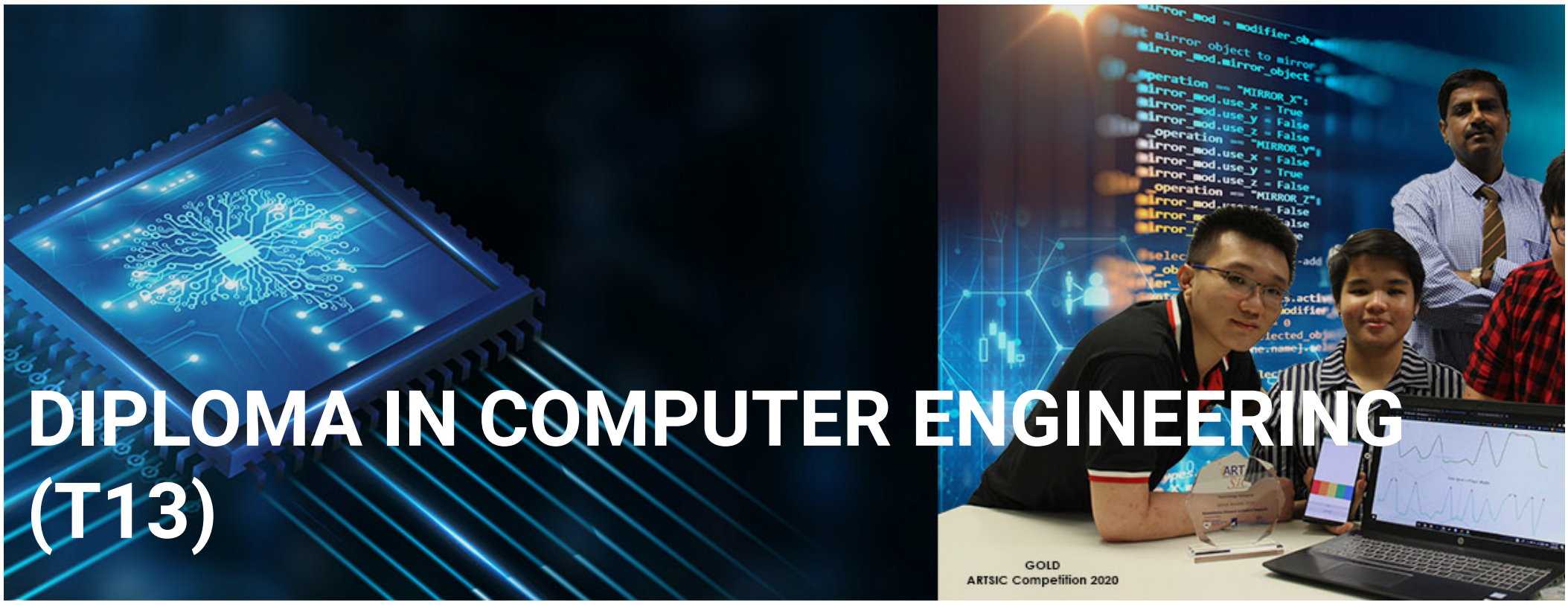

DIPLOMA IN COMPUTER ENGINEERING (T13)

Course Overview

With emerging Smart Nation trends such as the Internet of Things (IoT), data analytics, artificial intelligence, intelligent automation, cyber security and smart manufacturing — there's definitely a great demand for computer engineers skilled in these enabling technologies. This course will empower you to become part of this vital Smart Nation talent pool. You will be proficient in both hardware and software, as well as the integration of both. This will give you a competitive edge over purely software or purely hardware-skilled professionals.

In your final year, you can choose one of these elective clusters:

• Advanced Engineering Skills
• Industrial Internet of Things
• Virtual Reality

This course also prepares you for internationally recognised industry certification examinations such as those from National Instruments, CompTIA, Oracle, Microsoft and Cisco.

