MAWA EVENTS

Address: No. 857, Block A2. Leisure Commerce Square - No 9., 46150 Petaling Jaya, Selangor, Malaysia

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THERMAL AND COMBINED CYCLE POWER PLANTS PERFORMANCE

"Optimizing Performance and Efficiency in Thermal and Combined Cycle Power Plants"

Schedule

Date	Venue	Fees (Face-to-Face)
14 – 18 Sep 2025	Manama – Bahrain	USD 3495 per delegate

Introduction

Thermal and combined cycle power plants are critical to global energy generation, providing reliable electricity across industries and communities. With the rising demand for energy efficiency and lower emissions, optimizing the performance of these power plants is crucial for maximizing their output, reducing costs, and improving environmental sustainability.

This 5-day intensive course will focus on the operation, performance optimization, and maintenance of thermal and combined cycle power plants. Participants will learn how to maximize plant efficiency, troubleshoot operational issues, and ensure effective system integration. The course combines theoretical knowledge with practical case studies and hands-on exercises to provide participants with the tools to enhance plant performance and optimize resource utilization.

Objectives

By the end of this course, participants will be able to:

- Understand the key components and operations of thermal and combined cycle power plants
- Identify and troubleshoot performance issues in thermal and combined cycle plants
- Apply performance optimization techniques to improve efficiency and reduce operational costs
- Enhance plant reliability and uptime through preventive and corrective maintenance strategies
- Analyze and evaluate plant performance metrics and key performance indicators (KPIs)

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Why Attend

- Learn how to optimize the performance and efficiency of thermal and combined cycle power plants
- Gain practical knowledge of troubleshooting and maintaining complex power plant systems
- Enhance your skills in analyzing plant performance metrics and taking corrective actions
- Understand the latest trends in thermal and combined cycle power generation technologies
- Improve your ability to implement energy-saving strategies and reduce operational costs

Target Audience

This program is designed for:

- Power plant engineers and operators
- Maintenance managers and technical staff involved in power generation
- Project managers and energy efficiency specialists
- Anyone involved in the optimization, operation, and maintenance of thermal and combined cycle power plants
- Engineers and consultants working on energy management and sustainability projects

Individual Benefits

Key competencies that will be developed include:

- Deep understanding of thermal and combined cycle power plant operations
- Enhanced skills in troubleshooting and performance optimization
- Ability to evaluate plant performance data and make informed decisions
- Proficiency in improving energy efficiency and reducing costs
- Knowledge of best practices in plant maintenance and reliability

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Improved performance and operational efficiency in thermal and combined cycle power plants
- Reduced downtime and increased plant reliability through better maintenance strategies
- More effective monitoring and management of plant performance and efficiency
- Ability to implement cost-saving measures and enhance energy utilization
- A skilled workforce capable of troubleshooting and optimizing complex plant systems

Instructional Methodology

The course follows a blended learning approach combining theory with practical application:

- **Strategy Briefings** – Overview of thermal and combined cycle power plants and their performance parameters
- **Case Studies** – Real-world examples of performance optimization and troubleshooting in power plants
- **Workshops** – Hands-on exercises in plant operation, performance analysis, and optimization
- **Peer Exchange** – Group discussions on challenges, solutions, and best practices for plant optimization
- **Tools** – Performance evaluation templates, diagnostic tools, and maintenance checklists

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Course Outline

DETAILED 5-DAY COURSE OUTLINE

Training Hours: 7:30 AM – 3:30 PM

Daily Format: 3–4 Learning Modules | Coffee Breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Introduction to Thermal and Combined Cycle Power Plants

Module 1: Overview of Power Generation Technologies (07:30 – 09:30)

- Introduction to thermal and combined cycle power plants
- Key components of power plants: boilers, turbines, generators, heat recovery steam generators (HRSG)
- Differences between simple and combined cycle power plants

Module 2: Plant Operation and Efficiency Parameters (09:45 – 11:15)

- Operational principles of thermal and combined cycle plants
- Key performance indicators (KPIs) for plant efficiency
- Heat rate, thermal efficiency, and fuel consumption metrics

Module 3: Understanding Combined Cycle Integration (11:30 – 01:00)

- Integration of gas turbines and steam turbines in combined cycle plants
- Efficiency improvements through combined cycle operations
- Best practices for optimizing combined cycle operations

Workshop – Plant Overview and Performance Evaluation (02:00 – 03:30)

- Hands-on exercise on evaluating plant components and performance metrics
- Group discussion and analysis of plant system integration

Day 2: Performance Monitoring and Troubleshooting Techniques

Module 1: Monitoring Plant Performance (07:30 – 09:30)

