AEROSPACE ELECTRONICS COURSE MODULES

Always dreamt of navigating an aircraft from its cockpit one day? Or handling the in-flight entertainment and control systems onboard modern planes? With the Diploma in Aerospace Electronics [AE], the sky's the limit.

The course will provide you with a strong engineering foundation as well as a firm grounding in the design and application of electronics in aviation. You will also get to study the principles of flight and learn to fly an aircraft using a realistic flight simulator. If you are game enough, you can even sign up for national competitions such as the Singapore Amazing Flying Machine Competition and overseas competitions such as the International Unmanned Flying Car Competition in South Korea.

In the first two years, we will strengthen your engineering knowledge with modules such as Engineering Mathematics, Engineering Mechanics and Programming. You will also gain an overview of the avionics systems such as a plane's radar and global positioning system, and learn how to maintain an aircraft's electronics. In your final year, you will learn about the various sophisticated systems on an aircraft, such as navigation and communication systems.

Then, put your knowledge and skills into practice with either an industry project or an internship with industry leaders such as Airbus Helicopters, Hawker Pacific Aerospace, Rockwell Collins, Scoot, SilkAir, ST Aerospace, ST Electronics and Thales Solutions Asia.

LEVEL 2.1

Avionics Systems

This module provides students with an appreciation of aircraft electronic systems. It includes topics such as cockpit instrumentation, aircraft navigation, communication, surveillance and lighting electronics. This module equips students with the knowledge required for the advanced modules on Aircraft Navigation and Communication Systems (ANCS) and Aircraft Electrical & Instrumentation Systems (AEIS).

Aircraft Materials

This module familiarises students with the family of common engineering materials comprising metals, ceramics, polymers and composites with emphasis on the structures, properties, performance and processing of such materials for aircraft maintenance and repair. Learning is enhanced by laboratory work on microstructures and mechanical testing. Students will be introduced to a knowledge base for materials and processes.

Analogue Circuit Design & Applications

This module covers the fundamentals of analogue electronic circuit design and applications. The operating principles and design of commonly used analogue devices and operational amplifier circuits are taught in this module. The main topics include amplifiers, comparators, oscillators, filters, and digital-to-analogue and analogue- to-digital converters. Applications in various practical circuits are also illustrated in this module. This module is a pre-requisite for the Fundamentals of Control Systems module.

Engineering Physics

This module is offered to students of Diploma in Aerospace Electronics. The syllabus is designed to equip the students with the necessary knowledge and skills to understand the intricacy of the Aviation principles. Topic covered in this module include Mechanics, Kinematics, Fluid mechanics, Wave and Sound, Optics and Light and Thermodynamics.

Career & Professional Preparation II

This module helps students with skills necessary to seek and secure work. They will also be equipped to communicate their personal brand in a positive way. As students sharpen their communication skills, they will also learn how to market themselves effectively.

Electronic Design Prototyping 1

The main objectives of this module are to introduce students the techniques to construct an electric circuit and practical skills in measurement and troubleshooting. Students will learn the process for planning, construction and testing of a project. The focus of the module is on the hands-on practice for bread boarding, PCB design and assembly and test & measurement. Simple troubleshooting techniques and CAD tools will also be introduced to aid in their design of the PCB.

Microcontroller Programming & Interfacing

This module introduces students to the fundamentals of microcontroller programming and interfacing. C language programming is used to illustrate the operation of the microcontroller. Interfacing the microcontroller to basic input-output devices such as switches, LEDs, 7-segment display and keypads help to demonstrate the behaviour of the application software running on a working system.

Interdisciplinary Elective Module (IS Module)

Students embark on a general module from categories ranging from Communication, Life Skills, Entrepreneurship, Media & the Arts to Science & Technology.

LEVEL 2.2

Aircraft Maintenance Practices

This module helps students to become familiar with the workshop as well as inculcates good workshop practices. It covers various soldering methods such as welding, brazing, soldering and bonding, aircraft weight and balance, aircraft handling and storage, disassembly, inspection, repair and assembly techniques, and maintenance procedure.

Applications Programming

This practice-oriented module equips students with the fundamental knowledge and skills required to develop Windows applications. The students will develop conceptual understanding to design and develop applications to solve business and engineering problems. Main topics include branch and loop, array, and data files accessing and methods.

Electronic Design Prototyping 2

The main objectives of this module are to introduce students the prototyping techniques on electronic assembly and practical skills in electronic project design. Students will learn the process for planning, construction and testing of a project. The focus of the module is on the hands-on practice for CAD design, bread-boarding, point-to-point wiring, PCB assembly, test & measurement, and fault finding on electronic circuits.

Engineering Mathematics 3A

This module is a continuation of Engineering Mathematics 2. Topics in this module include integration with applications, differential equations, Laplace transform and Fourier Series.

Fundamentals of Aerospace Technology

This activity-based module introduces students to the principles of flight, and traces the historical development of aerospace technology, its impact on society and the economics, safety and environmental issues. It highlights the nature and scope of the aerospace industry in Singapore, and the broad technical training for the profession with specific reference to the structure of the course. The module aims to create professional awareness in students.

Human Factors

This module is intended to provide an introduction to human factors and human performance and limitations for students who may be working in the aviation industry. The module and assessment expand upon the syllabus items listed in the Module 9 of CAAS SAR-66 requirement. In addition to class test, the assessments also include individual reading assignments and a case study. It has to be noted that this module is not a fully comprehensive reference document on human factors in aircraft maintenance. Further references have to be made from an organisation perspective.

Telecommunication Principles

This module is the introductory module to radio communication. It gives an understanding of the basic concepts of analog communication systems. The characteristics of a basic communication system and the environmental factors that affect communication will be discussed. The concepts that are necessary for the understanding of linear systems will be explained, with emphasis on resonance and filters. Students will be taught the fundamental concepts of analog modulation and demodulation techniques such as AM and FM and their applications. The concept of AM/ FM receiver will also be introduced.

World Issues: A Singapore Perspective (IS Module)

This module takes a global approach to significant current and historical events. The aim is to enhance students' understanding of such events and issues in the context of Singapore, as well as challenge students to think critically about choices and decision-making vis-à-vis the nation state.

COURSE CURRICULUM

Module Name	Credit Units
YEAR 2	
Level 2.1 (26 hours per week)	
Aircraft Materials	3
Analogue Circuit Design & Applications	5
Avionic Systems	3
Career & Professional Preparation II	2
Engineering Physics	3
Electronic Design Prototyping 1	3
Microcontroller Programming & Interfacing	5
Interdisciplinary Studies (IS) elective ^	2
Level 2.2 (27 hours per week)	
Aircraft Maintenance Practices	3
Applications Programming	4
Electronic Design Prototyping 2	4
Engineering Mathematics 3A	4
Fundamental of Aerospace Technology	3
Human Factors	2
Telecommunication Principles	5
Interdisciplinary Studies (IS) elective ^	2

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is/

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a

knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.