Course Overview

From the smartphones we own to the electric cars we see on the roads, we live in a hyper-connected world driven by cutting-edge technologies. Electronic circuits and devices are key enablers of technological advancements in today's digital revolution. With the Diploma in Electronics, you too can spearhead our future digital transformation!

In this course, you will acquire skills in robotics, circuit analysis, User Interface (UI) design, data analytics, artificial intelligence, electronics prototyping and avionics. You will also be equipped with skill sets in emerging technologies and their applications in various fields such as healthcare, assistive technology, and green innovations for the environment. During your final year, choose from one of the following elective clusters you are passionate about: Aerospace Electronics (Avionics), Advanced Engineering Skills, Industrial Artificial Intelligence, Intralogistics & Cybersecurity, Robotics, or Semiconductor Technology.

Get opportunities to acquire specialised skills at the TP Advanced Manufacturing Centre (TP-AMC) and the Healthcare Engineering Centre (HEC), preparing you to embark on fulfilling careers as engineers and technologists in leading technology companies or as entrepreneurs in the high-tech business.

You can also earn industry certifications such as those from OMRON and CISCO.

Join our Diploma in Electronics and gear up for the new digital economy!

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

UNIVERSITY PATHWAY PROGRAMME
The TP-SUTD University Pathway Programme allows you to take university modules during your final year of this diploma, and gain conditional admission into SUTD. This shortens the time needed for you to obtain your degree.

MULTIDISCIPLINARY AND EXPERIENTIAL LEARNING
You will receive multidisciplinary and experiential training in our state-of-the-art research centres of excellence, working alongside skilled research engineers and learning from industry leaders such as Omron, PTC and Festo. This will equip you to ride the wave of digital transformation!

ROBUST STUDENT INTERNSHIP
You will have the opportunity to be attached to a leading organisation locally or overseas for student internship to be exposed to leading industry practices and latest technological trends. Selected students can embark on a year-long student internship (compared to 4 months normally), so as to get more in-depth industry experience and a head-start in their future jobs.

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	-
2023 Planned Intake	**50**
Net ELR2B2 aggregate range (2023 JAE)	**10 - 15**

Note: *Applicants should not be suffering from complete colour vision deficiency, uncontrolled epilepsy, profound hearing loss or 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

Acquire fundamental electronics knowledge and practical skills and learn to apply technical concepts in real-life applications related to smart nation applications, Internet of Things (IoT) technology, biomedical engineering, robotics and automation that are widely used today.

Core Subjects		—
Subject Code	**Subject**	**Credit Units**
EEE1001	**Circuit Analysis** 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** 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
EEE1003	**Digital Fundamentals 1** This subject provides basic knowledge of digital electronics and circuits. Topics include number systems, operations and codes, logic gates, Boolean algebra and logic simplification, combinational logic, functional blocks, latches and flip-flops.	5
EEE1004	**Digital Fundamentals 2** This subject builds upon the fundamentals of digital electronics acquired in Digital Fundamentals 1. It introduces the digital concepts of the	5

	various building blocks in a computer's digital system. You will acquire the theoretical and practical knowledge of registers, counters, memory devices, and conversions between digital and analogue signals and integrated circuit technologies. Digital troubleshooting techniques are also explored in the laboratory work.		
EEE1002	**Electronic Devices & Circuits** This subject covers the theory and practical knowledge of electronic devices such as diodes, bipolar junction transistors, field effect transistors and their applications. It also focuses on the fundamentals of operational amplifiers and their applications, and the rudiments of circuit troubleshooting and testing.	6	^
EED1001	**Electronic Prototyping** This subject introduces you to the use of hand tools and standard laboratory equipment for the construction and testing of electronic prototypes. You will also learn to identify basic electronic components for project work and how to use them to build electronic devices.	3	^
EMA1003	**Engineering Mathematics 1** 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.	5	^
EMA1002	**Engineering Mathematics 2** 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	4	^

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.

Subject Code	Subject	Credit Units	
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.		

