

Subject Description Form

Subject Code	AAE5002
Subject Title	Human Factors, Accident Prevention and Aircraft Maintenance
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<p>This subject will provide students with</p> <ol style="list-style-type: none"> 1. the essential concepts, ideas of human factors and accident prevention approaches in pilot training, ATC and aircraft maintenance industries; and 2. the neuroscience and research methodology in assessing human performance and errors.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. relate human cognitive and physical capabilities and limitations to the design of human-machine systems in aviation; b. apply sound methods to identify and analyse sources of human errors for aviation accident prevention; c. design solutions to reduce human errors with consideration for human, hardware, organization, and environmental factors; and d. design human factor experiments and conduct overall human-system design evaluation via neuroscience and research methodology.
Subject Synopsis/ Indicative Syllabus	<p>Human factors basics: Human error and threat management; Situational awareness, fatigue and stress; Non-technical skills; Crew resource management.</p> <p>Research methods: Statistical analysis; Failure modes and effect analysis; Root cause analysis; Error-case removal programme; Cause-and-effect diagram; Fault tree analysis; Subjective Scales; NASA task load index; Subjective workload assessment technique; Cooper-harper rating scale; Situational awareness global assessment technique.</p> <p>Accident analysis and prevention: Accident prevention management; Safety assessment, hazard identification and resolution; Integration of system safety and human performance in ATC, pilot and crew; Dirty dozen;</p> <p>Human factors in aircraft maintenance and inspection: Maintenance resource management; Line operations safety assessment; Maintenance error and decision aid.</p>

Teaching/Learning Methodology	<p>Teaching is conducted through class lectures and case study. The basic knowledge, research methodology and theoretical models will be introduced. The understanding of how to address and identify the human factors problem and formulate the resolution will be emphasized. Research methodology, case study and analytics skills are taught in class as well as the related real-life scenarios to enhance the teaching and learning abilities.</p>						
	Teaching/Learning Methodology		Outcomes				
		a	b	c	d		
	Lecture	√	√	√	√		
	Case Study		√	√	√		
Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks		% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
			a	b	c	d	
	1. Assignment	30%	√	√			
	2. Case study	30%			√	√	
	3. Final 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 style="text-align: center;">$0.6 \times \text{Continuous Assessment} + 0.4 \times \text{Final Examination}$</p>						
	<p>The continuous assessment (60%) is aimed at enhancing the students' comprehension and assimilation of various topics of the syllabus via assignment and case study. The final examination (40%) will also be considered to assess the students learning outcome.</p>						
Student Study Effort Expected	Class contact:						
	<ul style="list-style-type: none"> ▪ Lecture/Case Study 					39 Hrs.	
	Other student study effort:						
	<ul style="list-style-type: none"> ▪ Self-learning/preparation 					36 Hrs.	
	<ul style="list-style-type: none"> ▪ Literature study/case study/reading 					36 Hrs.	
	Total student study effort					111 Hrs.	

Reading List and References

1. Campbell, R. D., & Bagshaw, M. (2008). Human performance and limitations in aviation. John Wiley & Sons.
2. De Florio, F. (2016). Airworthiness: An introduction to aircraft certification and operations. Butterworth-Heinemann.
3. Dhillon, B. S. (2009). Human reliability, error, and human factors in engineering maintenance.
4. Dekker, S. (2004). Ten questions about human error: A new view of human factors and system safety. CRC Press.
5. Kinnison, H. A. (2013). Aviation maintenance management. McGraw-Hill Education.
6. Rodrigues, C. C., & Cusick, S. K. (2012). Commercial aviation safety. McGraw-Hill Education.
7. Stolzer, A. J., Halford, M. C. D., & Goglia, M. J. J. (2015). Safety management systems in aviation. Ashgate Publishing, Ltd.
8. Tsang, P. S., & Vidulich, M. A. (Eds.). (2002). Principles and practice of aviation psychology. CRC Press.
9. Wiegmann, D. A., & Shappell, S. A. (2017). A human error approach to aviation accident analysis: The human factors analysis and classification system. Routledge.
10. Wise, J. A., Hopkin, V. D., & Garland, D. J. (Eds.). (2016). Handbook of aviation human factors. CRC Press.

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