

Subject Description Form

Subject Code	ISE3010/IC383
Subject Title	Integrated Aviation Systems Project
Credit Value	4 Training Credits
Level	3
Pre-requisite / Co-requisite/ Exclusion	NIL
Objectives	<p>This subject aims at developing students' practical understanding of common technological systems and processes found in aviation industry.</p> <p>Through undertaking hands-on projects, students will also be able to integrate their academic knowledge with practical skills about key engineering tasks including: problem identification, design, fabrication, and evaluation.</p>
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a) recognize the constraints imposed on common aviation systems by technical, economic, environmental and safety factors; b) identify technical problems and improvement opportunities in a given aviation system by applying academic knowledge; c) design a technical system or process to meet desired needs in aviation industry; d) effectively work individually on their own initiative, and as members of a team; e) show a commitment to quality, timeliness, life-long learning and continuous improvement.
Subject Synopsis/ Indicative Syllabus	<p><u>Airframe fabrication</u></p> <ul style="list-style-type: none"> • Technical, economic, environmental and safety characteristics of common metal and composites airframe structures; • Working principle and operation of metal and composites fabrication processes: bending, drilling, riveting, wet-layup, pre-preg layup and autoclave curing; • Practical appreciation of airframe inspection and repair techniques. <p><u>Logistics automation</u></p> <ul style="list-style-type: none"> • Automation systems and the operation of key elements: Actuators, Sensors, Programmable Controller; • Working principle and operation of Radio Frequent Identification (RFID) system for object tacking and identification; • Integration of system components for typical logistics equipment such as conveyor systems, AS/RS (Automatic storage and retrieval systems), etc.;

	<ul style="list-style-type: none"> Enabling information technologies for logistics systems such as computer networking, Middleware, etc. <p><u>Aviation safety and human-factors</u></p> <ul style="list-style-type: none"> Risk concept, human factors models, error models; Common workplace hazards and protection; Risk analysis and controls; Safety management systems. <p><u>Project management</u></p> <ul style="list-style-type: none"> Operation of 2D CAD system: layer, draw, modify, block & attributes, standard library, plotting; Quality control and record-keeping practices. 																																															
<p>Learning Methodology</p>	<p>Workshop-based hands-on activities will be arranged for students to appreciate the principles and operations of common aircraft technologies and systems. The activities also help students to acquire essential practical skills for them to carry out project tasks. Short lectures, demonstrations, and tutorials will be mixed with hands-on activities to deliver technical contents.</p> <p>Group-based integrative-project will be used to enable students to integrate practical skill sets through fabricating and optimising physical products. Examples of physical products are: Airframe structures, ground equipment, aircraft maintenance tools, jigs and gauges, <i>etc.</i> The project will also encourage students to seek, learn and apply information that is pertinent to the work they are undertaking.</p> <p>Technical handouts will be available on-line for students to familiarise with the technical contents before lesson.</p>																																															
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1" data-bbox="456 1193 1485 1727"> <thead> <tr> <th rowspan="2">Assessment Methods</th> <th rowspan="2">Weighting (%)</th> <th colspan="5">Intended Learning Outcomes Assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>1. Workshop assignments</td> <td>45</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2. Quizzes</td> <td>15</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Performance of final product</td> <td>20</td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td>4. Training report</td> <td>20</td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Workshop assignments in the form of system configuration or fabrication tasks will be used to assess how well students understand the working principle, capabilities, and operation of the aviation systems and processes. Students' skill-level will be evaluated by the artifacts they produced, while their engineering judgment and critical thinking be evaluated by individually filled task worksheets.</p> <p>Quizzes will be used to assess broadly the students' understanding of declarative knowledge covered by the subject.</p>	Assessment Methods	Weighting (%)	Intended Learning Outcomes Assessed					a	b	c	d	e	1. Workshop assignments	45	✓	✓	✓	✓	✓	2. Quizzes	15	✓	✓				3. Performance of final product	20		✓	✓	✓		4. Training report	20		✓	✓	✓	✓	Total	100					
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	<p>Performance of final product, evaluated by product trials, QC checks, and supervisors' inspection, will be used to assess how well the students exercise their engineering judgments, and how efficient they working as a team.</p> <p>Individual training report will be used to assess holistically how well the students consolidate technical contents, reflect on their engineering decisions, and critically review their teamwork performance. The students also elaborate on their professional attitude and commitment in their writing.</p>	
Student Study Effort Expected	Class Contact	
	▪ Lectures, tutorials, and hands-on practices	36 Hrs.
	▪ Project	84 Hrs.
	Other Study Effort	0 Hrs.
	Total Study Effort	120 Hrs.
Reading List and References	<p>Reading Materials published by Industrial Centre on:</p> <ol style="list-style-type: none"> 1. Sheet Metal Fabrication Practice 2. Fiber Composites Fabrication 3. Fundamentals of Engineering Drawing and CAD 4. AutoCAD Techniques 	