



Accredited Africa Training Institute for Capacity Development

Unit FO409, Hatfield Plaza · 1122 Burnett St, Hatfield 0028 · Pretoria, Gauteng · South Africa

Tel: +27 12 004 8389 · Mobile: +27 65 077 6310

Email: apply@aatikcd.co.za · Website: www.aatikcd.co.za

COURSE BROCHURE

Computational Fluid Dynamics (CFD)

Custom Courses / Engineering and Instrumentation

Unit Standard AATICD-0032 · NQF Level 5 · 10 Credits · 5 Days

COURSE OVERVIEW

This course equips learners with foundational and applied knowledge of Computational Fluid Dynamics (CFD), enabling them to simulate and analyze fluid flow, heat transfer, and related phenomena using numerical methods and software. Participants will gain the skills to set up, run, and interpret CFD simulations for engineering applications, enhancing design and problem-solving capabilities.

Category	Custom Courses
Subfield	Engineering and Instrumentation
Unit Standard	AATICD-0032
Accreditation	SAQA Accredited · NQF Level 5 · 10 Credits
Duration	5 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply the fundamental principles of fluid dynamics and numerical methods to set up CFD models.
- Analyze simulation results using appropriate post-processing techniques to validate and interpret fluid behavior.
- Evaluate the accuracy and limitations of CFD simulations by considering mesh quality, boundary conditions, and turbulence models.
- Design simple CFD case studies to solve practical engineering problems involving fluid flow and heat transfer.
- Implement best practices for geometry preparation, meshing, solver setup, and convergence monitoring in CFD software.
- Demonstrate the ability to communicate CFD findings effectively through technical reports and visualizations.

WHO SHOULD ATTEND

- Engineers, technicians, and technical professionals in mechanical, civil, chemical, and aerospace fields who require practical CFD skills for design, analysis, or research purposes.

COURSE OUTLINE

Day 1: Introduction to CFD and Governing Equations

- Overview of CFD and its applications in engineering.
- Basic fluid dynamics concepts: laminar vs turbulent flow, compressibility.
- Governing equations: Navier-Stokes, continuity, energy equation.
- Introduction to discretisation: finite difference, finite volume, finite element.
- Boundary conditions: types and implementation.
- Overview of the CFD workflow: geometry, mesh, solver, post-processing.

Day 2: Mesh Generation and Geometry Preparation

- Geometry creation and import from CAD.
- Mesh types: structured, unstructured, hybrid.
- Mesh generation techniques: tetrahedral, hexahedral, prism layers.
- Mesh quality metrics: skewness, aspect ratio, orthogonal quality.
- Boundary condition setup on mesh surfaces.
- Practical considerations for mesh independence studies.

Day 3: Solver Settings and Numerical Methods

- Solver types: pressure-based vs density-based.
- Discretisation schemes: first-order vs second-order upwind.
- Under-relaxation factors and solution stability.
- Convergence monitoring: residuals, forces, imbalances.
- Introduction to turbulence modelling.
- Multiphase flows and heat transfer modelling basics.

Day 4: Post-Processing and Validation

- Post-processing tools: contours, vectors, streamlines, animations.
- Quantitative analysis: forces, pressures, flow rates, heat transfer coefficients.
- Validation techniques: grid convergence index, comparison with benchmarks.
- Common errors: divergence, poor mesh quality, incorrect boundary conditions.
- Reporting results: graphs, tables, and technical documentation.

Day 5: Advanced Applications and Project Work

- Advanced applications: aerodynamics, turbomachinery, heat exchangers.
- Multiphase flow modelling: VOF, Eulerian, Lagrangian approaches.
- Fluid-structure interaction concepts.
- Parametric studies and design optimisation.
- Best practices for efficient CFD workflows.
- Final project: solve a practical problem from scratch.

ASSESSMENT & CERTIFICATION

Delegates are assessed through exercises and a final test. A mark of **50% or above** earns an **AATICD Certificate of Completion**, issued digitally with a unique verification code. This course carries **10 NQF credits** at **NQF Level 5**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 24,200.00	R 24,200.00
1	In-House	R 31,400.00	R 31,400.00
1	On-Campus (Pretoria)	R 36,200.00	R 36,200.00

UPCOMING SESSIONS

Start	End	Method	Venue
10 Aug 2026	14 Aug 2026	On-Campus	Durban, South Africa
10 Aug 2026	14 Aug 2026	On-Campus	Abu Dhabi, UAE
17 Aug 2026	21 Aug 2026	On-Campus	Harare, Zimbabwe
17 Aug 2026	21 Aug 2026	On-Campus	Shenzhen, China
24 Aug 2026	28 Aug 2026	On-Campus	Bangkok, Thailand
24 Aug 2026	28 Aug 2026	On-Campus	Victoria Falls, Zimbabwe
31 Aug 2026	04 Sep 2026	On-Campus	Lusaka, Zambia
31 Aug 2026	04 Sep 2026	On-Campus	London, UK

Contact us if no suitable date is listed – on-demand sessions can be arranged for groups.

HOW TO GET A QUOTE OR APPLY

- 1. Get an instant quotation online:** visit www.aaticd.co.za, open the page for this course (Unit Standard AATICD-0032) and click **Get A Quote / Apply**. Select your training method and number of delegates – your quotation is generated immediately and emailed to you with the course brochure attached.
- 2. Apply by email:** send the course title, your preferred training method (Online, In-House or On-Campus Pretoria), the number of delegates and your preferred dates to apply@aaticd.co.za – our team will reply with a formal quotation.
- 3. Apply by phone or WhatsApp:** call +27 12 004 8389 or WhatsApp +27 65 077 6310 and we will prepare your quotation and reserve your seats.
- 4. Confirm your booking:** accept the quotation and settle the invoice. As soon as payment is confirmed your delegates are enrolled and receive their AATICD LMS login details by email, along with joining instructions for their chosen training method.

Group discounts apply automatically – the more delegates you enrol, the lower the price per delegate. No payment is required to request a quotation.

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