YEAR 1   **YEAR 2**   YEAR 3   TPFUN

Be trained to handle advanced electronics, connected devices, motors & drives, control systems, embedded systems and data analytics, while acquiring further practice-based skills which are relevant for the industry.

Core Subjects —

Subject Code	Subject	Credit Units	
EEE3005	**Advanced Electronics & Communications**	4	^
	This subject covers essential concepts in advanced electronic circuits such as amplifiers, filters, oscillators, smart sensors and transducers as well as systems for processing analogue signals. It introduces the principles and characteristics of analogue signals and signal transmission in electronic communication systems.		
ECT2005	**Circuits & Control Systems**	4	^
	This subject introduces various concepts involved in the study of circuits and control systems. It provides you with the theories and practical knowledge of transient and steady state response of first and second order circuits, the structure of		

feedback control systems and stability analysis. The controllers and compensator design techniques used in control systems are also discussed. You will learn all the necessary skills to simulate, interpret and analyse the performance of various control systems and electric circuits. The digital control system, distributed control system and fieldbus control system are also covered in detail.

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.

EEE2006	Digital Sensors & Integrated Circuit Applications	4	^

This subject covers the applications of Integrated Circuits (IC) which form the building blocks in the field of electronics. It covers the development of digital sensors and industry practices for its deployment, including the handling procedure for Electrostatic Discharge (ESD) sensitive devices. Various applications using operational amplifier (op-amp), filters, wave shapers, analogue-to-digital converters, timers and voltage regulators will be used in the development of digital sensors.

EMA2003	Engineering Mathematics 3	4	^

This subject introduces Ordinary Differential Equations (ODE). In particular, it focuses on the formulation of engineering problems into first and second order differential equations. Some techniques in solving ODE and the applications of ODE will be discussed, including the use of Laplace Transforms and the calculation of Fourier series.

EED2011	**Integrated Project**	3	^
	This subject covers the basic principles in the development of product design through hands-on experience. The project will involve the use of mechanical hardware, electronics, software and data visualisation to demonstrate solutions to real world problems in advanced manufacturing.		
EMC3006	**Microcontroller Applications**	5	^
	This subject provides you with working knowledge on microcontroller architecture, the features and characteristics of the internal peripherals in the microcontroller, such as interrupts, Timer and PWM, in order to design and implement an embedded system that involves hardware and software interfacing. The subject also covers the features of evolving microcontrollers that support Internet of Things (IoT) applications.		
EEE3004	**Power Electronics & Drives**	4	^
	This subject is an introduction to the study of machines, power semiconductor devices and their applications as power converters and motor drives. Topics covered include basic principles of DC and AC motors, fundamentals of controlled rectifiers and drives, principles of DC choppers and drives, and inverters. The uses of semiconductor devices in power applications and thermal effects on the performance of these devices due to high power will also be discussed.		
EED1002	**Printed Circuit Board Design**	3	^
	This subject provides you with the basics in designing a printed circuit board (PCB) through the use of a PCB design software. You will learn the various parts of a PCB and the terminologies used, and understand the various processes involved in the design and fabrication of a PCB.		

Get an authentic workplace experience through your internship and prepare for the industry by working on a relevant Major Project. You can also specialise in one of our five cluster electives: Aerospace Electronics (Avionics), Industrial Artificial Intelligence, Robotics, Semiconductor Technology or Intralogistics & Cybersecurity.

| 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.		

#Students to choose one of these elective clusters

Cluster Elective Subjects

| Advanced Engineering Skills Elective Cluster | | | — |

Subject Code	Subject	Credit Units	
EED3014	**Advanced Skills Practices**	8	∧
	This subject provides opportunities for you to integrate and apply your knowledge for high level competitions or projects in practical learning situations. The project or skills training can involve substantial work related to either a high level industrial program or an end-user product, as well as advanced training to develop technical abilities to execute specific tasks competitively. It could also involve the development, evaluation of workable designs and implementation of ideas related to an innovative product suitable for manufacturing, or		

an improvement to existing products or processes. You may be required to work on software, hardware, or a combination of both hardware and software.