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

Watch video

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 following subjects^	1-6

Any two other subjects (except CCA)	-
2021 Planned Intake	**75**
Net ELR2B2 aggregate range (2021 JAE)	**9 - 14**

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:

- ITE Certificate Holders
- International Students

What You'll Learn

YEAR 1

Get a clear understanding of engineeering fundamentals and discover your competancies, interests and career aspirations through lab work, industrial visits and hands-on learning opportunities, which will prepare you for your next 2 years.

TP Fundamentals (TPFun) Subjects —

Subject Code	Subject	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 **M**essage, **A**udience, **P**urpose and **S**trategy (MAPS) when writing and delivering oral presentations.	**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 **M**essage, **A**udience, **P**urpose and **S**trategy (MAPS) will also be applied when engaging in verbal and written communication.	**2**

	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.	**3**	
	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.	**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.	**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**	
	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.	**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**	

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 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.	5
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 introduces the concepts in algebra and trigonometry that are fundamental to an engineering course. Topics include expressions and equations, functions and graphs, trigonometry, complex numbers, matrices and vectors. These also constitute pre-requisite knowledge for a course in Calculus.	**4**	
	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.	**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.	**3**	

YEAR 2

Envision and build smart iOT systems through the power of technology. Tap on hardware such as microcontrollers, sensors and actuators, utilise software systems such as ddatabase and enterprise applications and integrate them with programming, networking and artificial intelligence.

TP Fundamentals (TPFun) Subjects —

	Subject Code	Subject	Credit Units	
	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 **M**essage, **A**udience, **P**urpose and **S**trategy (MAPS) will be covered.	**2**	

	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. A one week residential stay is mandatory for this subject.		
	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.		
	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.		
	LEA1012	**Leadership: Essential Attributes & Practice 2**	**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.		
	MCR1002	**Career Readiness 2**	**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.		
	TGL1001	**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 must choose to take either one of these three subjects or TGL1001 Guided Learning.*

Core Subjects

Subject Code	Subject	Credit Units
ESE3012	**Artificial Intelligence & Machine Learning** This subject will provide you with the fundamental concepts of Artificial Intelligence (AI) and Machine Learning (ML). It will cover knowledge and skills in AI techniques and tools to build intelligent learning models from real-world data, through training, testing, validation and optimisation. Through hands-on group projects, you will build AI-based applications to add intelligence to existing systems.	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.	3
EMA2003	**Engineering Mathematics 3** 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.	4
ESE3014	**Full Stack Development** This subject will provide you with the basic knowledge of full stack application development. Full stack (web or mobile stack) refers to the development of both the front-end and the back-end portions of an application, thereby introducing all the necessary steps from conceptualisation of the application idea to the implementation of the final product. The subject will cover the various aspects of designing and implementing the client-end application as well as the design, implementation of a database, and the appropriate retrieval of the data, from the client application through a business logic layer.	4
ESE3013	**Intelligent Automation** This subject will provide you with basic knowledge and hands-on digital transformation skills on rapid multi-experience application development and integration of users, tasks and systems towards enhancing productivity, human augmentation and automatic data-driven decision-making. It will cover techniques on how to leverage on data from information systems and Internet of Things (IoT) devices for agile response and productivity. This subject will enable you to automate data-driven decision making through integration of advanced analytics and learning models to applications.	3

EMC2006	**Internet of Things Project** This subject equips you with the knowledge and skills required for implementing the new paradigm in which things interact with things, people and the Internet or information systems. The subject provides knowledge, skills and design approaches in using embedded systems, sensors, actuators and appropriate data communication technologies such as sensor networks, edge and cloud computing to achieve such interaction. A systems engineering approach will be adopted, under which you will review key technologies from prior learning for the different levels of the IoT (Internet of Things) stack and figure out how these different levels could be integrated to form complete IoT systems.	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.	5	
ESE2004	**Object-oriented Programming** This subject equips you with a good understanding of software design and development process. Important phases of the software development process will be covered. More emphasis will be placed on object-oriented software design using UML (Unified Modelling Language), software documentation and testing methodologies in order to gear you towards a more practice-oriented industry.	5	

