
AER1216 UAV Design-Part 1

September 13th, 2018

Syllabus

- Introduction (1hr-Peter)
- Design Process (1.5hrs-Peter)
 - PDR
 - FDR
- Aerodynamics Part I (3hrs-Phil)
- Aerodynamics Part II (3hrs-Phil)
- Aerodynamics Part III and UAV Regs (1.5 hr-Phil, 1.5hr-Jeremy on Regs)
- Configurations (3.5hrs)
 - Fixed Wing Configurations (1.5hrs-Peter)
 - Standard
 - Canard
 - Tandem
 - Bi-plane
 - Flying Wing

Syllabus

- Multi-rotor/Helicopter Configurations (1.5hr-Steve)
 - Different multirotor types (monospinner, tricopter, quadrotor,...)
 - Limitations of multicopter
 - Alternative implementations (VTOL/fixed wing blends..)
 - Helicopters
 - Components of multirotor systems
 - Payloads/uses
- Propulsion (3hrs-Peter)
 - propellers
 - electric motors
 - overall system
 - internal combustion?
- PDR presentations? (3hrs - All?)
- Performance (3hrs-Hugh)
 - Range
 - Endurance

Syllabus

- Turn-rate
- Climb-rate
- Take-off/Landing
- Multi-rotor performance (reading assignment?)
- Stability/Control (6hrs)
 - Fixed Wing Stability (3hrs-Hugh)
 - Multi-rotor Stability and Control (3hrs-Angela)
- Structures (6hrs - Craig)
 - Review of common classical structural models
 - free body diagrams
 - beam theory
 - torsion
 - buckling
 - shear
 - Fixed wing structures
 - developing load case
 - factors of safety?

- approximate structural configuration for classical analysis
- Multi-rotor structures
 - developing load case
 - factors of safety?
 - approximate structural configuration for classical analysis
- FDR presentations? (3hrs - All?)

Syllabus

Date	Topic	Lecturer
Sept 13th	Introduction, Design Process	Peter Grant
Sept 20th	Aerodynamics Part I–wing planform aerodynamics	Phil Lavoie
Sept 27th	Aerodynamics Part II	Phil Lavoie
Oct 4th-1.5 hrs	Aerodynamics Part III	Phil Lavoie
Oct 4th-1.5hrs	UAV Regulations	Jeremy Wang
Oct 11th - 1.5 hrs	Fixed Wing Configs	Peter Grant
Oct 11th- 1.5 hrs	Multirotor Configs	Steven Waslander
Oct 18th	Performance	Hugh Liu
Oct 25th	PDR presentations	All
Nov 1st	Fixed Wing Stability and Control	Hugh Liu
Nov 8th	Propulsion	Peter Grant
Nov 15th	Multi-rotor Stability and Control	Angela Schoellig
Nov 22nd	Structures Part I	Craig Steeves
Nov 29th	Structures Part II	Craig Steeves
Dec 13th	FDR Presentations	All

Syllabus

Subject	Assign Date	Due Date	Marks	Responsibility
Aerodynamics	Sept 27th	Oct 11th	10%	Phil
Regulations, Configurations	Oct 11th	Oct 18th	8%	Peter and Steve
PD presentation	-	Oct 25th	5%	All
PD report	-	Nov 1st	15%	All
Performance and Propulsion	Oct 18th	Nov 15 th	10%	Hugh and Peter
Fixed and Multi-rotor Stability and Control	Nov 15th	Nov 29th	9%	Hugh and Angela
Structures	Nov 29th	Dec 6th	8%	Craig
FD presentations	-	Dec 13th	10%	All
FD report	-	Dec 20th	25%	All