



DIPLOMA IN AEROSPACE ENGINEERING (T51)

Course Overview

Have you always been fascinated with the world of aircraft? Whether it's appreciating the complexity of a plane's engine or researching how heavy aircraft can soar above the clouds, turn your fascination into passion with our Diploma in Aerospace Engineering!

In this course, you will gain a strong foundation specialising in aerodynamics, aircraft engines, as well as aircraft structures and systems. Your learning journey includes a six-month practical training in our Lufthansa Technical Training (LTT) Centre, opportunities for overseas study trips in Germany and the USA, as well as attachments in aerospace organisations in Singapore and beyond.

As TP is the only local polytechnic certified by the CAAS as an Approved Maintenance Training Organisation (AMTO), you can get direct credits that will shorten your subsequent professional Aircraft Maintenance Licence (AML) apprenticeship by up to 10 months.

Our diploma will prepare you for career opportunities in aircraft maintenance, repair and overhaul (MRO) and component manufacturing. In addition, if you aspire to be a pilot, you can take flying lessons as part of your Student Internship Programme in your final semester of study to get that coveted Private Pilot Licence (PPL).

You will get a **Certificate of Recognition (SAR Part-147 Approved Basic Training Course)** upon completion of the required modules in this course too.

The sky is the limit for you with our Diploma in Aerospace Engineering!

To download a copy of our 4-page course brochure, click [here](#).



FIRST SAR-147 APPROVED AMTO

First Polytechnic approved by the Civil Aviation Authority of Singapore to be a SAR-147 Approved Maintenance Training Organization (AMTO).



LEARN FROM EXPERTS

Quality practical skills training in aircraft maintenance practices with Lufthansa Technical Training (a SAR-147 AMTO).



TAKE FLIGHT

Opportunity for one-semester attachment to Singapore Youth Flying Club (SYFC) for Private Pilot License (PPL).

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	120
Net ELR2B2 aggregate range (2023 JAE)	6 - 15

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.

What You'll Learn

YEAR 1

YEAR 2

YEAR 3

TPFUN

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 subsequently embarking on the more rigorous aspects of aerospace training.

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
EEE1002	Electronic Devices & Circuits This subject covers the theory and practical knowledge of electronic devices such as diodes, bipolar junction transistors, field effect	6

transistors and their applications. It also focuses on the fundamentals of operational amplifiers and their applications, and the rudiments of circuit troubleshooting and testing.

EDR1003

Engineering Drawing

4



Engineering drawing is essential for communicating engineering design. This subject will introduce you to the understanding and preparation of two-dimensional mechanical engineering drawings with the use of both manual and Computer Aided Design/ Drafting (CAD) software. CAD modelling is also taught. You will also learn general methods of dimensioning according to international and local standards.

EMA1003

Engineering Mathematics 1

4



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.

EMA1002

Engineering Mathematics 2

4



This subject introduces the basic concepts of calculus and statistical method to test a hypothesis. Basic concepts in calculus include limits, derivatives and integrals. Applications of the derivative and integrals in engineering will be discussed. Basic statistical method in hypothesis testing includes normal distribution, confidence interval of population mean and procedure to test hypothesis for a claim made about a population mean.



ESC1004

Engineering Physics

3



This subject covers a spectrum of fundamental physics laws and concepts applicable to the scope of engineering physics. It covers a few core areas including Mechanics,

	Energy, Thermal Physics, Electromagnetism, Waves & Optics and Materials. This subject provides a foundation for a further in depth study of the various engineering disciplines.		
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.	4	
EME2009	Thermodynamics This subject equips you with the basic knowledge in thermodynamics, concepts of the 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 guide for relevant topics on thermodynamics listed in the Singapore Airworthiness Requirements (SAR-6) Module 2 "Physics". Knowledge of this subject allows you to understand the mechanisms of heat transfer and how gas turbine engines work.	3	

YEAR 1

YEAR 2

YEAR 3

TPFUN

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.

Core Subjects		
Subject Code	Subject	Credit Units
EAE1002	Aircraft Electrical Fundamentals This subject provides you with broad-based knowledge on electrical	4

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.

EAE1008

Aircraft Electronics & Digital Systems

4



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

EAE2002





Aviation Legislation & Human Factors




4



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.

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	
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	
EME2006	Engineering Materials 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.	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.	4	

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.	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".	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 learn the fundamental principles of dynamics and apply them to the analyses of bodies in motion. The objective is to present the foundation and applications of dynamics. 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.	5 

You will be taught engineering materials, hardware and aircraft maintenance practices during your attachment to the 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.

Core Subjects			
Subject Code	Subject	Credit Units	
EMP3002	<p>Major Project</p> <p>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.</p>	8	^
EAE3020	<p>Aerospace Maintenance Practices</p> <p>The subject provides fundamental knowledge and understanding of aircraft maintenance practices as well as materials and hardware for <i>ab initio</i> 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</p>	16	^

electrical components of the aircraft systems.

EAE3015

Aircraft Structures & Composites

4



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.

EAE3022

Engine Maintenance & Workshop Practices

4



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.

Options

Lufthansa Technical Training (LTT) Option



Subject Code

Subject

Credit Units

EAE3020

Aerospace Maintenance Practices

16



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.

Aerospace System Design (ASD) Option

Subject Code	Subject	Credit Units
EAE3015	<p>Aircraft Structures & Composites</p> <p>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.</p>	4
EAE3022	<p>Engine Maintenance & Workshop Practices</p> <p>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</p>	4

Maintenance, Repair & Overhaul (MRO) sector.

EMP3002

Major Project

8





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.

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.

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	2	

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 **Message, Audience, Purpose and Strategy** (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 **Message, Audience, Purpose and Strategy** (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	97 credit units
Total Credit Units Completed	min 133 credit units