Aerospace Engineering

OVERVIEW

Are you the type to look up to the sky every time you hear the roar of an aircraft high above? Do you marvel at how these magnificent machines can overcome gravity and stay airborne? Do you wonder how engineers build aeroplanes, and how some of them can fly so fast that they can break the sound barrier?

Then come to the course that will shed light on these mysteries. From aircraft flight and aircraft design to airframe structure and engine systems to the manufacturing of aircraft systems, and more, you will receive the training you deserve, and become an aerospace engineer the industry needs!

Your Journey

Year 1

Our core engineering subjects and some TP fundamental subjects will give you the solid foundation you need, and help you grow holistically. These will prepare you well before you subsequently embark on the more rigorous aspects of aerospace training.

Year 2

You can look forward to more CAAS SAR-66 modules, which enable you to appreciate aerospace engineering, and further improve your competency skill sets. You will feel challenged and yet more enriched in your pursuit of more advanced aerospace concepts.

Year 3

You will be taught engineering materials, hardware and aircraft maintenance practices during your attachment to TP-Lufthansa Technical Training Centre. You will also gain invaluable experience as an aerospace professional through your internship in an aerospace engineering company in the industry.

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 partial or 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

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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
EAE1002	Aircraft Electrical Fundamentals This subject provides you with broad-based knowledge on electrical theories, components and devices. It also covers electrical machines. In addition, you will be equipped with the knowledge that is expected under the Singapore Airworthiness Requirements (SAR-66) standard, so that you will be competent in getting your aircraft maintenance certification later on.	1	4
EAE1008	Aircraft Electronics & Digital Systems This subject covers the basics of semiconductors, printed circuit boards, servomechanisms, electronic instrument systems, logic circuits, fibre optics, electronic displays, electronic sensitive devices, electromagnetic environment and digital aircraft systems. The depth of coverage will adhere to the requirement of SAR-66 (Category B1) for M4 - Electronic Fundamentals and M5 - Digital Techniques/Electronic Instrument Systems. The aims of this subject are to equip students with the knowledge and skills to: • use and work with synchros and resolvers in servomechanisms • identify the layout of electronic/digital aircraft systems in modern wide transport aircraft • understand the electronic fundamental theory in modern board aircraft electronic instrument systems as required by the SAR-66 Module 4 and 5 (Category B1) of the Civil Aviation Authority of Singapore • pass the M4 and M5 (Category B1) examinations	1	4
EDR1003	Engineering Drawing Engineering drawing is essential for communicating engineering design. This subject will introduce you to two-dimensional mechanical engineering drawings as well as three-dimensional modelling with the use of both manual and computer-aided design (CAD) software. You will also learn general methods of dimensioning according to international and local standards.	1	4

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
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
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.	1	4
EME1002	Statics & Strength of Materials This subject consists of two principal areas: Fundamentals statics and strength of materials. Fundamental statics provides an introduction to the basic concepts in simple statics, while strength of materials introduces the methodology for designing members subjected to various loading conditions.	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

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
EAE2002	Aviation Legislation & Human Factors The subject provides basic knowledge and understanding of aviation legislation and human factors for ab initio engineers studying for their Singapore Airworthiness Requirements (SAR-66) aircraft maintenance licences. Knowledge of this subject has a significant impact on the safety standards expected of an aircraft maintenance engineer.	2	4
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.	2	4
EME2006	Engineering Material This subject will equip you with fundamental knowledge and practical skills to evaluate, process and inspect common aircraft materials, thereby building up your capability in detecting and testing surface defects in actual applications. You will be able to develop the knowledge and skills in the designing and selection of materials, as well as in supporting key processes to optimise the performance of aerospace components.	2	4
EME2008	Principles of Dynamics The application of dynamic systems theory can be seen everywhere in our daily lives, from vehicles moving on the road to planes flying in the air. In this subject, you will learn the fundamental principles of dynamics and apply them to the analyses of bodies in motion. The main topics covered include Newton’s laws of motion, the principle of work and energy, the principle of impulse and momentum, and the motion of projectiles, gyroscopic principles and periodic motion.	2	5
EME2009	Thermodynamics The aim of this subject is to equip students with the basic knowledge in thermodynamics, concepts of temperature scales and measurements, the First Law of Thermodynamics, Ideal Gas Laws, Second Law of Thermodynamics and heat energy calculations using a P-V diagram. The syllabus is based on the syllabus guide for relevant topics on thermodynamics listed in the Singapore Airworthiness Requirements (SAR-66) Module 2 “Physics”.	2	3
EME2010	Fluid Mechanics This subject provides students with fundamental knowledge in applied mechanics of fluids under incompressible viscous flow condition. It covers fluid properties, fluid statics, fluid in motion, governing equations, viscous flow through duct, minor losses, multiple-pipe system, drag and lift, and compressible flow.	2	3

