



*Graduate course*

**(Advanced Dynamics)**

**(Jan 25-28, 2021, T.U. Delft)**

**(Feb 2-3, 2020, U. Twente)**

# General

Dynamics is one of the fundamentals of Engineering Mechanics. Although the discipline of dynamics has been present since the 18th century, new engineering applications raise new challenges, and the evolution of computer hardware and numerical methods bring new opportunities for more efficient experimental and numerical techniques. For those reasons engineering dynamics plays a central role for innovation in high-tech systems such as cars, micro and nanosystems, wind-turbines, sport equipment or biomedical devices.

This course, planned in 6 days, is intended to revise the fundamentals of engineering dynamics and to go in more depth for some advanced subjects that are currently at the center of new scientific and technological developments. Hands-on exercises as well as presentations of engineering applications will be included throughout the course.

The course is mainly intended for PhD students willing to refresh their engineering dynamics knowledge and to understand some important advanced aspects they might use in their research or encounter during their professional life. But the course is also open to participants from industries willing to revive forgotten basics and to develop a deeper insight in engineering dynamics.

## Local organization

The course is organized by the research staff and teachers dealing with dynamics at the three Technical Universities in The Netherlands.

The local organizing committee is handled by

TU Delft (Jan 25-28, 2021 -Online)

- Dr. Farbod Alijani
- Marianne Stolker (secretary)

U Twente (Feb 2-3, 2021- Online)

- Dr. Jurnan Schilder
- Debbie Zimmerman (secretary)

## Lecturers

- Farbod Alijani(TUD)
- Peter G. Steeneken (TUD)
- Hassan HosseinNia (TUD)
- Alejandro Aragon (TUD)
- Pierpaolo Belardinelli (University of Marche)
- Gerard Verbiest (TUD)
- Peter Wellens (TUD)
- Jurnan Schilder (UT)
- Marcel Ellenbroek (UT)
- Dario Di Maio (UT)

## Lecture notes

Lecture notes and course material will be distributed at the start of the course.

## Prerequisites

It is assumed that the participants have an MSc degree in Mechanics or in another related field. Participation in the course is facilitated by basic familiarity with:

- calculus and algebra
- continuum mechanics and numerical techniques
- dynamics and signal theory

It is also requested that students bring their laptops to the course and have MATLAB and if possible MATHEMATICA software installed on them.

## Contents

The course will be held online. The links to the online sessions will be communicated with the students at the beginning of the course. The course consists of lectures, computer-practical sessions and presentations of engineering applications, and will cover the following topics:

- Basic principles of dynamics of discrete and continuous systems
- Dynamics of micro and nanosystems
- Numerical methods for dynamics
- Nonlinear dynamics
- Chaos
- Vibration isolation and control
- Fluid structure interactions
- Flexible multibody dynamics
- Modal analysis

## Registration

Participants need to register by completing the on line registration form that can be found <https://engineeringmechanics.nl/courses/#upcoming> and returning it **before January 11, 2020** to the Secretariat of the Graduate School Engineering Mechanics, Eindhoven University of Technology.

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