



Accredited Africa Training Institute for Capacity Development

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

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COURSE BROCHURE

Matrices and Graphs for Systems of Equations and Networks

Physical, Mathematical, Computer and Life Sciences / Mathematical Sciences

Unit Standard 243840 · NQF Level 5 · 2 Credits · 1 Day

COURSE OVERVIEW

This course equips learners with the skills to apply matrix algebra and graph theory to solve systems of linear equations and analyse network problems. Participants will learn to model real-world scenarios using matrices and graphs, perform matrix operations, and interpret results in engineering, logistics, and data science contexts.

Category	Physical, Mathematical, Computer and Life Sciences
Subfield	Mathematical Sciences
Unit Standard	243840
Accreditation	SAQA Accredited · NQF Level 5 · 2 Credits
Duration	1 day
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply matrix operations (addition, multiplication, inversion) to solve systems of linear equations.
- Analyse network problems using graph theory concepts such as adjacency matrices and shortest paths.
- Evaluate the consistency and uniqueness of solutions to systems of equations using determinants and rank.
- Design matrix models to represent real-world systems, including electrical circuits and transportation networks.
- Implement graph algorithms (e.g., Dijkstra's algorithm) to solve network flow and connectivity problems.
- Demonstrate proficiency in using software tools (e.g., MATLAB, Python) for matrix and graph computations.

WHO SHOULD ATTEND

- The course is designed for engineers, data analysts, IT professionals, and operations researchers who need to solve complex systems of equations or analyse network structures in their work.

COURSE OUTLINE

Day 1: Matrices and Graphs for Systems of Equations and Networks

- Introduction to matrices: notation, types (row, column, square, identity), and basic operations.
- Solving systems of linear equations: Gaussian elimination, row echelon form, and back-substitution.
- Matrix multiplication and inverses: conditions for invertibility, application to network equations.
- Determinants and Cramer's rule for small systems.
- Graph fundamentals: vertices, edges, directed vs undirected graphs.
- Adjacency and incidence matrices: construction and interpretation.
- Network analysis: path counting, connectivity, and flow using matrices.
- Case studies: electrical circuits, traffic flow, and social networks.

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 **2 NQF credits** at **NQF Level 5**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 13,400.00	R 13,400.00
1	In-House	R 17,400.00	R 17,400.00
1	On-Campus (Pretoria)	R 20,200.00	R 20,200.00

UPCOMING SESSIONS

Start	End	Method	Venue
03 Aug 2026	03 Aug 2026	On-Campus	Dubai, UAE
03 Aug 2026	03 Aug 2026	On-Campus	Johannesburg, South Africa
05 Aug 2026	05 Aug 2026	On-Campus	Pretoria, South Africa
05 Aug 2026	05 Aug 2026	On-Campus	Mauritius
06 Aug 2026	06 Aug 2026	On-Campus	Cape Town, South Africa
06 Aug 2026	06 Aug 2026	On-Campus	Lagos, Nigeria
11 Aug 2026	11 Aug 2026	On-Campus	Abu Dhabi, UAE
11 Aug 2026	11 Aug 2026	On-Campus	Cape Town, South Africa

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 243840) 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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