MERCURY

FPSO Operators Training: Combined-Cycle Power Systems

21 – 25 March 2027
Istanbul (Turkey)



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Ref: 16351_1017001 **Date:** 21 – 25 March 2027 **Location:** Istanbul (Turkey) **Fees:** 5500 Euro

Introduction:

The FPSO Operators Training: Combined-Cycle Power Systems course addresses the unique operational challenges faced by oil and gas operators transitioning into offshore environments with advanced power systems. Floating Production, Storage, and Offloading FPSO vessels are increasingly equipped with Combined-Cycle power generation units, which differ significantly from conventional gas turbine generator systems.

Operators must therefore develop both a theoretical understanding and applied skills in handling these integrated systems. This FPSO Operators Training: Combined-Cycle Power Systems offers an in-depth overview of Combined-Cycle principles, with a focus on efficiency, reliability, and safety in offshore settings. Participants will learn how to optimize performance, troubleshoot key issues, and ensure compliance with operational standards.

The FPSO Operators Training: Combined-Cycle Power Systems program provides a bridge between existing experience in process plant operations and the specific expertise required for offshore Combined-Cycle systems. It emphasizes practical decision-making, system integration, and sustainable operations. Operators will manage power systems efficiently in real-world FPSO environments.

Targeted Groups:

This FPSO Operators Training: Combined-Cycle Power Systems targets professionals seeking specialized knowledge and skills:

- FPSO operators working in offshore oil and gas facilities.
- Power plant operators transitioning to offshore energy environments.
- Gas turbine generator specialists expanding to Combined-Cycle operations.
- Utility system engineers seeking offshore Combined-Cycle expertise.
- Maintenance technicians are responsible for power generation systems.
- Offshore supervisors manage power and utility operations.
- Health, safety, and environment HSE professionals oversee power systems.
- Energy professionals aiming to enhance offshore power optimization skills.

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Course Objectives:

Participants will achieve the following objectives by completing the FPSO Operators Training: Combined-Cycle Power Systems course:

- Understand the fundamental principles of Combined-Cycle power generation.
- Explain the differences between simple cycle and Combined-Cycle operations.
- Analyze the integration of gas turbines, heat recovery, and steam turbines.
- Apply operational knowledge to optimize performance under offshore conditions.
- Demonstrate procedures for start-up, shutdown, and emergency response.
- Evaluate efficiency and performance indicators of Combined-Cycle systems.
- Develop troubleshooting strategies for mechanical and process-related issues.
- Identify environmental and safety compliance requirements offshore.
- Assess system performance to ensure a reliable energy supply.
- Adapt existing oil and gas process plant knowledge to Combined-Cycle applications.
- Implement control system strategies for stable and safe operation.
- Enhance decision-making by interpreting operational data effectively.
- Collaborate within multidisciplinary offshore teams to optimize systems.
- Gain confidence to lead operational tasks in FPSO Combined-Cycle systems.

Targeted Competencies:

Participants will gain the following competencies during the FPSO Operators Training: Combined-Cycle Power Systems program:

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- Operate Combined-Cycle systems in FPSO environments with confidence.
- Integrate gas turbine and steam turbine operations effectively.
- Monitor system parameters to maintain efficiency and reliability.
- Troubleshoot operational issues using structured approaches.
- Apply control system knowledge to stabilize processes.
- Conduct safe and efficient start-up and shutdown procedures.
- Interpret performance data to optimize system operation.
- Implement offshore safety and compliance protocols.
- Adapt prior process plant experience to offshore power systems.
- Collaborate with technical teams for continuous performance improvement.

Studying Scenarios:

In this FPSO Operators Training: Combined-Cycle Power Systems, participants will develop their skills through the analysis of the following scenarios:

- Managing start-up procedures of a Combined-Cycle unit offshore.
- Responding to emergency shutdown situations with system integration.
- Troubleshooting performance issues in heat recovery steam generators.
- Optimizing turbine efficiency under fluctuating FPSO power demands.
- Addressing utility system failures affecting Combined-Cycle operations.
- Analyzing offshore safety incidents linked to power system operations.
- Implementing energy efficiency measures in real FPSO environments.
- Coordinating multidisciplinary teams for system recovery after faults.
- Applying control system adjustments to stabilize operational fluctuations.

Course Content:

Unit 1: Fundamentals of FPSO Power Systems:

- Overview of FPSO operations and offshore energy requirements.
- Introduction to gas turbine generators in offshore environments.
- Evolution of power systems from simple cycle to Combined-Cycle.
- Key design features of FPSO Combined-Cycle configurations.
- Safety and reliability considerations in offshore power generation.
- Energy demand patterns and optimization strategies.
- Basic thermodynamic principles of power generation.
- Offshore utility systems integration with power units.

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Unit 2: Combined-Cycle Power Generation Principles:

- Components of a Combined-Cycle system: gas turbine, HRSG, steam turbine.
- Process flow diagrams and system integration.
- Thermodynamic efficiency and energy recovery principles.
- Role of Heat Recovery Steam Generators in Efficiency Improvement.
- Operating modes: base load, part load, and peak load management.
- Key performance indicators for Combined-Cycle systems.
- Start-up and shutdown sequences in Combined-Cycle plants.
- Offshore adaptations of Combined-Cycle power systems.
- Environmental compliance and emissions considerations.

Unit 3: Offshore Operations and Control Systems:

- Offshore-specific challenges in power generation operations.
- Role of Distributed Control Systems DCS in monitoring and control.
- Integration of control logic between turbines and HRSG units.
- Real-time monitoring and performance data interpretation.
- Control strategies for stable operation under load fluctuations.
- Communication protocols in offshore control systems.
- Safety interlocks and emergency shutdown systems.
- Remote monitoring and predictive maintenance applications.
- Data-driven decision-making in offshore power operations.

Unit 4: Maintenance, Troubleshooting, and Reliability:

- Preventive and predictive maintenance strategies.
- Condition monitoring for turbines, HRSGs, and auxiliary systems.
- Troubleshooting gas turbine operational issues offshore.
- Diagnosing steam turbine and HRSG performance losses.
- Reliability engineering in offshore power systems.
- Spare parts management and maintenance planning.
- Mechanical and electrical fault detection techniques.
- Case Studies of Offshore Combined-Cycle Operational Failures
- Strategies for minimizing downtime and maximizing reliability.

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Unit 5: Safety, Efficiency, and Optimization Offshore:

- Offshore safety standards for power generation operations.
- Environmental risks and mitigation measures.
- Energy efficiency practices in Combined-Cycle operations.
- Operational strategies for minimizing fuel consumption.
- Offshore Emergency Response Planning for Power Systems.
- Coordination with HSE departments for compliance.
- Optimizing Combined-Cycle systems under harsh offshore conditions.
- Continuous improvement approaches in FPSO power operations.
- Future developments in offshore Combined-Cycle technologies.

Final Insights & Key Takeaways:

This training equips experienced oil and gas operators with specialized knowledge to transition into offshore combined-cycle power systems. Participants will bridge their existing process plant expertise with offshore operational demands. The program ensures confidence, competence, and safety in managing FPSO power generation systems.