Cluster Elective Subjects

Students must choose the same Elective Cluster in both Year 2 and Year 3

Advanced Engineering Skills Elective Cluster

Subject Code	Subject	Credit Units
EED3014	**Advanced Skills Practices** 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.	8

Industrial Internet Of Things Elective Cluster

	Subject Code	Subject	Credit Units	
^	**EMC3005**	**System & Network Integration** This subject equips you with the knowledge and skills essential for integrating heterogeneous subsystems into a smart system. The subject will adopt a systems engineering approach to examine current and emerging trends, key techniques and strategies for developing system and network integration solutions. You will be exposed to integration challenges such as legacy integration, human-system integration and system of system integration. Commonly used industrial connectivity standards and fieldbuses, as well as relevant hardware and software interfaces suitable for such integration, will also be covered. A mini-project will provide opportunity for you to apply your prior learning on embedded systems and programming along with those acquired in this subject to solve a system integration problem.	**4**	^

Intralogistics & Cybersecurity

	Subject Code	Subject	Credit Units	
^	**BLO2010**	**Distribution Centre Management** 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.	**4**	^

Virtual Reality Elective Cluster

	Subject Code	Subject	Credit Units	
^	**EDM2010**	**3D Modelling for Virtual Reality** This subject covers theories and skills for 3D modelling and basic animation. You will be equipped with an understanding of the fundamentals of how 3D software tools work, and gain experience in completing a 3D modelling and animation production development cycle. The subject uses a practice-oriented approach to equip you with the skills to develop 3D assets, create a virtual environment and enhance realism with appropriate lighting, texturing techniques and advanced render setting.	**4**	^

YEAR 3

You are now ready to embark on your Student Internship Programme and Major Project where you will apply the knowledge and skills you have acquired.

TP Fundamentals (TPFun) Subjects

Subject Code	Subject	Credit Units
ESI3001	**Student Internship Programme** 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.	**12**
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**
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**

Core Subjects

Subject Code	Subject	Credit Units
EMP3002	**Major Project** 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.	**8**

Cluster Elective Subjects

Students must choose the same Elective Cluster in both Year 2 and Year 3

Advanced Engineering Skills Elective Cluster

	Subject Code	Subject	Credit Units	
^	**EED3014**	**Advanced Skills Practices** 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.	**8**	^

Industrial Internet Of Things Elective Cluster

	Subject Code	Subject	Credit Units	
^	**ECC2013**	**Mobile Device Applications Development** This subject covers the development of applications on mobile and wireless computing platforms. It provides an overview of Mobile Web and Mobile Applications, their importance and benefits, as well as the technologies and methodologies for their development, such as the architectures, frameworks, standards, programming languages, design process and tools.	**4**	^

Intralogistics & Cybersecurity

	Subject Code	Subject	Credit Units	
^	**CCF2C02**	**IOT Security** 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.	**4**	^

Virtual Reality Elective Cluster

	Subject Code	Subject	Credit Units	
^	**EDM3004**	**Interactive Programming for Virtual Reality** This subject covers the fundamental theories and practical skills of 3D interactive design and development. It includes topics such as scripting for 3D assets with behaviour and interactivity, lighting, audio, animating 3D objects, user interfaces and deployment of the interactive applications. You will build upon the foundational skills you have acquired in 3D modelling, texturing and programming from previous semesters to create interactive and real-time applications such as Virtual Reality and Augmented Reality.	**4**	^

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. They are taken in addition to the diploma elective cluster 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** 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.	**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.	**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.	**4**	^

GRADUATION REQUIREMENTS

Cumulative Grade Point Average	min of 1.0
TP Fundamentals Subjects	36 credit units
Diploma Core Subjects	81 credit units
Diploma Cluster Elective Subjects	min 8 credit units
Total Credit Units Completed	125 credit units