Subject Description Form

Subject Code	AAE4107
Subject Title	Aircraft Gas Turbine Engine Systems
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** AAE3003 Aircraft Propulsion Systems **AND** AAE2102/IC2133 Aircraft Manufacturing and Maintenance Fundamentals
Objectives	To provide students with knowledge of aircraft gas turbine engine systems and application in engine monitoring and maintenance
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Acquire good understanding of aircraft turbine engine design and construction; and b. Demonstrate good understanding of compressor stall/surge and its prevention; and c. Apply their knowledge and skills to explain the limitations of aircraft gas turbine engines under normal and abnormal operational conditions.
Subject Synopsis/ Indicative Syllabus	**Inlet -** Compressor inlet ducts; Effects of various inlet configurations; Ice protection. **Compressors -** Axial and centrifugal types; Constructional features and operating principles and applications; Wide-chord fan technology; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compression ratio. **Combustion Section -** Different designs of combustion chambers; Constructional features and principles of operation. **Turbine Section -** Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep; Turbine cooling **Exhaust -** Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.
Teaching/Learning Methodology	Lectures are used to deliver the fundamental knowledge in relation to aircraft gas turbine engines (outcomes a to c). Tutorials are used to illustrate the applications of fundamental knowledge to practical situations (outcomes a to c).

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

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
		a	b	c
1. Assignments / Quizzes	50%	✓	✓	✓
2. Final examination	50%	✓	✓	✓
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 continuous assessment including assignments and closed-book quizzes. The continuous assessment is aimed at enhancing the students' comprehension and assimilation of various topics of the syllabus.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures	36 Hrs.
	▪ Tutorials	3 Hrs.
	Other student study effort:	
	▪ Assignments	20 Hrs.
	▪ Self-study	46 Hrs.
	Total student study effort	**105 Hrs.**

Reading List and References

1. EASA Module 15 Gas Turbine Engine, Aircraft Technical Book Co. 4th Edition
2. The Jet Engine, Rolls Royce, Latest Edition
3. Mattingly, J.D., Boyer, K.M., von Ohain, H., Elements of Propulsion: Gas

	Turbines and Rockets, AIAA, 2016.

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