Subject Description Form

Subject Code	AAE3102/IC380
Subject Title	Integrated Aviation Engineering Project
Credit Value	4 Training Credits
Level	3
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject aims at developing students' understanding on the principles and operations of common aircraft manufacturing process. Through undertaking hands-on projects, students will also be able to integrate their academic knowledge with practical skills about key engineering stages including: project planning, machining, assembly, testing and evaluation.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Demonstrate a practical understanding on the working principle, capability and operation of major aircraft manufacturing processes; b) Select and use appropriate materials and manufacturing processes for specific parts requirements; c) Work collaboratively and effectively to execute key stages of a manufacturing projects; and d) Show a commitment to quality, timeliness, regulation conformance, and continuous improvement.
Subject Synopsis/ Indicative Syllabus	<u>Digital machining</u> • Materials and manufacturing of common aircraft engine parts; • Working principle and operation of metal removal processes including turning, milling, drilling; • Practical appreciation of precision multi-axis machining and coordinate measurement; <u>Sheet-metal fabrication</u> • Materials and constructions of common metal airframe structures; • Working principle and operation of sheet-metal fabrication processes including bending, drilling, riveting; • Practical appreciation of damage removal and bolted repair techniques. <u>Fiber composites fabrication</u> • Materials and constructions of common fiber composites airframe components; • Working principle and operation of composites fabrication processes including wet-layup, pre-preg layup, autoclave curing;

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	• Practical appreciation of composites damage detection techniques including tap-test, UT A scan, and UT C scan; • Practical appreciation of damage removal and bonded repair techniques. Project management • Use of aircraft repair manuals and other technical documentations; • Quality control and record-keeping practices; • Appreciation of computer-aided product data management (PDM).
Learning Methodology	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, cabin installations, aircraft maintenance tools, jigs and gauges, *etc*. Workshop-based hands-on activities will be used for students to appreciate the principles and operations of common aircraft manufacturing technologies, and 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. The project fabrication work and hands-on practices will be scheduled to intertwine to facilitate reflective observation. Technical handouts will be available on-line for students to familiarise with the technical contents before lesson.

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Assessment Methods in Alignment with Intended Learning Outcomes

Assessment Methods	Weighting (%)	Intended Learning Outcomes Assessed			
		a	b	c	d
1. Workshop assignments	45	X	X		
2. Quizzes	15	X	X		
3. Performance of final product	20		X	X	
4. Training report	20	X	X	X	X
Total	100				

Workshop assignments in the form of small group manufacturing tasks will be used to assess how well students understand the working principle, capabilities, and operation of the manufacturing 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.

Multiple-choice quizzes will be used to assess broadly the students' understanding of declarative knowledge covered by the subject.

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.

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 team-working. The students also elaborate on their professional attitude and commitment in their writing.

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Student Study Effort Expected	**Class Contact**	
	▪ Hands-on practice	36 Hrs.
	▪ Project	84 Hrs.
	Other Study Effort	0 Hrs.
	Total Study Effort	**120 Hrs.**
Reading List and References	Reference Standards and Handbooks: 1. FAA-H-8083-30 Aviation Maintenance Technician Handbook – General Chapter 5: Aircraft Materials, Processes, and Hardware, 2008 2. FAA-H-8083-31 Aviation Maintenance Technician Handbook – Airframe Chapter 08 Aircraft Painting and Finishing, 2012 3. FAA-H-8083-31 Aviation Maintenance Technician Handbook – Airframe Chapter 04 Aircraft Metal Structural Repair, 2012 4. FAA-H-8083-31 Aviation Maintenance Technician Handbook – Airframe Chapter 07 Advanced Composite Material, 2012	