

교과목 번호 (Course Code)	명칭 (Title)	국문	도심항공 모빌리티 다분야 설계			
M3229.001600	영문	Multi-Disciplinary Design for Urban Air Mobility				
학과(부)(전공) (Department)	공과대학 항공우주공학과 (Dept. of Aerospace Engineering, College of Engineering)		과정 및 학년 (Level)	대학원 (Graduate)	학점구조 (Credit-Structure)	3-3-0
교과구분 (Classification)	전공선택 (Elective Subject for Major)		성적부여 (Grading)	A-F	수강정원 (Quota)	60
담당교원 (Instructor)	WANG, James / jmwheli@gmail.com , https://dr.ntu.edu.sg/cris/rp/rp00734 Office Hour: Please contact me by e-mail					
수업기간 (Course Dates)	22 June – 3 August, 2021		강의시간 (Timetable)	Tue, Thu (12:00~15:30)		
운영방식 (Mode of Teaching)	실시간 온라인 강의 위주 + 녹화강의 (Basically, Synchronous + Recorded Lectures)					

Prerequisite Course	There are no prerequisites for this course.							
Course Objectives	Urban air mobility– or UAM– is an aircraft propelled by electric power and capable of carrying people. There has been a dramatic resurgence of interest in that aircraft, driven by advances in electric-propulsion, digital manufacturing, high-fidelity simulations, and drone technologies (mobile computing and deep-learning). However, man-rated aircraft is more complex than drones, and requires more than a clever combination of scaled-up components from consumer electronics and automobiles. Maturation of UAM into a safe, sound, and sensible aircraft requires a clear understanding of the rotary-wing fundamentals, principles of enabling technologies, and timely resolution of its major barriers. The objective of this course is to introduce those fundamentals, technologies, and barriers.							
Course Materials and References	All course materials will be available through the course website.							
Evaluation (%)	Attendance	Assignment	Midterm	Final	Additional Evaluation	Attitude	Other	Sum
		40		60				100
	Attendance Policy :		Students who are absent for over 1/3 of the class will receive a grade of 'F' or 'U' for the course. (Exceptions can be made when the cause of absence is deemed unavoidable by the course instructor.)					
Other Remarks :		There will be 5 assignments.						
Lecture Plan	1st week Case study of an eVTOL aircraft What is Urban Air Mobility Aircraft design schedule and process Compare eVTOL aircraft architectures Review electrical engineering							
	2nd week							

		Battery and energy sources Electric motor principle Hybrid-electric propulsion Hydrogen propulsion
		3rd week eVTOL aircraft weight estimation Payload Range How are helicopters controlled Rotor dynamics Stability and control Flight simulation Model flight testing Wind tunnel testing Flight testing
		4th week Rotor performance Rotorcraft Aeromechanics Aircraft performance
		5th week Parametric study on eVTOL aircraft Competitive analysis eVTOL aircraft designing
		6th week Aircraft certification Aircraft sub systems eVTOL aircraft manufacturing eVTOL aircraft cost eVTOL direct operating cost
		7th week Comprehensive review and wrap up on aircraft designing Deep dive into leading competitors' aircraft design and business model
		Additional Notes for Students
Assistance for Students with Disabilities	Class	<ul style="list-style-type: none"> ○ Visual Impairment: Make textbooks(digital textbook, braille textbook, enlarged textbook etc.), Allow note takers ○ Physical Disability: Make textbooks (digital textbook), Allow note takers and assistants ○ Hearing Impairment: Allow note takers and translators, Allow lecture recording ○ Health Impairment: Excuse absence due to health problems, Allow note takers ○ Learning Disability: Allow note takers ○ Intellectual Disability / Autism Spectrum Disorder: Allow note takers and mentors
	Assignment & Evaluation	<ul style="list-style-type: none"> ○ Visual Impairment / Physical Disability / Hearing Impairment / Health Impairment / Learning Disability: Extend assignment deadlines, Offer alternate assignment submission and response method, Extend testing period, Offer alternate testing method, Offer different testing room ○ Intellectual Disability / Autism Spectrum Disorder: Offer individualized assignments and alternative evaluations
	Others	Students who take this course can get appropriate level of support service including the support listed above depending on the students' individual characteristics and needs through consultation

		<p>with professors and the Support Center for Students with Disabilities. If you have any questions concerning support service for students with disabilities you can contact Professor *** (Contact Information) or Support Center for Students with Disabilities (02-880-8787).</p>
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