



Dept. of Civil Engineering | CPD Courses

# Structural Engineering and Materials

Master's Modules 2022



**UNIVERSITY OF CAPE TOWN**  
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

# Introduction



**The Master's Programme:** The programme offers high level training in structural design, structural analysis and structural materials by providing sound theoretical background and encouraging critical and innovative thinking. Students benefit from expertise in concrete technology, concrete durability, structural performance and design, computational mechanics and finite element analysis. The programme is supported by excellent laboratory and computing facilities and draws from cutting edge research including the in-house developed structural analysis software SESKA.

All programmes can be completed in a minimum of two years full-time or may be taken over an extended period of a maximum of five years.

**CPD Courses:** Four of these master's modules are offered as individual short courses in 2022. Continuing Professional Development students may take each module as a separate certificate course. CPD students are required to attend the lectures but are not required to submit assignments or write the exam.

## Who Should Attend?

The programme has been designed to be accessible to people in full-time employment as well as full-time students. Applicants may register for the individual master's level courses offered by the programme as Continuing Professional Development students. These students will be awarded a Certificate of Attendance. University credits will not be awarded to these students. Courses are typically attended by consultants or government officials working within the Structural Engineering field.

## Format

Please note: Each course is usually presented face-to-face over 5 days. Due to current COVID-19 protocols, it may be necessary to change the format of a course to an online format. Details will be supplied closer to the time.

## Structural Dynamics with Materials

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CIV5113Z: 15 – 19 August 2022

This course aims to introduce the concepts of structural dynamics and its applications in structural engineering. Topics covered include dynamic equilibrium of structures. Response of a single degree of freedom system to dynamic excitation: free vibration, harmonic loads, impulse loading and general loading. Response of multi-degree-of-freedom systems. Free vibrations: mass, damping, and stiffness matrices. Rayleigh damping. Forced vibrations: modal superposition and step by step methods. Continuous systems. Applications to seismic design of structures, blast and impact effects on structures and wind engineering

*Convenor: Prof Pilate Moyo*

*5 CPD points, ECSA registration number: UCTSEMSDM22*

## Finite Element Modelling in Structural Analysis

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CIV5142Z: 29 August – 2 September 2022

The course aims to introduce advanced students to finite element modelling theory, typical applications in structural engineering and recommendations. The topics include fundamental approaches and solution strategies in finite element modelling; linear and non-linear structural problems; different types of non-linearity in structural engineering; implication of the various mesh types including truss, beam, plate and shell elements; the effects of h and p mesh refinements and mesh quality; different types of structural supports including rigid supports, elastic bedding, kinematic constraint supports, the influence on stress distribution and recommendations of suitable application; different treatment of concentrated loads and distributed loads and the effect of mesh resolution.

*Convenor: Prof Sebastian Skatulla*

*5 CPD points, ECSA registration number: UCTSEMFEMSA22*

## Advanced Structural Concrete Engineering

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CIV5006Z: 31 October – 4 November 2022

The aims of this course are to provide structural engineers with an understanding of concrete behaviour and design that builds upon knowledge from the undergraduate curriculum. This includes some specialist topics. Topics included elastic theory, crack mechanism and liquid retaining structures. Flexural, shear behaviour and design of reinforced and prestressed concrete deep beams. Design of shear walls for reinforced concrete buildings as well as the design of concrete slabs with application to irregular shaped slabs.

*Convenor: Mr Kenny Mudenda*

*5 CPD points, ECSA registration number: UCTSEMASCE22*

# Plate and Shell Structures

CIV5100Z: 14 – 18 November 2022

This course aims to be a comprehensive treatment of plate and shell theories, and their application to the solution of various problems in structural engineering. Plate and Shell Structures Part A will cover plates subjected to bending and twisting (slope, curvature, twist, bending moments, transverse shears and twisting moments); the derivation of the bending equation for transversally loaded plates (rectangular and polar co-ordinates); solutions for rectangular plates and circular plates; practical applications; introduction to shell structures; the membrane hypothesis for shells; the membrane theory of axisymmetrically loaded shells of revolution; applications to the analysis of pressure vessels, liquid-containment vessels, domes and cooling towers.

*Convenor: Prof Alphose Zingoni*

*5 CPD points, ECSA registration number: UCTSEMPSS22*

## Overview

<b>Programme</b>	Structural Engineering and Materials CPD courses	
<b>Modules and duration</b>	Structural Dynamics with Materials: 15 – 19 August Finite Element Modelling in Structural Analysis: 29 August – 2 September Advanced Structural Concrete Engineering: 31 October – 4 November Plate and Shell Structures: 14 – 18 November	
<b>Venue</b>	PG Seminar Room, NEB, Upper Campus, University of Cape Town <b>or</b> online	
<b>CPD</b>	CPD points and ECSA codes as indicated per module	
<b>Fees</b>	Standard fee: R14 950	Full-time student: R7 475



# Registration

## Registration and Cancellation

- [Register for this course](#)
- Registration covers attendance of all sessions of the course and course material.
- Registrations close one week before the start of the course. Confirmation of acceptance will be sent on receipt of a registration form.
- **Cancellations must be received one week before the start of a course, or the full course fee will be charged.**
- For more information on application and registration procedures, please visit our website: [www.cpd.uct.ac.za](http://www.cpd.uct.ac.za)

## Certificates and CPD Points

A certificate of attendance will be awarded to CPD participants. Participants need to attend 80% of the lectures to qualify for an attendance certificate.

CPD participants can also request a formal university transcript, which will show this course as part of a Professional Development Career.

Please note: If you are interested in attending this course for credit purposes, you will need to register for the master's programme or as an occasional student. If you attend the course as a CPD participant, credit cannot be claimed in retrospect.

For further information on the master's programme please see the website: <http://www.civil.uct.ac.za/transport-studies>

## Contact details

For more information or details on CPD courses, visit our website or contact us.

**Web:** [www.cpd.uct.ac.za](http://www.cpd.uct.ac.za)      **Email:** [ebe-cpd@uct.ac.za](mailto:ebe-cpd@uct.ac.za)

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