- Techniques for monitoring thermal and combined cycle plant performance
- Analyzing operational data: temperature, pressure, and efficiency indicators
- Use of SCADA and other digital tools for performance monitoring

Module 2: Common Performance Issues and Troubleshooting (09:45 – 11:15)

- Identifying common issues in thermal and combined cycle plants: efficiency loss, turbine degradation, fuel inefficiency
- Troubleshooting techniques for resolving common operational problems
- Diagnostic tools and methods for performance optimization

Module 3: Combustion and Heat Transfer Optimization (11:30 – 01:00)

- Optimizing combustion systems for improved efficiency
- Heat transfer efficiency and the role of HRSG in combined cycle plants
- Managing turbine performance and reducing fuel consumption

Workshop – Troubleshooting and Performance Correction (02:00 – 03:30)

- Hands-on practice in troubleshooting plant performance issues
- Group analysis of real-world case studies

Day 3: Energy Efficiency and Environmental Considerations

Module 1: Enhancing Energy Efficiency in Power Plants (07:30 – 09:30)

- Energy-saving strategies for thermal and combined cycle power plants
- Heat recovery and waste heat utilization techniques
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Improving overall plant efficiency through advanced technologies

Module 2: Emission Control and Sustainability (09:45 – 11:15)

- Environmental regulations for thermal power plants
- Emission control technologies and sustainable practices in combined cycle plants
- Reducing the environmental impact of power generation

Module 3: Operational and Maintenance Strategies for Improved Efficiency (11:30 – 01:00)

- Preventive maintenance strategies for thermal and combined cycle plants
- Condition-based maintenance (CBM) and predictive maintenance (PdM)
- Enhancing operational efficiency through routine and corrective maintenance

Workshop – Energy Efficiency and Sustainability Planning (02:00 – 03:30)

- Develop strategies for improving energy efficiency and sustainability in power plants
- Group presentation and discussion of strategies

Day 4: Advanced Control Systems and Automation

Module 1: Control Systems in Power Plants (07:30 – 09:30)

- Overview of plant control systems: DCS, SCADA, and PLC
- How automation and control systems enhance performance and reliability
- Integrating control systems with performance monitoring tools

Module 2: Digitalization and Data Analytics in Power Plant Operations (09:45 – 11:15)

- The role of digital tools and data analytics in optimizing power plant performance
- Big data, AI, and machine learning in predictive maintenance and optimization
- Case studies on digital transformation in power plants

Module 3: Risk Management and Reliability in Power Plants (11:30 – 01:00)

- Risk management strategies for plant reliability
- Failure modes and effects analysis (FMEA) in combined cycle plants
- Enhancing the reliability of critical components: turbines, HRSGs, and generators

Workshop – Control Systems and Automation (02:00 – 03:30)

- Hands-on practice with digital tools for control systems and performance analysis
- Group discussion and troubleshooting based on real-world scenarios

Day 5: Maintenance, Reliability, and Future Trends

Module 1: Maintenance Best Practices for Thermal and Combined Cycle Plants (07:30 – 09:30)

- Preventive and corrective maintenance best practices for power plants
- Optimizing maintenance schedules for maximum plant uptime
- Managing spare parts and resources effectively

Module 2: Reliability-Centered Maintenance (RCM) and Performance Enhancement (09:45 – 11:15)

- Implementing reliability-centered maintenance (RCM) to enhance turbine performance
- Key performance metrics for maintenance and reliability management
- Enhancing asset management and plant life-cycle optimization

Module 3: Future Trends in Thermal and Combined Cycle Power Plants (11:30 – 01:00)

- Emerging technologies and innovations in thermal and combined cycle power generation
- Trends in sustainability, digitalization, and smart plants
- Preparing power plants for future challenges in energy generation

Final Workshop – Strategic Plant Performance Optimization (02:00 – 03:30)

- Develop an action plan for optimizing plant performance and enhancing reliability
- Group review and presentation of performance strategies

Certification

Participants will receive a **Certificate of Completion in Thermal and Combined Cycle Power Plants Performance**, confirming their expertise in optimizing thermal and combined cycle power plant operations and performance.

Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
- **Industry-Leading Faculty:** Courses delivered by seasoned professionals with hands-on experience.
- **Practical Insights:** Learn to turn theory into actionable strategies for real-world business impact.
- **Client-Focused Solutions:** Customized programs designed to achieve your organisation’s unique goals.

In-House / Customized Training Interested in running this course for your team? Please contact us:	TEL: **+601116373203**	EMAIL: **info@mawaevents.net**