

DRAFT

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

Page 2-3

CONTACT

Janine Myburgh
021 808 2080
civilcourses@sun.ac.za

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.

Please contact @civilcourses
for registration link

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

	<ul style="list-style-type: none"> • Components of settlement (elastic, consolidation, creep, collapse) • Review of consolidation settlement calculation methods • Basic elastic settlement calculations • Simplified methods • Creep settlement • Non-linear stress-strain behaviour of soils • Determination of stiffness parameters from laboratory, field and in situ tests • Design examples
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"> • Load capacity of piles and pile groups • Settlement of single piles and pile groups • Laterally loaded piles • Basic concepts in pile group design
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"> • Township investigations (SANS 634) • Dolomite investigations (SANS 1936-2, SANS 633) • National Building Regulations (SANS 10400A, B & H) • Bases of Design (SANS 10160-1 and SANS 10160-5) • Construction Regulations