



Combining Axial Turbine Fundamentals with AxSTREAM Workshop for Turbomachinery Design Professionals

1. Axial Turbine Fundamentals

Introduction:

The 2-day course describes the key principles of axial turbine design and operation. The program provides engineers with a comprehensive overview of turbine gas dynamics, thermodynamics and structural analysis.

Duration: 2 days

Course Scope:

- Turbine designs and cycles.
- Initial turbine sizing. Multistage turbines
- Turbine calculation. Design and off-design operating modes
- Profiling and 3D blade design

Who should attend

- Engineers who want to get a detailed overview of axial turbine basics

Outline and Schedule

Day 1

1. Turbine designs and cycles.

Basic steam and gas turbine designs. Rankine and Brayton cycles consideration. Gas dynamic basics. Working fluids properties.

2. Initial turbine sizing. Multistage turbines

Turbine stage and cascade: definitions, dimensions. Transformation of energy through turbine stage: impulse and reactive turbines, velocity triangles, stage dimensionless parameters. Turbine efficiency and energy losses. Main challenges in design process.



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Day 2

3. Turbine calculation. Design and off-design operating modes

Turbine calculation: meanline (1D) and streamline (2D), distributions of parameters spanwise, cylindrical and twisted blades: effects on turbine performance, mechanical and thermodynamic design. Off-design turbine performances prediction, turbine operating modes.

4. Profiling and 3D blade design

Basic profiling knowledge. Potential flow in blade-to-blade channel. Boundary layer. Laminar and turbulent flow modes. 3D blade design: cylindrical and twisted blades. Special blade design effects: lean, sweep.