

## TENTATIVE TEACHING PLAN OF ME578 (2021-SPRING)

(subject to minor updates during the semester)

<b>Instructor:</b> Dr. Boyang Li <a href="mailto:boyli@polyu.edu.hk">boyli@polyu.edu.hk</a>	<b>Teaching Assistant:</b> Mr. GAO Lihao <a href="mailto:19043948r@connect.polyu.hk">19043948r@connect.polyu.hk</a>	<b>Venue and time:</b> MS Team: Friday 18:30-21:20
---	---	--

### W1. Introduction

- a. Course Overview
- b. Introduction to Aircraft Design
- c. Aircraft design process
- d. Aircraft Configuration

### W2. Initial Sizing

- a. Introduction to Initial Sizing
- b. Weight estimation
- c. Design Example
- d. Thrust-to-Weight Ratio and Wing Loading

### W3. Review of Aerodynamics

- a. Standard Atmosphere
- b. Lift, Drag, and Moment
- c. Thrust-to-Weight Ratio and Wing Loading cont.

### W4. Wing Design

- a. Airfoil selection
- b. Wing geometry
- c. Wing Geometry Design
- d. Wing Location Selection
- e. Wing and Aircraft Configuration

### W5. Tail Design

- a. Tail Functions
- b. Tail Arrangement
- c. Tail Geometry
- d. Tail Volume Coefficient
- e. Control-Surface Sizing

### W6. Fuselage Design

- a. Fuselage Sizing
- b. Crew station
- c. Passenger compartment
- d. Payload -Cargo Provisions
- e. Payload -Weapons Carriage

### W7. Propulsion and Engine

- a. Reciprocating Piston Engines
- b. Gas Turbine Engines
- c. Ramjet Engines
- d. Propulsion and Fuel System Integration

### W8. Landing Gear

- a. Landing gear arrangement
- b. Tire Sizing
- c. Shock Absorbers

- d. Gear Retraction Geometry
- W9. Flight Performance
  - a. Equation of Motion
  - b. Steady Level Flight
  - c. Steady Climbing and Descending Flight
  - d. Level Turning Flight
  - e. Gliding Flight
  - f. Takeoff and Landing Analysis
- W10. Stability, Control, and Handling Qualities
  - a. Longitudinal Static Stability
  - b. Lateral-Directional Static Stability
  - c. Handling Qualities
- W11. Cost Analysis and Airworthiness
  - a. Cost Analysis
  - b. Aircraft Airworthiness
- W12. Unmanned Aerial Vehicle (UAV) Design Tutorial
- W13. Group Project Presentation
  - a. *Case study report*
  - b. *Group presentation*