

Aerospace Engineering and Operations Management –

Course Outline

The course will focus on managing the Aerospace enterprise with a deep focus on engineering design and production operations. Aerospace and aeronautics are a very broad field of technological activity. This course will specialize in aircraft engineering and production operations. The specialist skills of aerospace engineering operations and production systems are vital to drive productivity improvements. AER1601 students will gain the sought-after capability to manage major improvement programmes in the aerospace manufacturing industry or instigate intervention that delivers improvements to the performance of their businesses. This is an industry-focused course and it is designed around the needs of today's aerospace industry. The goal of the courses is to educate the next generation of industry ready aerospace engineers.

Course Modules

Part 1-The Aerospace Enterprise Environment

Mod 0 – Course Overview and Orientation

Mod 1 Aerospace Overview and Context

- History of Aviation
- Industry Drivers
- Various Aerospace Companies
- Aerospace Education and Careers
- Principles of aeronautics
- Aircraft Engineering and Product Technology

Mod 2 The Aerospace Industry Supply Chain

- The Industry Structure – Tier 1 to 3 Aerospace Eco-System
- Aviation Supply Chain
- Example of Suppliers Eco-system
- Corporate social responsibility
- Lean Supply Chain
- Synchronized Production
- Supplier Certification
- Alliances and Partnership

1st Industrial Trip Choose an Aerospace issue with current employer or collaborate with an external company to document the problem to be solved. (Customer / stakeholder issues, establish business issues, understand the process, measures, products and services)

Mod 3 Lean Aerospace Enterprise-Business Transformation

- Lean Aerospace Initiative (MIT)
- Lean Paradigm and Value Stream
- Integrated Product Development
- Concurrent Engineering
- Lean Production & Manufacturing System
- Continuous Flow and Pull System
- Employee Involvement and Continuous Improvement

2nd Trip Establish a cause and effect fishbone diagram to gather root cause data - each student would own an individual fishbone arm.

Part 2-Aerospace Engineering & Product Development Process

Mod 4. Engineering and Product Development Process

- IDEF Modeling Techniques
- Engineering Process Management Framework
- Aerospace Engineering and Product Development System
- Phases, Milestones, and Deliverables Architecture
- Virtual Product Development
- NPD Process Management

Mod 5. Aerospace Programme Management Office

- Programme Management Office Organization
- Programme Structuring and Planning
- Risk Management

3rd Trip Establish a cause and effect fishbone diagram to gather root cause data - each student would own an individual fishbone arm.

Mod 6. Aerospace Programme Initiation and Execution

- Programme Initiation
- Programme Execution
- Programme Reviews

Part 3-Aerospace Production Operations

Mod 7. Aerospace Enterprise Management Systems

- ERP / MRPII / Supply Chain In Aerospace Production
- Compliance
- Quality Control
- Capacity Planning

- Logistics Management
- Repair Process Management
- Financials and Reporting

4th Trip Establish a cause and effect fishbone diagram to gather root cause data - each student would own an individual fishbone arm.

Mod 8. Product Data & Lifecycle Management in the Aerospace enterprise

- Product Engineering Master data
- Manufacturing Engineering and Routing data
- Supplier and Customer data
- Group Technology classification and coding
- Engineering Change Management
- Configuration Management

5th Trip – Conduct further analysis

Mod 9. MRPII in Aerospace- Manufacturing Planning, Execution and Control

- Aerospace Manufacturing Planning and Control System Methodology
- Mater Production Scheduling,
- Materials Requirements Planning & Purchasing Management
- Shop Floor Control
- Cost Management

6th Trip Present the alternative solutions to the Aerospace Company for management feedback

Part 4-Aerospace Regulation, Culture and Innovation

Mod 10. Aviation Regulation, Airworthiness & Certification

- Civil Aviation Regulatory Framework, ICAO
- Aerospace Defense Regulatory Agencies (DND, MOD, DOD etc)
- Organization & function of Transport Canada, FAA, EASA.
- Key regulations for aeronautical product design, certification, production, modification, repair & operation.
- Product design standards.
- Type certification requirements and process.
- Continuing airworthiness.
- Bilateral / international agreements & validation of aeronautical products.
- Safety Management Systems (SMS).

7th Trip Presents solution and the way forward presentation to the Aerospace company management and get feedback.

Mod 11. Aerospace HRM, Culture, Unions & Leadership

- HRM in Aerospace
- Aerospace Unions
- Workplace Design Design Exchange Express
- Socio-Technical Systems Approach – Special Case of Engineers

Mod 12. Managing Aerospace Innovation and Change – Transforming the Enterprise

- Managing Innovation
- Building the Innovative Aerospace Enterprise
- Aerospace Enterprise best practices – Dimensions of Innovation

Mod 13. Project Presentation

8th and final Trip Presents solution and the way forward presentation to the Aerospace company management and get feedback.