Subject Description Form

Subject Code	AAE3005
Subject Title	Introduction to Aircraft Design and Aviation Systems
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject will provide students with 1. To develop students' knowledge on the components and operating principles of essential mechanical, electrical and avionics systems in civil transport aircraft; and 2. To provide students an overview of the components of aviation systems; and 3. To develop students' understanding of the up-to-date operational concepts, technology applications and practices in aviation industry; and 4. To develop students' appreciation towards academic integrity.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand key aircraft systems including flight control system, fuel system, propulsion system, hydraulic system, electrical systems, avionics system, environmental control system, pneumatic system, and emergency system; and b. Explain the relationship among major aviation systems; and c. Understand air traffic management, flight standards, airworthiness provided by regulatory bodies, and accident investigation.
Subject Synopsis/ Indicative Syllabus	**Atmospheric Condition** - Properties of air. The Earth's atmosphere. Standard atmosphere. Atmospheric wind and turbulence. **Flight Control Systems** - Principles of flight control. Primary and secondary flight controls. **Powerplant and Fuel Systems** - Aircraft engine. Turbojet engine. Characteristics of aircraft fuel systems. **Hydraulic Systems and Pneumatic Systems** – Hydraulic systems in aircraft and their applications. Landing-gear system. Braking and anti-skid. Use of bleed air. Bleed air control. Thrust reversers. **Electrical Systems** - Civil aircraft electrical system. Electrical power generation. Motor and Actuators. Electrical loads. **Avionics Systems** – Regulatory and Advisory Agencies related to avionics systems. Fundamentals of airborne communication systems. Basic principles of terrestrial radio navigation and landing aids. **Environmental Control Systems** - Environmental control system design, Lighting, Air conditioning. Cabin pressurization.

Land Gear Systems - Aircraft landing gear, gear arrangement, retraction and detraction, structures and tyres.

Emergency Systems - Emergency power generation. Battery system. Warning systems. Fire detection and suppression.

Aviation Systems – Key aviation system components. Relationship among various components. Flight planning. Flight simulator. Airport operation. Airline management.

Aviation Authorities, Air Agreements and Government Flying Service - Key aviation authorities. Bi-lateral agreement. Air transportation agreements. Role of Government Flying Service.

Air Traffic Control – Radar fundamentals & basic surveillance systems, e.g. ATCRBS.

Academic Integrity – An online Tutorial on Academic Integrity on or before Week 4 of the semester.

Teaching/Learning Methodology

Lectures and tutorials are used to deliver the fundamental knowledge in relation to various aircraft systems and aviation systems (outcomes a to c).

Teaching/Learning Methodology	Intended subject learning outcomes to be covered		
	a	b	c
1. Lectures	✓	✓	✓
2. Tutorials	✓	✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
		a	b	c
1. Examination	50%	✓	✓	✓
2. Assignments and quiz	50%	✓	✓	✓
3. Online Tutorial on Academic Integrity	0%			
Total	100 %			

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Overall Assessment:

0.5 × End of Subject Examination + 0.5 × Continuous Assessment

Examination is adopted to assess students on the overall understanding and the ability of applying the concepts. It is supplemented by the tests, assignments and laboratory reports which provide timely feedbacks to both lecturers and students on various topics of the syllabus.

	Pass Condition In order to pass this subject, students must obtain a Grade D or above for total marks comprising the above assessment components AND successfully complete the Online Tutorial on Academic Integrity (OTAI) on or before week 4 of the semester.	
Student Study Effort Expected	Class contact:	
	▪ Lecture	33 Hrs.
	▪ Tutorial	6 Hrs.
	Other student study effort:	
	▪ Self-Study	45 Hrs.
	▪ Case study report preparation and presentation	21 Hrs.
	Total student study effort	**105 Hrs.**
Reading List and References	1. I. Moir amd A.G. Seabridge, Design and Development of Aircraft Systems – An Introduction, First Edition, AIAA Education Series, 2004. 2. Richard De Neufville. Airport Systems: Planning, Design, and Management, McGraw-Hill, 2003. 3. Jon D. Fricker and Robert K. Whitford, Fundamentals of Transportation Engineering: A Multimodel Systems Approach, Prentice-Hall, 2004. 4. Helfrick A, Principles of Avionics, 7th Edition, Avionics Communications, 2012.	

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