B.E. Aeronautical Engineering Curriculum

Er. Perumal Manimekalai College of Engineering presents a comprehensive 8-semester curriculum for B.E. Aeronautical Engineering, designed to prepare students for excellence in aerospace engineering through a systematic progression from foundational sciences to advanced specialized subjects.

Semester I: Foundation Building

Core Mathematics & Sciences

- Matrices and Calculus
- Engineering Physics
- Engineering Chemistry

Communication Skills

- Professional English - I
- Heritage of Tamils
- Wellness Programs

Engineering Fundamentals

- Engineering Graphics
- Laboratory Practices
- Physics and Chemistry Lab

The first semester establishes a strong foundation with 21 total credits, focusing on mathematical concepts, basic sciences, and essential communication skills that form the bedrock of engineering education.

Semester II: Engineering Principles

Advanced Mathematics & Materials

- Statistics and Numerical Methods
- Engineering Materials
- Engineering Mechanics

Technology Integration

- Basic Electrical & Electronics Engineering
- Problem Solving using Python Programming
- Tamils and Technology

24

Total Credits

Comprehensive semester load

5

Lab Courses

Hands-on experience

Semester II introduces students to engineering mechanics and programming, building upon mathematical foundations while incorporating practical laboratory experiences.

Semester III: Aeronautical Foundations

Advanced Mathematics

Transforms and Partial Differential Equations provide the mathematical tools for aeronautical analysis

Aeronautical Introduction

Fundamentals of Aeronautical Engineering and Aero Engineering Thermodynamics

Core Engineering

Fluid Mechanics and Machinery, Strength of Materials form the engineering backbone

This semester marks the transition into specialized aeronautical subjects with 22 credits, introducing students to the fundamental principles of flight and aircraft systems.

Semester IV: Aerodynamics & Propulsion

Aerodynamics - I

Introduction to the science of airflow around aircraft, covering fundamental principles of lift, drag, and flight mechanics essential for aircraft design.

Air Breathing Propulsion

Comprehensive study of jet engines, turbofans, and other propulsion systems that power modern aircraft through atmospheric flight.

UAV Systems and Design

Emerging field of unmanned aerial vehicles, covering design principles, control systems, and applications in modern aerospace.

Aircraft Systems

Integration of various aircraft subsystems including instrumentation, navigation, and control systems for safe flight operations.

Semester IV delivers 19 credits of specialized aeronautical knowledge, including mandatory in-plant training to bridge academic learning with industry experience.

Semester V: Advanced Propulsion & Design

1

Universal Human Values and Ethics

Developing ethical foundations and human values essential for professional engineering practice

2

Rocket Propulsion

Advanced propulsion systems for space applications, covering solid, liquid, and hybrid rocket technologies

3

Aerodynamics - II

Advanced aerodynamic concepts including compressible flow, shock waves, and high-speed flight phenomena

4

Aircraft Structures

Structural analysis and design of aircraft components, stress analysis, and material selection for aerospace applications

The fifth semester introduces rocket propulsion technology and advanced structural analysis, preparing students for space-age engineering challenges while maintaining focus on ethical professional development.

Semester VI: Flight Dynamics & Design Integration

Flight Dynamics

Comprehensive study of aircraft stability, control, and performance characteristics during various flight conditions and maneuvers.

Aircraft Design

Integrated approach to aircraft design process, from conceptual design through detailed engineering and performance optimization.

Finite Element Analysis

Advanced computational methods for structural analysis, enabling precise prediction of stress, strain, and deformation in aircraft components.

21

Total Credits

Balanced academic load

3

Elective Courses

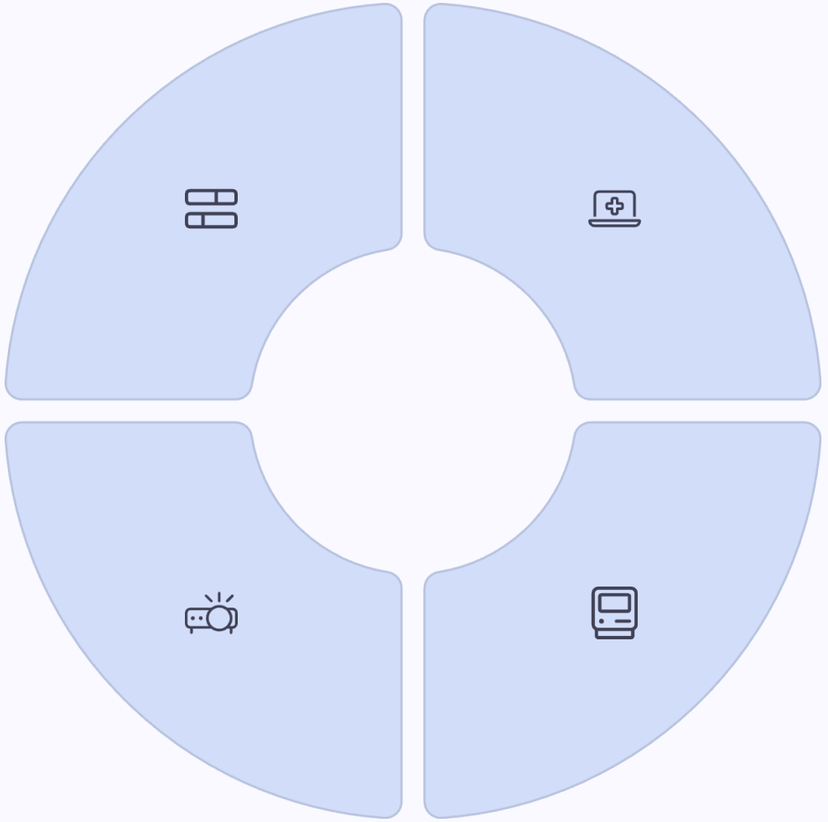
Professional & Open Electives

Semester VI emphasizes design integration and flight dynamics, combining theoretical knowledge with practical design methodologies essential for aircraft development.

Semester VII: Aviation Management & Advanced Systems

Aviation Management

Business aspects of aviation industry including operations, regulations, and strategic management



Avionics

Electronic systems in aircraft including navigation, communication, and flight control systems

Project Phase - I

Beginning of capstone project work, applying accumulated knowledge to real-world engineering challenges

Computational Fluid Dynamics

Advanced numerical methods for analyzing complex fluid flow phenomena in aerospace applications

Semester VII represents the culmination of technical education with 26 credits, integrating management principles with advanced technical systems while initiating the final project phase.

Semester VIII: Capstone Experience

Project Phase - II / Internship

The culminating experience of the B.E. Aeronautical Engineering program, where students demonstrate mastery through comprehensive project work or intensive industry internship.

- 24 contact periods dedicated to project work
- 10 credits representing significant academic weight
- Optional 3-6 month mandatory internship
- Integration of all previous learning

Project Options

- Independent research project
- Industry collaboration project
- Innovation and design challenge
- Extended internship program

The final semester provides intensive project-based learning, allowing students to synthesize four years of education into a meaningful contribution to aerospace engineering.

Complete Academic Journey: 164 Credits