Graduate course Stability of Structures

May 13th – May 15th 2019
June 3rd – June 5th 2019

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

General

This course provides an introduction to the topic stability 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 wil 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.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 May 13th – May 15th and from June 3rd to June 5th, 2019. 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
- 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

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. The course fee for non EM members is € 250 for students and € 1000 for other participants. They will receive an invoice after accepted registration. Participants need to register by completing the registration form online, which can be found at http://www.em.tue.nl/events/index.php/2/2019 and returning it **before May 1st, 2019** to the Secretariat of the Graduate School Engineering Mechanics, Eindhoven University of Technology. Members of the Graduate School Engineering Mechanics receive priority in case of over-subscription.

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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.em.tue.nl.