Avionics Elective Cluster

Subject Code	Subject	Credit Units	
EAE3018	**Aircraft Digital Systems**	4	^

This subject gives a general knowledge of the theoretical and practical aspects of aircraft digital fundamentals. It covers study in the area of electronic instrument systems, logic circuits, fibre optics, electronic displays, electronic sensitive devices, electromagnetic environment and digital aircraft systems as required by Singapore Airworthiness Requirements (SAR-66) of the Civil Aviation Authority of Singapore.

The aims of this subject are to equip students with the knowledge and skills to:

- Identify the layout of electronic/digital aircraft systems in modern wide body transport aircraft.
- Understand the digital fundamentals of aircraft electronic instrument systems as required by the SAR-66 Module 5 of the Civil Aviation Authority of Singapore.

Subject Code	Subject	Credit Units	
EAE1006	**Avionic Systems**	4	^

This subject gives a broad overview of aircraft avionics and architecture at the system level, and provides a context for follow-on training. The subject introduces students to the key avionics deployed on-board an air transport aircraft, including the crew information systems, the safety and surveillance systems, the flight and engine control systems, the navigation systems as well as the communications and information systems.

The aim of this subject is to equip students with the knowledge to have a good appreciation of the integrated avionic systems onboard an aircraft.

Industrial Artificial Intelligence Elective Cluster

Subject Code	Subject	Credit Units	
ECC3011	**Edge Computing & Machine Learning** This subject covers the technical skillsets required for deploying Artificial Intelligence (AI) models and machine learning in Edge Computing devices. It covers the fundamentals of AI and Machine Learning, the implementation of fine-tuning and transfer learning on pre-trained models, as well as the process of optimising, flattening and deploying of AI models and Machine Learning algorithms in the Edge Computing devices.	4	⌃
ECC2014	**Industrial IoT Analytics** This subject covers the essential concepts and skills needed for implementing digital transformation in smart manufacturing plants. It covers the application of industrial software platforms to wirelessly interconnect sensors, Internet of Things (IoT) devices and equipment. Students will learn to develop dashboard for acquiring, analysing and displaying data that is commonly found in Advanced Manufacturing. Modern approaches in activation of hardware and software responses when interventions are required for process improvement or corrective actions are also covered in detail.	4	⌃

Intralogistics & Cybersecurity Elective Cluster

Subject Code	Subject	Credit Units

BLO2010	Distribution Centre Management	4	^
	This subject provides an overview of the role of a Distribution Centre (DC) in the supply chain. It also covers the various activities performed within a DC and the significance of these activities on customer service and total logistics costs. It focuses on the major resources to be applied in a DC and explains how they interact with one another in contributing to the DC's effectiveness and efficiency. It will also cover the significance of providing DC services to the Third-Party Logistics industry.		
CCF2C02	IOT Security	4	^
	This subject covers the knowledge and skills required to analyse and troubleshoot IoT vulnerabilities and threats. You will use latest technologies to perform risk assessments and recommend mitigation strategies for common security issues in IoT systems.		

Robotics Elective Cluster —

Subject Code	Subject	Credit Units	
EMF3005	Robotics & Automation	4	^
	This subject covers factory automation systems which are the foundation for advanced manufacturing systems. It provides the essential concepts and background on industrial automation, robotics and their applications, as well as their integration into a complete manufacturing system. You will also learn the working principles and applications of automation equipment and how to automate production processes to achieve quality and high productivity. Both hardware and software links between the main factory automation components are introduced.		

EMF2002	Smart Manufacturing System	4	^
	This subject introduces the core elements of a smart manufacturing system where real-time manufacturing data enables flexibility and increases productivity. An introduction to advanced manufacturing and key enabling technologies such as Radio Frequency Identification (RFID) systems, Manufacturing Executions Systems (MES) and Augmented Reality (AR) are used to lay the foundation for understanding the application and benefits of smart manufacturing.		

