

# SHORT COURSE: FOUNDATION DESIGN

DEPARTMENT OF CIVIL ENGINEERING • 5 days • 3 to 7 July 2023

## COURSE COORDINATOR

### Prof Peter Day

Extraordinary Professor of  
Geotechnical Engineering &  
Consultant, Jones & Wagener

## FEES

5-day course: R10,000

## ECSA CPD POINTS

5 points

## LANGUAGE

The course will be presented in  
English.

## COURSE CONTENT

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## CONTACT

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## OBJECTIVES

This course is presented from the perspective of a practicing  
geotechnical engineer.

The objective of this course is to provide a practical  
understanding of:

- Extending the theories of bearing capacity and settlement as taught at undergraduate level to practical design of foundations
- Obtaining and selecting design parameters from site investigation data
- Selection of appropriate foundation types for various types of development and soil profiles
- Design of spread footings, piled foundations and raft foundations
- Application of limit states principles to design of foundations

## OUTCOMES

At the end of the course, the participants should be able to:

- Define and specify site investigation requirements for types of development and soil conditions
- Select appropriate methods of design for common types of foundations
- Determine the load bearing capacity and settlement of foundations
- Better understand practical issues that need to be considered in foundation design

## COURSE ARRANGEMENTS

This course will be presented in  
hybrid mode: (Face-to-face on the  
Stellenbosch Campus & Online  
via MS Teams) Details will be  
forwarded to registered delegates  
once payment has been received.

TO REGISTER CLICK BELOW

**Face-to-Face :[CLICK HERE](#)**

**Online: [CLICK HERE](#)**

## REGISTRATIONS

Registrations close on  
23 June 2023; all payments are  
due by 30 June 2023

**Payment confirms registration.**



# Course Content

Topic	Subject matter
Foundation Types	<p>Types of foundations in common use in South Africa</p> <ul style="list-style-type: none"> <li>• Spread footings</li> <li>• Various types of piled foundations</li> <li>• Raft foundations</li> </ul> <p>Selection of appropriate foundation types for various developments and soil profiles</p>
Site Investigation and Soil Properties	<p>Soil, rock and groundwater</p> <ul style="list-style-type: none"> <li>• Typical South African soil profile</li> <li>• Soil types and characteristics</li> <li>• Effect of climate on soils and rocks</li> <li>• Description of soil profiles</li> <li>• Problem soil types and their distribution</li> <li>• Significance of water table and fluctuations thereof.</li> </ul> <p>Site investigation</p> <ul style="list-style-type: none"> <li>• Common methods of investigation</li> <li>• Soil sampling for laboratory testing</li> <li>• Common in-situ testing methods and their limitations</li> <li>• Other field tests.</li> </ul> <p>Determination of soil properties</p> <ul style="list-style-type: none"> <li>• Soil properties relevant to various ground and foundation types</li> <li>• Soil classification tests</li> <li>• Soil characterisation tests</li> <li>• Soil and rock strength</li> <li>• Soil and rock compressibility.</li> </ul> <p>Statutory requirements and applicable standards</p> <ul style="list-style-type: none"> <li>• Housing projects (NHBRC and National Building Regulations)</li> <li>• Dolomites</li> <li>• National standards</li> <li>• Other standards.</li> </ul> <p>Reference material</p> <ul style="list-style-type: none"> <li>• Maps and other resources</li> <li>• CGS database</li> <li>• Essential references</li> </ul>
Analysis and Design of Spread Footings	<p>Design approaches (WLD and LSD)</p> <p>Bearing capacity of shallow foundations</p> <ul style="list-style-type: none"> <li>• Review of design methods for drained and undrained soils</li> <li>• Influence factors (shape, depth, load inclination, etc.)</li> <li>• Load eccentricity</li> <li>• Factors of safety for WLD</li> <li>• Determination of design parameters</li> <li>• Factors affecting bearing capacity</li> <li>• Design examples using WSD and LSD</li> </ul> <p>Settlement of spread footings</p>

	<ul style="list-style-type: none"> <li>• Components of settlement (elastic, consolidation, creep, collapse)</li> <li>• Review of consolidation settlement calculation methods</li> <li>• Basic elastic settlement calculations</li> <li>• Simplified methods</li> <li>• Creep settlement</li> <li>• Non-linear stress-strain behaviour of soils</li> <li>• Determination of stiffness parameters from laboratory, field and in situ tests</li> <li>• Design examples</li> </ul>
Basic design of raft foundations	<p>Typical applications of raft foundations</p> <p>Types of foundation rafts (slab on grade, stiffened rafts, waffle rafts)</p> <p>Design criteria for heave and collapse</p> <p>Lytton's method for heaving soils</p>
Deep Foundations	<p>Types of deep foundations and applications</p> <p>Deep spread footings</p> <p>Design of piled foundations</p> <ul style="list-style-type: none"> <li>• Load capacity of piles and pile groups</li> <li>• Settlement of single piles and pile groups</li> <li>• Laterally loaded piles</li> <li>• Basic concepts in pile group design</li> </ul>
Subgrade Reaction	<p>Modulus of subgrade reaction</p> <p>Beam on elastic foundation methods v analysis of elastic continua.</p>
<p>Limit States Design using SANS 10160-5</p> <p>Note: Overview only – covered by Advanced Geotechnics Course</p>	<p>Bearing capacity</p> <p>Settlement</p> <p>Piles</p> <p>Selection of parameters</p>
Statutory Requirements and Applicable Standards	<ul style="list-style-type: none"> <li>• Township investigations (SANS 634)</li> <li>• Dolomite investigations (SANS 1936-2, SANS 633)</li> <li>• National Building Regulations (SANS 10400A, B &amp; H)</li> <li>• Bases of Design (SANS 10160-1 and SANS 10160-5)</li> <li>• Construction Regulations</li> </ul>