

Subject Description Form

Subject Code	AAE4101
Subject Title	Aviation Power Systems
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	To provide students with knowledge of electrical power systems, application of power electronics, industry practice in aircraft and space.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. Acquire good understanding of electrical power systems in aircraft; and b. Acquire good understanding of electrical power distribution in aircraft; and c. Acquire the knowledge of applying power electronics in aviation.
Subject Synopsis/ Indicative Syllabus	<p>Aircraft Electrical Generation Systems - role of electrical power systems, electrical power sources and loads, power conversion, voltage and frequency regulation, synchronization and load shedding, power management.</p> <p>Aircraft Electrical Distribution and Protection - evolution of aircraft electrical system, more electric equipment & system, power distribution and protection systems, no-break power transfer, load shedding, case studies.</p> <p>Aircraft power electronics - AC/DC conversion, DC/DC conversion, TRU, VSCF, Auxiliary power unit.</p> <p>Backup power - Battery system, charger, backup generator, Backup converter</p> <p>Power utilization - Lighting, Heating, ventilation, entertainment system, Avionics system</p>
Teaching/Learning Methodology	<ol style="list-style-type: none"> 1. The teaching and learning methods include lectures/tutorials sessions, homework assignments, tests, case study reports/presentations, and examination. 2. The continuous assessments and examination are aimed at providing students with integrated knowledge required to understanding the impact on environment from the aviation industry and the related mitigation measures. 3. Technical/practical examples and problems are raised and discussed in classes and tutorial sessions.

	Teaching/Learning Methodology	Intended Learning Outcomes to be covered																																			
		a	b	c																																	
	1. Lecture	✓	✓	✓																																	
	2. Tutorial	✓	✓	✓																																	
	3. Homework assignments	✓	✓	✓																																	
	4. Case study report and presentation		✓	✓																																	
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="478 748 1425 1290"> <thead> <tr> <th data-bbox="478 748 751 916" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="751 748 919 916" rowspan="2">% weighting</th> <th colspan="3" data-bbox="919 748 1425 848">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th data-bbox="919 848 1086 916">a</th> <th data-bbox="1086 848 1257 916">b</th> <th data-bbox="1257 848 1425 916">c</th> </tr> </thead> <tbody> <tr> <td data-bbox="478 916 751 1016">1. Homework assignments</td> <td data-bbox="751 916 919 1016">10%</td> <td data-bbox="919 916 1086 1016">✓</td> <td data-bbox="1086 916 1257 1016">✓</td> <td data-bbox="1257 916 1425 1016">✓</td> </tr> <tr> <td data-bbox="478 1016 751 1084">2. Test</td> <td data-bbox="751 1016 919 1084">20%</td> <td data-bbox="919 1016 1086 1084">✓</td> <td data-bbox="1086 1016 1257 1084">✓</td> <td data-bbox="1257 1016 1425 1084">✓</td> </tr> <tr> <td data-bbox="478 1084 751 1151">3. Case study</td> <td data-bbox="751 1084 919 1151">10%</td> <td data-bbox="919 1084 1086 1151"></td> <td data-bbox="1086 1084 1257 1151">✓</td> <td data-bbox="1257 1084 1425 1151">✓</td> </tr> <tr> <td data-bbox="478 1151 751 1218">4. Examination</td> <td data-bbox="751 1151 919 1218">60%</td> <td data-bbox="919 1151 1086 1218">✓</td> <td data-bbox="1086 1151 1257 1218">✓</td> <td data-bbox="1257 1151 1425 1218">✓</td> </tr> <tr> <td data-bbox="478 1218 751 1290">Total</td> <td data-bbox="751 1218 919 1290">100 %</td> <td data-bbox="919 1218 1086 1290"></td> <td data-bbox="1086 1218 1257 1290"></td> <td data-bbox="1257 1218 1425 1290"></td> </tr> </tbody> </table> <p data-bbox="478 1339 1431 1406">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p data-bbox="478 1440 724 1473">Overall Assessment:</p> <p data-bbox="478 1507 1265 1541">$0.6 \times \text{End of Subject Examination} = 0.4 \times \text{Continuous Assessment}$</p> <p data-bbox="478 1574 1431 1709">The continuous assessment consists of three components: homework assignments, test and case study report & presentation. They are aimed at evaluating the progress of study, assisting them in self-monitoring of fulfilling the respective indented subject learning outcomes.</p> <p data-bbox="478 1742 1431 1839">The examination is used to assess the knowledge acquired by the students for understanding and analysis the problem critically and independently; as well as to determine the degree of achieving the indented subject learning outcomes.</p>				Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			a	b	c	1. Homework assignments	10%	✓	✓	✓	2. Test	20%	✓	✓	✓	3. Case study	10%		✓	✓	4. Examination	60%	✓	✓	✓	Total	100 %			
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Student Study Effort Expected	Class contact:																																				
	▪ Lecture			26 Hrs.																																	
	▪ Tutorial/Case Study			13 Hrs.																																	
	Other student study effort:																																				

	▪ Self-study	36 Hrs.
	▪ Homework Assignments	15 Hrs.
	▪ Case Study Report Preparation	15 Hrs.
	Total student study effort	105 Hrs.
Reading List and References	<ol style="list-style-type: none"> 1. Pallett, Aircraft Electrical Systems, Pearson Education, 1 Sep 2006. 2. David Wyatt, Mike Tooley, Aircraft Electrical and Electronic Systems, Routledge, 4 Jun 2009. 3. Thomas K. Eismen, Aircraft Electricity & Electronics, McGraw-Hill, 2013. 4. A. Emadi, M. Ehsani, and J.M. Miller, "Vehicular Electric Power Systems", Marcel Dekker, Inc., New York, 2004. 	

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