

## Subject Description Form

<b>Subject Code</b>	AAE4305
<b>Subject Title</b>	Advanced Electronics Instrumentation and Control - Flight Management Systems
<b>Credit Value</b>	3
<b>Level</b>	4
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	To provide students with essential knowledge of electronics instrumentation and control with emphasis on Flight Management Systems.
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>a. Possess essential knowledge and skills in the area of electronics instrumentation and control; and</li> <li>b. Apply their knowledge, skills and hand-on experience to maintain and perform diagnosis on existing flight management systems; and</li> <li>c. Extend their knowledge to analyze and develop new modules and components in electronics instrumental and control for desired needs.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Aerodynamics and Aircraft Control</b> - Revisit of aircraft stability and dynamic; longitudinal and lateral control; powered flying control and stability augmentation.</p> <p><b>FBW</b> - Basic concept and features of Fly-By-Wire and the associated sensors, e.g., MEMS, modern gyroscopes, accelerometers, and actuators, e.g., servo motors and amplifier; Control laws; Redundancy and failure survivals.</p> <p><b>Autopilots and Flight Management Systems</b> - Flight Management Computer FMC and Control Display Unit CDU; Electronic Flight Information System EFIS (Primary Flight Display PFD and Navigation Display ND); Auto Flight System AFS (Autopilot, Flight Director, Auto throttle)</p> <p>Case studies on <b>Avionics Systems Integration</b></p>
<b>Teaching/Learning Methodology</b>	<ol style="list-style-type: none"> <li>1. The teaching and learning methods include lectures/tutorial sessions, homework assignments, test, case study report and examination.</li> <li>2. The continuous assessment and examination are aimed at providing students with integrated knowledge required for electronics instrumentation and control.</li> <li>3. Technical/practical examples and problems are raised and discussed in class/tutorial sessions.</li> </ol>

	Teaching/Learning Methodology		Intended subject learning outcomes to be covered		
			a	b	c
	1. Lecture		✓	✓	
	2. Tutorial		✓	✓	
	3. Homework assignment		✓	✓	
4. Case study report		✓	✓	✓	
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
			a	b	c
	1. Assignments	20%	✓	✓	
	2. Test	20%	✓	✓	
	3. Case study	20%	✓	✓	✓
	4. Examination	40%	✓	✓	✓
	Total	100%			
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Overall Assessment:</p> <p><math>0.4 \times \text{End of Subject Examination} + 0.6 \times \text{Continuous Assessment}</math></p> <p>The continuous assessment consists of three components: homework assignments, test, and case study. They are aimed at evaluating the progress of students study, assisting them in self-monitoring of fulfilling the respective subject learning outcomes, and enhancing the integration of the knowledge learnt.</p> <p>The examination is used to assess the knowledge acquired by the students for understanding and analyzing the problems critically and independently; as well as to determine the degree of achieving the subject learning outcomes.</p>					
<b>Student Study Effort Expected</b>	<b>Class contact</b>				
	▪ Lecture	26 Hrs.			
	▪ Tutorial	13 Hrs.			
	Other student study effort				
	▪ Self-Study	22 Hrs.			
	▪ Case Study	44 Hrs.			
Total student study effort		<b>105 Hrs.</b>			
<b>Reading List and References</b>	<p>1. David Wyatt, Aircraft flight instruments and guidance systems: principles, operations, and maintenance, Routledge, 2014.</p> <p>2. Thomas R. Yechout et al, Introduction to aircraft flight mechanics : performance, static</p>				

	stability, dynamic stability, classical feedback control, and state-space foundations, 2 <sup>nd</sup> Edition, AIAA 2014
	3. Collinson R.P.G, Introduction to Avionics Systems, 3 <sup>rd</sup> Edition, Springer 2011.
	4. Pilot's Handbook of Aeronautical Knowledge, U.S. Department of Transportation, FAA, Flight Standards Service, 2008.
	5. Edited by Cary R. Spitzer, The avionics handbook, CRC Press, 2001.

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