ETX1002 | **Professional Communication** | 3 | ︿ |

This subject covers professional communication skills for the workplace and employability skills in the areas of career preparation. It covers communication and interpersonal skills, including effective virtual communication etiquette, and conducting oneself professionally in the workplace. In addition, essential career preparation skills such as resume writing and interview skills, needed to seek and secure work would be included. The **M**essage, **A**udience, **P**urpose and **S**trategy (**MAPS**) framework would also be applied when engaging in written and verbal communication. There will be opportunities to communicate and collaborate through active learning activities, apply digital and information literacy skills and build competence through self-directed learning.

The subject aims to equip students with the knowledge and skills to:
- communicate effectively in the workplace using principles of effective written communication and interpersonal skills.
- apply effective job search and interview skills in their career preparation.

| GTP1101 | **Leadership Fundamentals** | 2 | ︿ |

This subject focuses on self-leadership based on the values of integrity, respect, and responsibility. Increasing awareness of self and others will lay the foundations for personal and relationship effectiveness. Consequential thinking, clear articulation of personal values and visions, emphatic listening, and collaboration in serving others are some of the essential skills covered in this leadership journey. There will be opportunities to build and to apply the concepts of being a values-centred leader.

The aim of this subject is to guide students to:
- design a personal growth plan based on strengths, values and purpose.
- apply the attributes of logical and emotional intelligence to improve team effectiveness.
- identify the key messages of respect in relationships.
- apply the principles of effective personal financial management.

| GTP1102 | **Leadership in Action** | 1 | ︿ |

This subject focuses on Service Learning as an experiential platform to apply the tenets of Self and Team Leadership. Service Learning will be the capstone project for this subject, which will require an analysis of the diverse needs of the community, collaboration with community partners and demonstration of learning, including key elements of empathy. There will be opportunities to build and to apply the concepts of being a values-centred leader.

This subject aims to equip students with the knowledge and skills to:
- plan and carry out a project to demonstrate empathy towards people in a diverse community.
- apply diploma core knowledge and skills through the Service Learning platform to address community needs.
- reflect on the Service Learning experience when working in teams and with community partners.

| GTP1201 | **Career Readiness CARE1** | 1 | ︿ |

This subject focuses on personal management skills. It develops an understanding of one's career interests, values, personality and skills for career success. It covers the necessary knowledge, skills and attitudes needed to succeed in the workplace and achieve professional

goals. There will be exposure to apply digital and information literacy skills, build competence through self-directed learning methods and acquire the skills of being a lifelong learner.

This subject aims to equip students with the knowledge and skills to:
- analyse personal characteristics that can contribute positively to achieving personal, educational and career goals.
- make career decisions that are aligned with their interests, skills and values.

| GTP1202 | **Career Readiness CARE2** | 1 | ∧ |

This subject focuses on career management skills. It covers the importance of workplace readiness skills to adapt and respond to the changing job market environment. Career ownership and continuous learning for lifelong employability will be emphasised. There will be exposure to apply digital and information literacy skills, build competence through self-directed learning, and acquire the skills of being a lifelong learner.

This subject aims to equip students with the knowledge and skills to:
- identify their work profiles to help them in their career choices in a changing job market environment.
- take career ownership for continuous learning and lifelong employability.

| LSW1002 | **Sports & Wellness** | 2 | ∧ |

The subject enables students to build a good foundation for healthy living. Students will have the opportunity to participate in hands-on practical sessions where they will experience and develop both physical and technical skills in their chosen sports or fitness activities. Through a structured curriculum that facilitates group participation, practice sessions and mini competitions, students will be able to build lifelong skills such as resilience, leadership, communication and teamwork. Physical activity sessions will also be supplemented by health-related topics that span the dimensions of health, such as diet, nutrition, stress and weight management, to provide students with a holistic approach to healthy living.  This subject also prepares students to be self-directed and accountable for lifelong learning for good health.

| EIN1001 | **Innovation & Entrepreneurship** | 2 | ∧ |

The subject is designed for learners from all disciplines to embrace innovation in either their specialised field or beyond.  Learners will be taught to apply the Design Thinking framework to develop problem statements, ideate and identify feasible solutions. Learners will be exposed to several tools for prototyping. In addition, commercial awareness will be imbued in learners through various innovation and entrepreneurship concepts or tools. This subject also prepares students to be self-directed lifelong learners who are digital and information literate. It nurtures communicative and collaborative citizens who can use objective analysis in problem-solving.

| EGS1002 | **Global Studies** | 3 | ∧ |

This subject provides essential skills and knowledge to prepare students for an overseas experience. They will examine the elements of culture and learn the key principles of cross-cultural communication. In addition, they will gain an appreciation and awareness of the political, economic, technological and social landscape to function effectively in a global environment. The subject prepares students to be responsible citizens and leaders who can contribute to the global community through effective communication and collaboration.

| EGS1003 | **Managing Diversity at Work*** | 3 | ∧ |

This subject explores the concepts of identity, diversity and inclusion at the workplace. It examines the relationship between identity and diversity, the benefits and challenges of diversity and the strategies that promote inclusion and inspire collaboration in a diverse workplace. Examples of the elements of diversity covered in this subject include nationality, generation, ethnicity and gender. The subject prepares students to be responsible citizens and leaders who can contribute to the global community through effective communication and collaboration.

| EGS1004 | **Global Citizenship & Community Development*** | 3 | ∧ |

Students will examine the meaning and responsibilities of being a Global Citizen, in order to contribute towards a more equitable and sustainable world. In addition, students will learn how sustainable solutions can support community development, and, execute and critique a community action plan that addresses the needs of a specific community/cause. The subject prepares students to be responsible citizens and leaders who can contribute to the global community through effective communication and collaboration.

| EGS1005 | **Expressions of Culture\*** | 3 | ⌃ |

This subject provides a platform for an understanding of culture and heritage through modes of expression. Students will be introduced to global and local cultures via everyday objects, places and human behaviour seen through time and space. Students will explore issues and challenges in culture and heritage sustainability in community, national and global contexts. The subject prepares students to be responsible citizens and leaders who can contribute to the global community through effective communication and collaboration.

| GTP1302 | **Guided Learning** | 3 | ⌃ |

The subject introduces students to the concepts and process of self-directed learning in a chosen area of inquiry. The process focusses on four stages: planning, performing, monitoring and reflecting. Students get to plan their individual learning project, refine and execute the learning plan, as well as monitor and reflect on their learning progress and project. The learning will be captured and showcased through a curated portfolio. The self-directed learning project will broaden and/or deepen a student's knowledge and skills. Students will enhance their problem solving and digital literacy skills through this subject.

| ESI3001 | **Student Internship Programme** | 12 | ⌃ |

This structured programme is designed to link your learning with the real work environment. You will be placed in organisation(s) with opportunities to apply the concepts and skills acquired in the course of your study. Besides reinforcing technical concepts and mastering of skills in areas that you have been trained, the practical training will enable you to build important skills such as problem-solving, communication, teamwork, and to cultivate good attitude and a strong work ethic.

\*Students must choose one of these three electives under the 'Global Studies 2' subject, or take 'Guided Learning'

**GRADUATION REQUIREMENTS**

| | |
|---|---|
| Grade Point Average | min 1.0 |
| TP Fundamental Subjects | 36 credit units |
| Diploma Core Subjects | 84 credit units |
| **Total Credit Units Completed** | 120 credit units |