TECHNICAL
EDUCATION
ACADEMY

School of Engineering

COURSE PROGRAMME

000435

MECH035 - Gas Turbine Engine Technology

The Gas Turbine Engine Technology training program is meticulously designed to provide participants with a comprehensive understanding of gas turbine engines, crucial in industries like aviation, energy, and manufacturing.



Learn from the Best in the Business!

Course overview

Intermediate level

Why take this course

The Gas Turbine Engine Technology training program is meticulously designed to provide participants with a comprehensive understanding of gas turbine engines, crucial in industries like aviation, energy, and manufacturing. This program is divided into four key segments, each focusing on different aspects of gas turbine technology, ensuring a well-rounded educational experience.

First, the basics of gas turbines are introduced, covering fundamental concepts and various types like heavy-duty, industrial, and aero-derivative gas turbines. Participants will learn about optimizing turbine performance through advanced topics such as pressure ratio and firing temperature.

Next, the program delves into the intricate design aspects of gas turbines. This includes configurations like single, spool, and split shaft turbines, the design of axial compressors, inlet guide vanes (IGVs), stators, rotors, and combustor designs. A significant focus is on the operation and innovative techniques for internal blade cooling.

The third segment addresses supporting systems that ensure the smooth operation of gas turbines, including lubrication, fuel, and hydraulic systems, along with control and protection systems. Emphasis is placed on TMR (Triple Modular Redundant) and simplex systems, and the role of critical redundant sensors.

Finally, the program focuses on the practical aspects of gas turbine operation and maintenance. Participants will learn about operating parameters, pre-start checklists, start-up and shutdown procedures, and speed and temperature control. Special attention is given to the trip oil system, an essential safety feature.

In conclusion, this training program offers a holistic and in-depth exploration of gas turbine engine technology, combining theoretical knowledge with practical insights. It is ideal for professionals seeking to deepen their understanding and enhance their skills in this critical field.

Who it is for and how it helps

The Gas Turbine Engine Technology training course is designed for a diverse range of professionals and students who are interested in or currently involved in fields related to gas turbines. The ideal candidates for this course typically include:

• Mechanical and Aerospace Engineers: Engineers working in industries where gas turbines are extensively used, such as aerospace, energy, and manufacturing, will benefit greatly from this course. It will enhance their understanding of turbine design, operation, and maintenance.

• Technical Staff and Technicians: Technical staff, including technicians who are involved in the operation, maintenance, or repair of gas turbine systems, will find this course beneficial for improving their skills and understanding of the systems they work with.

Course overview — continued

• Project Managers and Administrators: Managers and administrative personnel overseeing projects or operations involving gas turbines can gain a better understanding of the technology, which can aid in decision-making, planning, and management.

• Research and Development Professionals: Those involved in R&D related to gas turbine technology, looking to stay abreast of the latest developments and innovations in the field.

• Power Plant Operators: Professionals working in power plants that utilize gas turbines for electricity generation can learn more about the nuances of operation and maintenance for better efficiency and reliability.

• Field Service Engineers: Engineers who are responsible for the installation, commissioning, and servicing of gas turbine equipment in various industrial settings.

• Environmental and Safety Professionals: Individuals concerned with the environmental impact and safety aspects of gas turbine operation can benefit from understanding the technology and its latest advancements.

• Consultants and Policy Makers: Consultants advising on energy solutions and policymakers involved in setting regulations for industries using gas turbines can gain valuable insights from this course.

The course is suitable for anyone seeking a comprehensive understanding of gas turbine engine technology, whether for career development, academic interests, or personal knowledge enhancement. It provides a solid foundation and practical insights, valuable for both newcomers to the field and experienced professionals looking to update their knowledge.

What you will learn

- Analyze and interpret gas turbine performance parameters to optimize efficiency and reliability
- Apply critical thinking and problem-solving skills to identify and troubleshoot axial compressor, combustor, and axial turbine issues
- Demonstrate effective communication skills when discussing gas turbine-related topics with colleagues, supervisors, and other stakeholders
- Implement best practices for pre-start checklists, start-up, and shutdown procedures to ensure safe and efficient operation
- Work collaboratively within a team to optimize gas turbine performance and address any operational challenges
- Utilize time management skills to prioritize tasks during gas turbine operation and maintenance activities
- Adapt to changing operational conditions and respond appropriately to abnormal situations in gas turbines
- Exhibit attention to detail when monitoring and analyzing system parameters, such as vibration, temperature, and pressure
- Follow safety protocols and guidelines to ensure a safe working environment while operating and maintaining gas turbines

Course overview — continued

- Continuously update knowledge and stay current with industry developments, best practices, and technological advancements in gas turbine design and operation

Curriculum

Modules 01–04

01 Basics of Gas Turbines

- Introduction to Gas Turbine
- Simple Gas Turbine Cycle
- Heavy Duty Gas Turbine
- Industrial Gas Turbine
- Aero derivative Gas Turbine
- Advanced Gas Turbine
- Pressure Ratio and Firing Temperature

02 Design of a Gas Turbine

- Single, Spool and Split Shaft Gas Turbines
- Principle of Operation of Axial Compressors
- Design of IGV, Stators and Rotors
- Can, Annular and Can-annular combustors
- Fuel Nozzles
- Principle of Operation of an Axial Turbine
- Impulse and Reaction Turbine Blades
- Techniques of Internal Cooling of the Blades

03 Auxiliaries, Protection and Control Systems

- Lubrication System
- Gas Fuel System
- Oil Fuel System
- Hydraulic System
- Starting System
- TMR and Simplex Control System
- Critical Redundant Sensors
- Protection System

04 Performance and Operation of a Gas Turbines

- Operating Parameters

Curriculum

Modules 04–05 · Module 04 — continued

- Factors Affecting the Performance of a Gas Turbine
- Pre- start check out list
- Start Up and Shutdown Procedures
- Synchronizing procedure
- Normal Loading
- Speed Control and Temperature Control
- Trip Oil system

05 Monitoring System and Troubleshooting

- Vibration Monitoring and Analysis
- Abnormal Conditions of a Gas Turbine
- Axial Compressors Problems
- Combustors Problems
- Axial Turbine Problems

Joining the programme

Contact the Academy and quote course code 000435 to confirm dates, delivery format, prices and enrolment terms.

Training for your team

Tell us your business goals, the roles and number of participants, and your preferred dates and location. This will help us discuss the right training option.

Preparing for the programme

The published programme does not specify any prerequisites. Contact us before enrolling to confirm how to prepare.

Discuss your training needs

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