

## **Module Synopses for DEASL Programme (DEASL)**

### **Certificate in Aeronautics Fundamentals 1**

#### **MM7411 – Aircraft Powerplant (90 hrs)**

To provide students with a basic knowledge on the fundamental principles of aircraft gas turbine engine theory and construction. To give student a working knowledge on the principles, functioning and operating characteristics of the various aircraft gas turbine engine systems, components, and safety devices.

#### **MM7501 - Fundamentals of Flight (60 hrs)**

This module introduces the principles of flight governing heavier than air flying machines, namely; properties of the atmosphere and use of the pressure information at altitude to estimate flight altitude and, together with total pressure, to estimate flight speed, development of aerodynamic forces and moments followed by wing and planform effects; basic descriptions of aircraft performance especially during take-off and landing as well as, most importantly, cruise are analysed; aircraft stability and control and their significance to flight, and fundamentals of high speed flight & rotary wing flight are also taught.

#### **MM7801 - Human Factors & Air Legislation (60 hrs)**

This module aims to equip students on the concepts of human factors and application of human factors to mitigate human errors in aviation maintenance. The students will also be learning a basic knowledge of Singapore aviation legislation covering the regulatory framework placing specific emphasis on aircraft maintenance and engineering.

#### **MM7031 – Practicum 1 (45 hrs)**

The company will provide the students with on-the-job-training to deepen their skills sets at the workplace; Singapore Polytechnic (School of Mechanical & Aeronautical Engineering) will conduct the assessment of the module.

### **Certificate in Aeronautics Fundamentals 2**

#### **MM7503 - Aircraft Systems (60 hrs)**

This module provides a full understanding of aircraft mechanical systems. Topics include hydraulic, pneumatic, landing gear, flight control, air conditioning, pressurisation, fire detection & extinguishing, ice detection & anti-icing & de-icing, oxygen, fuel, and water & waste systems.

#### **MM7502 - Aircraft Structures (60 hrs)**

This module provides a basic knowledge of aircraft design and construction. Topics include the different types of fuselage construction, wings, empennage, flight controls and landing gear.

#### **MM7211 - Computer-Aided Design (Aeronautical) CATIA (60 hrs)**

CATIA is the de-facto CAD software in the aerospace industries. This module aims to impart aeronautical students with CAD skills using CATIA. The module is designed to impart fundamentals of solid modelling, surface modelling and Sheet metal design in the context of Aerospace. Generation of 2D Engineering drawings and assembly drawings are also covered.

#### MM7032 – Practicum 2 (45 hrs)

The company will provide the students with on-the-job-training to deepen their skills sets at the workplace; Singapore Polytechnic (School of Mechanical & Aeronautical Engineering) will conduct the assessment of the module.

### **Certificate in Engineering Fundamentals 1**

#### MM7311 - Engineering Materials (60 hrs)

This module provides students with fundamental knowledge of common engineering materials and it covers phase diagram, microstructure, heat treatment processes, properties and applications of the common engineering materials such as plain carbon steels, alloy steels, aluminium and its alloys, and plastics and elastomers. Mechanical tests and casting processes are also taught.

#### MM9400 - Statics & Dynamics (60 hrs)

To provide knowledge in foundational concepts of units, dimension, motion, force, torque and their effects. This subject also supports the overall course aim of developing problem solving skills in the engineering mechanics.

#### MM7013 – Fundamental of Composite Repair (60 hrs)

This module aims to equip students with a comprehensive training, understanding and application of full range of composite repair techniques from cosmetic through to structural repairs. Emphasis is on understanding failure modes, recognising materials and production process, the correct use of tools and techniques to apply effective repair.

### **Certificate in Engineering Fundamentals 2**

#### MM7014– Aerospace Component Manufacturing (60 hrs)

To provide students with a working knowledge of the capabilities and limitations of computer aided machining processes. This includes both CNC turning and CNC Milling. Lab-assignments will be given to all students to practise on the latest CAD/CAM and CNC applications. Together with practical sessions on Measurements, the module integrates key manufacturing activities from Design, Manufacturing to Inspection of Precision Engineering Components. (CDIO Standard 3).

#### MM7015 – Introduction to Additive Manufacturing (45 hrs)

To provide students with a basic knowledge of the capabilities and limitations of Additive Manufacturing (AM) processes. This includes understanding different AM technologies, part and process selection, part pre-process, part printing and post process for Polymer and Metal AM. Lab-assignments will be given to all students to understand the latest AM machine. Together with sessions

on design software for AM, the module integrates key activities from Design, fabrication to post processing of AM Components.

#### MM9802 – Quality Engineering and Management (60 hrs)

The module teaches the basic concepts of Quality Management, requirements in Quality Management Systems Standards as well as Quality Improvement Techniques. Upon completion of this module, students will have some knowledge on management of quality in an organisation, understand ISO 9001 Quality Management System Requirements, know some fundamentals of measurement, basic inspection tools and gauge control and be able to apply appropriate techniques (FMEA, SQC or DOE) to solve quality related problems.

#### **Certificate in Engineering Fundamentals 3**

##### ENG103 - Digital Electronic Design (36 hrs)

Upon the completion of the Digital Electronics Design course, students will be able to perform analysis and design of digital circuits. The course teaches the principles of digital circuit components that are the basic building blocks, and also the application of appropriate mathematical methods for modeling components and circuits.

##### ENG101 - Analogue Electronics Design (36 hrs)

Semiconductor devices and integrated circuits are the backbone of modern technology. This course provides students with a thorough understanding of analogue electronics principles, components and systems, which form the foundation of this technology. ENG101 teaches the principles of electronics components that are the basic building blocks, and also the application of appropriate mathematical methods of modelling of components and circuits. It is an integral part of undergraduate curriculum for students majoring in electrical or computer engineering and shall deliver the essential concepts through both the theoretical and practical know how as needed in this field of engineering.

##### EAS109 - Thermo-Fluid Mechanics (36 hrs)

This course provides the student with introductory knowledge and understanding of fluid mechanics and engineering thermodynamics. Examples of engineering applications relating to fluid flow and thermodynamic principles will be used during the lectures and tutorial exercises. This is an integral part of the undergraduate curriculum for students specializing in aerospace engineering. The subject concepts and practical applications will be delivered through seminars and laboratory classes.