Online Graduate course Stability of Structures

23 June - 25 June 2021
29 June - 1 July 2021

Department of Mechanical Engineering
Precision and Microsystems Engineering
Delft University of Technology

General

This online course provides an introduction to the topic Stability of Structures. The Stability of Structures module 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, typical examples from the micro- and nano domains will be presented.

Local organization

The course is organized by the department of Precision and Microsystems Engineering of Delft University of Technology (TUD). The local organizing committee is composed of

- Prof. dr. ir. Fred van Keulen
- Mw. Marianne Stolker (secretary)

Lecturers

- Dr. Paolo Tiso (ETH Zurich)
- Prof.dr.ir. Patrick Onck (RUG)
- Dr.ir. Frans van der Meer (TU Delft)
- Dr. C.L. Walters (TU Delft)
- Dr.ir. Matthijs Langelaar (TU Delft)
- Dr.ir. Hans Goosen (TU Delft)
- Prof. dr. ir. Fred van Keulen (TU Delft)

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Lecture notes

Lecture notes and course material will be made available through Dropbox.

Prerequisites

Participation in the course is facilitated by basic familiarity with:

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

Contents

The course is hosted by Delft University of Technology, from 23 June - 25 June and from 29 June - 1 July 2021. The course consists of both lectures and computer-practical sessions. The course covers the following topics:

- Elastic stability
- Introduction to elastic buckling
- Asymptotic buckling analysis for elastic problems
- Finite element implementation of Koiter analysis
- Buckling of stiffened panels
- Multimode post buckling Koiter analysis
- Nonlinear static equilibrium: Newton–Raphson algorithms, path following techniques
- Dynamic buckling
- Influence of plasticity on post-buckling response.
- Rigid-plastic second order analysis.
- Computational modelling of plastic collapse.
- Topology optimization under buckling constraints
- Buckling and residual stress in MEMS/NEMS
- Buckling-driven self-formation of microchannels

Assessment

The course comes with homework and a short assessment, based on the presented content. In order to complete the course, participants must hand in homework of sufficient quality and pass the assessment.

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Registration

Participants need to register by completing the registration form, which can be found at: https://engineeringmechanics.nl/courses/#upcoming . Please register before **June 16, 2021.**

Further information

Arrangements regarding dinners and accommodation will be communicated to the course participants by email prior to the course.

For more information on the contents of the course, contact:

Prof.dr.ir. Fred van Keulen, TUD

E-mail: A.vankeulen@tudelft.nl

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