# Graduate course Stability of Structures

## October 5th – October 6th 2023
## October 9th – October 11th 2023

**Delft University of Technology**

## General

This course provides an introduction to the topic of stability of structures. The course is designed to give the participants a thorough foundation for solving the variety of structural stability problems they may encounter in practice for static problems. Students will become acquainted with both analytical and numerical techniques. The course is intended to put stability problems in a broad context. Therefore, nonlinear buckling, post-buckling and design aspects are included as well. In the course, engineering examples from the nanoscale to the structural scale will be presented.

## Local organization

The course is hosted by Delft University of Technology (TUD) and coordinated by Frans van der Meer from the Department of Materials, Mechanics, Management, and Design at the Faculty of Civil Engineering and Geosciences.

## Lecturers

- Prof. dr. ir. Fred van Keulen (TU Delft)
- Dr.ir. Frans van der Meer (TU Delft)
- Dr. Carey Walters (TU Delft)
- Dr.ir. Matthijs Langelaar (TU Delft)
- Dr.ir. Hans Goosen (TU Delft)

## Lecture notes

Lecture notes and course material will be made available digitally at the start of the course.

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## Prerequisites

Participation in the course is facilitated by basic familiarity with:

- structural and continuum mechanics;
- partial differential equations and boundary-value problems;
- numerical techniques (in particular finite-element methods);
- programming with python

## Contents

The course is hosted by Delft University of Technology, from October 5$^{th}$ – 11$^{th}$, 2023. The course consists of both lectures and practical sessions. The course covers the following topics:

- Introduction to elastic buckling
- Buckling of arbitrary systems
- Introduction to initial post-buckling
- Buckling and residual stress in MEMS/NEMS
- Buckling of stiffened panels
- Geometrically nonlinear finite element analysis
- Linear buckling analysis
- Influence of plasticity on the post-buckling response
- Rigid-plastic second order analysis
- Computational modelling of plastic collapse

## Fee/Registration

The course is free for registered members of the graduate school Engineering Mechanics and for the research members of the contributing research groups. Participants need to register by completing the registration form at https://engineeringmechanics.nl/courses/#upcoming. Please register ultimately **September 20, 2023**.

## Further information

For more information on the contents of the course, feel free to contact: Frans van der Meer (f.p.vandermeer@tudelft.nl).

Further information about the educational programme and other activities of the Graduate School on Engineering Mechanics can be found at: engineeringmechanics.nl.