



CIVIL ENGINEERING AND CONSTRUCTION TRAINING

Computer Aided Structural Analysis and Design

5 day course

Classroom, online or in-house

Course overview

A finite element model will return a tidy set of member forces whether its supports, releases and load paths are right or badly wrong, and the software cannot tell you which. This course teaches engineers to build analysis models they can defend. Delegates start from the stiffness method that sits underneath every package, then move through idealising frames, trusses and slabs, choosing element types, meshing plates and shells, and modelling supports, releases and rigid links. Load cases and combinations to SANS and Eurocode practice follow, with second order effects and modal checks. Each stage ends with hand verification: equilibrium sums, deflection estimates and sanity checks on reactions. Delegates leave able to set up, interrogate and document a structural model, and to pass its results into member design without blind trust in the output.

What you will learn

- Explain the matrix stiffness method that underlies finite element structural software
- Idealise real buildings and frames into analysis models with appropriate members, nodes and supports
- Select beam, plate, shell and solid elements and a mesh density suited to the question being asked
- Define load cases and combinations consistent with SANS 10160 and Eurocode load provisions
- Interpret second order, buckling and modal results and recognise when they govern
- Verify computer output by hand using equilibrium, deflection estimates and reaction checks
- Transfer analysis results into member design checks and document the model for review
- Identify common modelling errors that produce plausible but incorrect results

Who should attend

- Graduate and junior structural engineers
- Civil engineers moving into building and industrial structures
- Structural technologists who prepare analysis models
- Checking engineers reviewing consultant calculations
- Design office leads setting modelling standards

Course outline

- 01 The stiffness method behind the software
- 02 Idealising structures into analysis models
- 03 Element types and meshing of plates and shells
- 04 Supports, releases, rigid links and diaphragms
- 05 Load cases, patterns and combinations
- 06 Second order effects, buckling and modal analysis
- 07 Hand checks and verification of output
- 08 From analysis results to member design
- 09 Model documentation and peer review

Upcoming dates

Dates	Venue	Format	Fee per delegate
2 to 6 November 2026	Online	Online	R8,500
28 December 2026 to 1 January 2027	Dar es Salaam, Tanzania	Classroom	USD 1,325
8 to 12 March 2027	Port Louis, Mauritius	Classroom	USD 1,325



Fees and how to register

This 5 day course is **R8,500** per delegate online, **R19,950** in the classroom in South Africa, Botswana, Namibia, Lesotho and Eswatini, and **USD 1,325** in the classroom elsewhere in Africa. In-house training is quotation on request. Book 2 or more delegates on this course and save 10%.

To register or request an in-house proposal, visit www.afrisciencegroup.com, email info@afriscience.co.za, or WhatsApp us on **+27 63 479 1136**.

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