Electronics

OVERVIEW

Artificial intelligence, the Internet of Things and autonomous vehicles are some of the latest smart technologies that have emerged in today's hyper-connected world. As Electronics is the "heart" that make such smart connectivity possible, this has spawned strong demand for Electronics diploma holders.

This Electronics course grooms you holistically in both soft skills and technical skills, giving you a wide range of career options related to electronics, analytics and software programming.

Join our Electronics diploma course and chart your path to a successful future! You can also get up to 1 year of advanced standing for local or overseas university degree programmes!

Your Journey

Year 1

Through a student-centred approach, learn to acquire and apply broad-based knowledge and practical skills in interesting real-life applications related to technologies that are used in various industries globally, such as smart nation applications, Internet of Things (IoT) and robotics.

Year 2

Be trained in our well-equipped robotics centres of excellence and learn to handle advanced electronics, the connectivity of sensors and drives, data collection and analysis, and control systems, while acquiring higher-level practical skills that are highly sought after amidst today's industry transformation.

Year 3

Get authentic workplace experience and hone your interpersonal and technical skills through an internship and by working on a Major Project. You can also opt to specialise in one of these 4 areas: Aerospace Electronics, Industrial Artificial Intelligence, Robotics, or Semiconductor Technology.

ENTRY REQUIREMENTS

Minimum 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.

English Language (EL1)	Grades 1-7
Mathematics (E or A)	Grades 1-6
Any one of the listed subjects^	Grades 1-6
Any two other subjects, excluding CCA	-

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.

See also the minimum entry requirements for:

- International Students

Electronics

COURSE STRUCTURE

TP Fundamentals Subjects

Subject code	Subject	Level	Credit Units
ECS1005	Communication & Information Literacy In this subject, you will learn how to conduct research for relevant information and validate information sources. You will also learn to recognise and avoid plagiarism, and follow standard citation and referencing guidelines when presenting information. In the course of learning, you will be required to plan, prepare and present information appropriately in written and oral form. You will also be taught to consider the Message, Audience, Purpose and Strategy (MAPS) when writing and delivering oral presentations.	1	2
ECS1006	Workplace Communication In this subject, you will be taught how to conduct effective meetings while applying team communication strategies and the skills for documenting meeting notes. You will be required to write clear emails, using the appropriate format, language, tone and style for an audience. You will also be taught to communicate appropriately in and for an organisation when using various platforms. In all aspects, the principles of applying Message, Audience, Purpose and Strategy (MAPS) will be covered.	1	2
ECS1007	Persuasive Communication In this subject, you will be taught how to use persuasive language in written documents. You will be required to use information to your advantage to verbally communicate and convince an audience about your idea, product or service. Skills such as persuasive vocabulary, language features, graphical illustrations, tone and style would also be covered. The Message, Audience, Purpose and Strategy (MAPS) will also be applied when engaging in verbal and written communication.	1	2
GCC1001	Current Issues & Critical Thinking This subject presents you with a panoramic view of current local and global issues, which may have long term implications for Singapore. You will learn to apply critical thinking tools to examine current issues, support your views with relevant research and up-to-date data, articulate an informed opinion and mature as civic-minded individuals.	1	2

EIN1001	Innovation & Entrepreneurship The Innovation & Entrepreneurship subject is designed for learners from all disciplines to embrace innovation in either their specialised fields or beyond. You will first learn the Design Thinking framework, where you will develop problem statements and ideate solutions. Next, you will discover the tools for prototyping and innovation, such as 3D printing and laser cutting, at TP's Makerspace+ facility. Finally, you will acquire commercial awareness through the LEAN Startup framework of idea crystallisation, prototype building, customer testing and validation, refinement of business model canvas, and crowdfunding or crowdsourcing avenues.	1	2
LEA1011	Leadership: Essential Attributes & Practice 1 LEAP 1, 2 and 3 are three fundamental subjects that seek to cultivate in you, the attitude, skills and knowledge for the development of your leadership competencies. This character-based leadership programme enables you to develop your life-skills through establishing personal core values, which will become the foundation for your leadership credibility and influence.	1	1
LEA1012	Leadership: Essential Attributes & Practice 2 LEAP 1, 2 and 3 are three fundamental subjects that seek to cultivate in you, the attitude, skills and knowledge for the development of your leadership competencies. This character-based leadership programme enables you to develop your life-skills through establishing personal core values, which will become the foundation for your leadership credibility and influence.	1	1
LEA1013	Leadership: Essential Attributes & Practice 3 LEAP 1, 2 and 3 are three fundamental subjects that seek to cultivate in you, the attitude, skills and knowledge for the development of your leadership competencies. This character-based leadership programme enables you to develop your life-skills through establishing personal core values, which will become the foundation for your leadership credibility and influence.	1	1
LSW1002	Sports & Wellness This subject will help you develop both the physical and technical skills in your chosen sports or fitness activities. Through a structured curriculum that facilitates group participation, practice sessions and mini competitions, you will learn to build lifelong skills such as resilience, leadership, communication and teamwork. Physical activity sessions will be supplemented by health-related topics to provide you with a holistic approach to healthy living.	1	2
MCR1001	Career Readiness 1 This Career Readiness programme comprises three core subjects – Personal Management, Career Preparation and Career Management. It seeks to help you understand your career interests, values, personality and skills for career success. It also equips you with the necessary skills for seeking and securing jobs, and to develop professional work ethics.	1	1

