SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai
Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &
Accredited by NBA (B.E - CSE, EEE, ECE, Mech & B.Tech.IT)
COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF AEROSPACE ENGINEERING

Faculty Name	:	**Mr. N.Venkatesh, AP/ Aero**	Academic Year	:	**2024-2025 (Even)**
Year & Branch	:	**I Aero**	Semester	:	**II**
Course	:	**23AST101 Fundamentals of Aerospace Engineering**			

TWO MARKS
UNIT-3 AIRCRAFT STRUCTURES AND MATERIALS

General Types of Aircraft Construction

1. **What are the two main types of aircraft construction?**
   - The two main types are **truss-type construction** (framework of welded tubes or beams) and **monocoque/semi-monocoque construction** (stressed skin structure without a frame or with partial framing).
2. **What is the primary advantage of truss-type construction?**
   - It provides high strength and rigidity while being easy to repair and modify.
3. **Why is stressed skin construction preferred for modern aircraft?**
   - It reduces weight while maintaining strength, improving aerodynamic efficiency and fuel economy.
4. **What is the primary function of bulkheads in aircraft construction?**
   - Bulkheads provide structural integrity, support loads, and help maintain the shape of the fuselage.

Monocoque & Semi-Monocoque Construction

5. **What is the difference between monocoque and semi-monocoque construction?**
   - **Monocoque construction** relies entirely on the external skin for strength, while **semi-monocoque construction** uses a combination of the skin and internal supports like stringers and longerons.
6. **Why is semi-monocoque construction preferred over monocoque?**
   - It provides better strength-to-weight ratio and improved damage tolerance.
7. **What components support the skin in semi-monocoque construction?**
   - Stringers, longerons, bulkheads, and frames support the skin.
8. **How does semi-monocoque construction improve aircraft maintenance?**
   - Damage is localized to a smaller area, making repairs easier and reducing the need for full skin replacement.

Typical Wing and Fuselage Structure

9. **What are the primary components of a wing structure?**
   - Spars, ribs, and stringers form the wing's primary load-bearing structure.

10. **What is the function of the fuselage in an aircraft?**

- The fuselage houses crew, passengers, and cargo while distributing aerodynamic and structural loads.

11. **What role do spars play in a wing structure?**

- Spars are the main load-bearing components, providing strength and rigidity to the wing.

12. **How do ribs contribute to wing structure?**

- Ribs give the wing its aerodynamic shape and distribute loads from the skin to the spars.

13. **What is the function of longerons in fuselage construction?**

- Longerons provide longitudinal strength and help resist bending forces.

Metallic and Non-Metallic Materials

14. **What are the advantages of metallic materials in aircraft construction?**

- High strength, durability, and resistance to extreme temperatures and loads.

15. **Why are non-metallic materials used in modern aircraft?**

- They offer weight reduction, corrosion resistance, and improved fatigue performance.

16. **What are some common non-metallic materials used in aircraft?**

- Composites, fiberglass, Kevlar, and carbon fiber.

17. **What are the main disadvantages of composite materials?**

- High cost, difficulty in detecting internal damage, and complex repair processes.

Use of Aluminum Alloy, Titanium, Stainless Steel, and Composite Materials

18. **Why is aluminum alloy widely used in aircraft structures?**

- It has a good strength-to-weight ratio, is corrosion-resistant (when treated), and is easy to machine.

19. **What are the primary applications of titanium in aircraft?**

- Titanium is used in high-temperature areas like jet engine components and high-stress structural parts due to its strength and corrosion resistance.

20. **Why is stainless steel used in aircraft despite its high weight?**

- It provides excellent corrosion and heat resistance, making it ideal for exhaust systems and high-temperature components.