

## Subject Description Form

<b>Subject Code</b>	AAE4301
<b>Subject Title</b>	Avionics 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 knowledge of communications, electronics aspects of avionics, including aircraft instruments and integrated systems, and navigation 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>1. possess essential knowledge and skills in the area of avionics systems;</li> <li>2. apply their knowledge, skills and hand-on experience to manufacture and maintain existing products; analyze and develop new modules and components in avionics systems for desired needs;</li> <li>3. extend their knowledge of avionics systems to different situations of engineering context and professional practice</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Regulatory Agencies &amp; related documents:</b> ICAO Annex 10, F AA, RTCA; Concept of TSO; ARINC; DO-160.</p> <p><b>Airborne Communications Systems:</b> VHF &amp; HF transceivers, VDL modes; NAVCOM; EPIRB.</p> <p><b>Terrestrial Radio Navigation &amp; Landing Aids:</b> NDB; VOR; DVOR; DME; ILS &amp; GP; Radar altimeters &amp; AID.</p> <p><b>Satellite Navigation:</b> Introduction to GNSS and its impacts on Performance-based navigation – RNAV &amp; RNP.</p> <p><b>Surveillance Systems:</b> Primary &amp; Secondary Radars; ATCRBS replies; TCAS; ADS-B.</p> <p><b>Cockpit Integration:</b> Display technologies; Instrument Placement.</p> <p><b>On Board Data Buses:</b> ARINC 429; ARINC 629; ARINC 825 CAN Bus.</p> <p><b>Electronic Flight Control:</b> FBW flight control features. Control laws. Safety and integrity. Redundancy and failure survival. Digital implementation and problems. Flight control software functions.</p> <p><b>Case study:</b></p> <ul style="list-style-type: none"> <li>• Case study on an avionics system/avionics subsystem/avionics component</li> </ul>

<p><b>Teaching/Learning Methodology</b></p>	<ol style="list-style-type: none"> <li>The teaching and learning methods include lectures/tutorial sessions, homework assignments, test, case study report and examination.</li> <li>The continuous assessment and examination are aimed at providing students with integrated knowledge required for avionics systems.</li> <li>Technical/practical examples and problems are raised and discussed in class/tutorial sessions.</li> </ol> <table border="1" data-bbox="536 499 1406 707"> <thead> <tr> <th rowspan="2">Teaching/Learning Methodology</th> <th colspan="3">Intended subject learning outcome</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>1. Lecture</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>2. Tutorial</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>3. Homework assignment</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>4. Case study report</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	Teaching/Learning Methodology	Intended subject learning outcome			1	2	3	1. Lecture	✓	✓		2. Tutorial	✓	✓		3. Homework assignment	✓	✓		4. Case study report	✓	✓	✓										
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<b>Student Study Effort Expected</b>	Class contact:	
	▪ Lecture/Tutorial	39 Hrs.
	Other student study effort:	
	▪ Self Study	44 Hrs.
	▪ Case Study	22 Hrs.
	Total student study effort	105 Hrs.
<b>Reading List and References</b>	<ol style="list-style-type: none"> <li>1. Helfrick A, Principles of Avionics, 9th Edition, Avionics Communications, 2015.</li> <li>2. Tooley M, and Wyatt, Aircraft Electrical and Electronic Systems: Principles, Maintenance and Operation, Elsevier Ltd, 2009.</li> <li>3. Collinson R.P.G., Introduction to Avionics Systems, Third Edition, Springer, Feb 2011.</li> <li>4. Kayton Myron Walter R. Fried, Avionics Navigation Systems, Second Edition, John Wiley and Son, Published online 2007.</li> <li>5. Pilot's Handbook of Aeronautical Knowledge, U.S. Department of Transportation, FAA, Flight Standards Service, 2008.</li> <li>6. Advanced Avionics Handbook, U.S. Department of Transportation, FAA, Flight Standards Service, 2009.</li> <li>7. Alexander V. Nebylov, Aerospace sensors, Momentum Press, 2013.</li> </ol>	

December 2019