EAE3008	Gas Turbine Engine This subject equips you with knowledge of aircraft propulsion methods, thermodynamic cycles, combustion and thermochemical analysis, reciprocating engines, gas turbine and jet engines, effects of atmospheric variations (temperature, density, pressure altitude) on engine and on engine/aircraft combination, auxiliary systems (such as fuel system, lubrication system, ignition, starting, fire protection, auxiliary power unit), and current developments in propulsion systems. The syllabus is equivalent to the Singapore Airworthiness Requirements (SAR-66) Module M15 on Gas Turbine Engine".	3	4
EAE3009	Basic Aerodynamics This subject introduces the principles of aerodynamics and flight controls. It is designed to give a good balance between theoretical knowledge with applications using classroom lessons, wind tunnel and computational fluid dynamics experiments. The syllabus includes all topics in the Singapore Airworthiness Requirements (SAR-66) Module M08 on Basic Aerodynamics".	3	3

Options

- Lufthansa Technical Training (LTT) option

Subject code	**Subject**	**Level**	**Credit Units**
EAE3020	Aerospace Maintenance Practices The subject provides fundamental knowledge and understanding of aircraft maintenance practices as well as materials and hardware for *ab initio* engineers studying for their Civil Aviation Authority of Singapore (CAAS), Singapore Airworthiness Requirements (SAR-66) basic knowledge examination paper for the subject module Materials and Hardware (M06) and Maintenance Practices (M07) leading to the aircraft maintenance licence for category B2 maintenance engineers. This subject covers safety precautions, work practices in an aircraft maintenance environment, mechanical and electrical tools, generic aircraft systems and inspection techniques, ferrous, non-ferrous and composites materials, types of corrosion and their identification, bolts and rivets fastener, piping, control cables and also the electrical components of the aircraft systems.	3	16

- Aerospace System Design (ASD) option

Subject code	**Subject**	**Level**	**Credit Units**
EAE3015	Aircraft Structures & Composites The subject will provide a firm foundation in airframe structures, design application and testing of composites in aircraft. The focus on stress and strength computational analysis, as well as design philosophies and concepts, will enable you to troubleshoot, analyse and develop possible repair schemes on the airframe structures competently.	3	4

EAE3022	Engine Maintenance & Workshop Practices This subject will equip you with the knowledge and skills to perform basic maintenance and engine build & strip, as well as carry out inspection and identify suitable repair processes for various gas turbine components. The subject also covers workshop safety and basic workshop practices so that you are able to develop safe practices and work efficiently with the basic hand-skills acquired. This foundation will equip and suitably prepare you for an exciting career in the engine Maintenance, Repair & Overhaul (MRO) sector.	3	4
EMP3002	Major Project This subject will give you an opportunity to integrate and apply the skills and knowledge gained during your course of study prior to the Major Project (MP). The engineering design thinking process developed through the MP will enable you to frame problems adequately, create more ideas and develop the best solution. The team-based MP also gives you the opportunity to work as an integrated product team so that you are well prepared for project-based careers in the aerospace industry.	3	8

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.

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	97 credit units
Total Credit Units Completed	**min 133 credit units**