Semiconductor Technology Elective Cluster —

Subject Code	Subject	Credit Units	
EMI3005	Cleanroom Equipment & Technology	4	^
	This subject introduces contamination control in a cleanroom and the factors to control the environment. It includes wafer plant facilities, process equipment and vacuum technology. Practical training includes appreciating the environment in the cleanroom, identifying the various components of a deionised water purification plant and operating vacuum pumps and systems.		
EMI2008	IC Process Integration	4	^
	This subject covers the basic concepts of IC, IC fabrication and IC wafer fabrication, as well as producing process flow, conceptual mask layouts and test structures for CMOS process. It also covers the basic concepts of process in-line monitoring and characterisation of basic solid state devices.		

University Pathway Programme (SUTD) —

Subject Code	Subject	Credit Units	
ESE3015	**Computational Thinking for Design**	4	^
	This subject covers programming both in the architectural design and computing contexts targeted at novice programmers. It will introduce students to programming and design computing skills that are essential for their studies. Students will learn visual programming and python programming together with design concepts, and will apply these skills in related projects.		
EMA3002	**Modelling & Analysis**	4	^
	The main objective of this subject is to provide students firm foundations of single variable calculus so that they can apply calculus to model, solve and analyse applied math problems. It aims to motivate students on the importance of calculus through a plethora of applications in engineering, physical and biological sciences, computer science, finance, economics, probability and statistics and other topics. On top of the basic concepts, techniques and applications of two branches of calculus - differentiation and integration, students will also learn to use simple software to implement numerical methods in calculus.		
ESC3002	**Physical World**	4	^
	This subject provide students with the ability to understand and explain the inner mechanism of the physical world based on the principles of mechanics and thermodynamics. It aims to help students appreciate the beauty of physics and enable them to apply key concepts learnt to evaluate and address physics-based problems to make a positive impact on the world. By using concepts established through simplified mathematical models, reverse engineering case studies and experiential learning through hands-on		

	demonstrations, connections between physics concepts and theoretical models are reinforced with practice.		
ECS3003	**Global Humanities: Literature, Philosophy & Ethics** This subject examines stories as a way to understand ourselves and our world. Some of these stories have endured for centuries and spread far beyond their locus of origin. They raise questions that resonate with our lives even today. This subject will equip you with critical reading, thinking, and writing skills by exploring different ways of reading and interpreting classic texts. You will learn to identify the connections between various texts and between thinkers in history – ranging from those in ancient China and Greece to those in contemporary Singapore.	4	⌃

Special Electives

Students can opt to take Special Electives when offered. These optional subjects aim to stretch the students' potential to enable them meet their aspirations. They are taken in addition to the diploma cluster elective subjects.

Special Electives			—
Subject Code	**Subject**	**Credit Units**	
EED3009	**Special Project 1** 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.	2	⌃
EED3010	**Special Project 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.	2	⌃

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.		
EMA3001	**Higher Engineering Mathematics**	4	^
	The subject introduces mathematical concepts and techniques used in advanced engineering courses. You will learn topics in calculus such as limits and continuity, infinite series, improper integrals, multiple integrals, higher order differential equations, 2D and 3D analytic geometry, and partial differentiation.		

YEAR 1   YEAR 2   YEAR 3   **TPFUN**
_____

You will also take this set of subjects that equips you with the crucial 21st-Century life skills you need to navigate the modern world as an agile, forward-thinking individual and team player.

TP Fundamentals (TPFun) Subjects —

Subject Code	Subject	Credit Units	
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.

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.

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.

| 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.

| GTP1201 | **Career Readiness** | 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.

| GTP1202 | **Career Management** | 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.

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 global 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.

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.

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.

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.

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.

TGS1001	**Sustainability & Climate Action***	**3**	^

This subject prepares students to be responsible global citizens and future leaders who can contribute to the global community. It introduces the topics of sustainability and explores how human societies can act to build a sustainable future. This subject focuses on the impact of climate change, potential solutions to climate change, and the future of the green economy from global and local perspectives.

** Students must choose to take either **Sustainability & Climate Action** or **Guided Learning**.*

GRADUATION REQUIREMENTS

Cumulative Grade Point Average	min 1.0
TP Fundamentals Subjects	36 credit units
Diploma Core Subjects	82 credit units
Diploma Cluster Elective Subjects	8 credit units
Total Credit Units Completed	min 126 credit units