MCR1002	Career Readiness 2 This Career Readiness programme comprises three core subjects – Personal Management, Career Preparation and Career Management. It seeks to help you understand your career interests, values, personality and skills for career success. It also equips you with the necessary skills for seeking and securing jobs, and to develop professional work ethics.	1	1
MCR1003	Career Readiness 3 This Career Readiness programme comprises three core subjects – Personal Management, Career Preparation and Career Management. It seeks to help you understand your career interests, values, personality and skills for career success. It also equips you with the necessary skills for seeking and securing jobs, and to develop professional work ethics.	1	1
EGS1002	Global Studies This subject provides essential skills and knowledge to prepare you for an overseas experience. You will examine the elements of culture and learn the key principles of cross-cultural communication. In addition, you will gain an appreciation and awareness of the political, economic, technological and social landscape to function effectively in a global environment.	1	3
EGS1003	Managing Diversity at Work* 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.	1	3
EGS1004	Global Citizenship & Community Development* 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.	1	3
EGS1005	Expressions of Culture* 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.	1	3
TGL1001	Guided Learning 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.	1	3

ESI3001	Student Internship Programme The on-the-job training nature of the programme allows you to gain some industrial experience. Through this programme, you will be exposed to the work environment so that you can better appreciate and understand the problems and issues at the work place. The content and scope of learning varies from organisation to organisation. However, it is envisaged that after the programme, you would have, in general, developed your communication and interpersonal skills as well as the right work ethics, and also become more mature, confident and independent, and have a more realistic expectation of what a working environment is like.	3	12

** Students must choose to take either one of these three subjects or TGL1001 Guided Learning.*

Core Subjects

Subject code	**Subject**	**Level**	**Credit Units**
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.	1	3
EED1002	Printed Circuit Board Design 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.	1	3
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.	1	6
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.	1	6
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.	1	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 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.	1	5
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.	1	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 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.	1	4
ESC1004	Engineering Physics 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.	1	3
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.	1	4
EED2011	Integrated Project This subject will enable you to learn and apply Python programming to develop software programmes for acquiring, extracting and organising structured and unstructured data from commonly used data sources, and feed the data into data visualisation tools or data analytics models with relevant project themes and applications.	2	3
EEE2006	Digital Sensors & Integrated Circuit Applications 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.	2	4

EMA2003	Engineering Mathematics 3 This subject introduces ordinary differential equations and approximation using the Maclaurin series and Fourier series. You will learn how to formulate engineering problems using first and second order differential equations and to solve initial value problems using techniques such as Laplace transforms. The application of statistics – Hypothesis Testing – will also be taught.	2	4
EMC3006	Microcontroller Applications 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.	2	5
ECT2005	Circuits & Control Systems 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.systems such as direct digital control system, distributed control system and fieldbus control system are also covered in detail.	2	4
EEE3004	Power Electronics & Drives 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.	3	4
EMP3002	Major Project The Major Project gives you an opportunity to integrate and apply your knowledge in a practical learning situation. Besides research, design and project management skills, the emphasis will also be on innovation, creativity, teamwork and enterprise.	3	8
EEE3005	Advanced Electronics & Communications This subject provides the basic concepts of designing and using linear integrated circuits for different functions such as amplifiers and voltage-controlled oscillators. The design of attenuators and filters, and fundamentals of sensors and transducers will be discussed too.	3	4
ESE1008	Data Visualisation & Analytics 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.	1	3

Cluster Elective Subjects

- Avionics elective cluster

Subject code	Subject	Level	Credit Units
EAE1006	Avionic Systems 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.	1	4
EAE3018	Aircraft Digital Systems 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.	3	5

- Industrial Artificial Intelligence elective cluster

Subject code	Subject	Level	Credit Units
ECC2014	Industrial IoT Analytics This subject provides the essential concepts and skills needed for digital transformation. It covers the application of middleware that facilitates interaction between traditional Programmable Logic Controllers (PLC), devices and machines enabled by the Internet of Things (IoT), and processes that enhance manufacturing operations. This knowledge in using middleware in manufacturing can be further exploited in other industries such as healthcare, education, and business.	2	4
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.	3	4

- Robotics elective cluster

Subject code	Subject	Level	Credit Units
EMF2002	Smart Manufacturing System This subject introduces the core elements of a smart manufacturing system, and how real time manufacturing data enables flexibility and increased 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. A hands-on approach and industrial visits will bring concepts and ideas of smart manufacturing to life, while e-learning will enable participants to learn at their own pace.	2	4
EMF3005	Robotics & Automation This subject covers factory automation systems that are the foundation for advanced manufacturing systems. It provides the essential concepts and background of 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. The links among the main factory automation components, in terms of both hardware and software, are also introduced.	3	4

- Semiconductor Technology elective cluster

Subject code	Subject	Level	Credit Units
EMI2008	IC Process Integration This subject covers the design of photo-masks, sequencing of processes to form a process flow, technologies in processing of solid state devices, isolation and interconnection structures, application of test structures for process monitoring as well as the characterisation and functionality testing of basic solid state devices.	2	4
EMI3005	Cleanroom Equipment & Technology 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.	3	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.

Subject code	Subject	Level	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.	3	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.	3	2
EED3011	Higher Engineering Skills 1 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.	3	2
EED3012	Higher Engineering Skills 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.	3	2
EMA3001	Higher Engineering Mathematics 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.	3	4

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**