

## Question list 2

### **Aerodynamics and Flight Mechanics; Code: MK3AEROJ06JL20-EN**

*ECTS Credit Points: 6*

1. Discuss the significance of the Reynolds number in aerodynamics and its impact on the flow characteristics around an airfoil.
2. Define and differentiate between parasite drag and induced drag. How do these forces impact the performance of an aircraft?
3. Discuss the phenomenon of wingtip vortices. How do they form and what measures can be taken to minimize their effects on drag?
4. Explain the concept of the center of gravity (CG) and center of pressure (CP) in aircraft design. How do their positions affect aircraft stability and control?
5. Describe the effects of dihedral and sweep angle on the lateral stability of an aircraft. Provide examples of aircraft design features that enhance stability.

### **Aircraft Engines I; Code: MK3REH1J08JL20-EN**

*ECTS Credit Points: 8*

1. Discuss the advantages and limitations of using gas turbine jet engines compared to other types of aircraft propulsion systems, such as turboprops, turbofans, turbojets, and ramjets.
2. Describe the high-pressure compressor in a gas turbine jet engine, detailing its axial and radial configurations and their respective pressure conditions and temperature rise. Compare and contrast the high-pressure compressor with the low-pressure compressor in terms of design and function.
3. Explain the function and operation of the turbine in a gas turbine engine. Discuss how it converts high-pressure, high-temperature air from the combustion chamber into rotational motion and describe the arrangement of its stages.
4. Discuss the importance of intake duct design for high-speed aircraft, emphasizing its significance in maximizing engine performance and efficiency. Explain the key considerations in intake duct design for supersonic and hypersonic flight applications including shock waves.
5. Explain the role of Inlets in gas turbine engines for different aircraft speeds (subsonic, supersonic, and hypersonic). Describe how each type of Inlet is designed to optimize engine performance and efficiency.