Geosynthetic Engineering

29 June – 10 July 2020
Introduction

The Masters Programme

The Master’s Programme with a specialisation in Geotechnical Engineering is intended to support high level training and enhance both the technical skills of recent graduates or experienced personnel who work in, or aspire to a career in civil engineering construction, consulting, environmental and related industries. The primary purpose of the programme is to provide advanced conceptual understanding, detailed factual geotechnical knowledge and specialist technical skills appropriate for postgraduates who wish to widen their professional scope and work towards a career in the field of geotechnical engineering. For further information about this master’s programme please visit the website: http://www.civil.uct.ac.za/msc-engineering-specialising-geotechnical-engineering

Continuing Professional Development

Modules of this master’s programme are offered to Continuing Professional Development delegates as 5 separate certificate courses from which a participant can obtain CPD credits. The Geosynthetic Engineering CPD course consists of 25 hours over 2 weeks.

Who should attend?

The Geotechnical Engineering courses are best suited for Civil Engineers, Consultants, Architects, Engineering Geologists, Geotechnical Engineers and Geologists, Bridge Engineers, Landscape Architects, Contractors, Soil Scientists, Project managers, City and Public Works Officials, City Planners, and other design professionals who address construction related issues.

Format

Due to current limitations as a result of COVID-19, the Geotechnical Engineering courses: Rock Mechanics, Ground Improvement Techniques, Geosynthetic Engineering, and Advanced Soil Mechanics courses will be presented online via Zoom. Course participants will need computer access and a reliable internet connection.

Please note: The guest lecturer is based in Australia, so the lecture times are to allow for the time difference.
Course Content

This course aims to introduce the geosynthetics, and their functions and applications in several civil engineering areas, including geotechnical engineering, hydraulic and geoenvironmental engineering, and transportation engineering. It focuses on the basic description of applications, analysis and design concepts, construction/application guidelines and case studies. It also includes a detailed discussion on general application guidelines, and installation and survivability requirements for various geosynthetic applications.

Learning Outcomes

On completion of this course, the participants should be able to:

- Differentiate between the types of geosynthetics, and their primary and secondary functions
- Recommend the types of test on geosynthetics required in any specific field project
- Select the geosynthetics for their appropriate and cost-effective use in specific applications
- Analyse several applications of geosynthetics and design the related structures, including retaining walls, embankments, shallow foundations, slopes (stabilisation and erosion control), filters and drains, landfills, earth dams, unpaved roads, paved roads and railway tracks
- Develop the general and some specific guidelines for geosynthetic installation, and
- Locate the additional references on geosynthetics and their applications.

Course Overview

<table>
<thead>
<tr>
<th>Name</th>
<th>Geosynthetic Engineering</th>
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<tbody>
<tr>
<td>Duration</td>
<td>29 June – 10 July 2020: 25 hours over two weeks</td>
</tr>
<tr>
<td>Venue</td>
<td>Due to current limitations as a result of COVID-19, the Geosynthetic Engineering course will be presented online via Zoom.</td>
</tr>
<tr>
<td>CPD</td>
<td>2.5 CPD points, ECSA Validation No: UCTGTEGSE20</td>
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<tr>
<td>Participants</td>
<td>Civil Engineers, Consultants, Architects, Engineering Geologists, Geotechnical Engineers and Geologists, Bridge Engineers, Landscape Architects, Contractors, Project managers, City and Public Works Officials, City Planners, and other design professionals who address construction related issues.</td>
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</tbody>
</table>
| Fees*              | Standard delegate: R10250.00 (25% discount for online format)  
                      | UCT student and staff fee: R5125.00                   |
Prof. Sanjay Kumar Shukla

PhD (IIT Kanpur), MTech (IIT Kanpur), BSc Eng (BIT Sindri), FIEAust, FIGS, FIE(India), MASCE, MIGS, MIFAI, MIRC, MISRMTT, MISTE, MCAII

Prof. Sanjay Kumar Shukla is an internationally recognized expert in the field of Civil (Geotechnical) Engineering. He is the Founding Editor-in-Chief of International Journal of Geosynthetics and Ground Engineering, published by Springer Nature, Switzerland. He is also the Founding Research Group Leader (Geotechnical and Geoenvironmental Engineering) at Edith Cowan University, Perth, Australia. He holds the Distinguished Professorship in Civil Engineering at VIT University, Vellore, Chitkara University, Himachal Pradesh, VR Siddhartha Engineering College, Vijayawada, India, and Fiji National University, Suva, Fiji.

He graduated in Civil Engineering from BIT Sindri, India, and earned his MTech in Civil Engineering (Engineering Geology) and PhD in Civil (Geotechnical) Engineering from Indian Institute of Technology Kanpur, India. His primary areas of research interest include geosynthetics and fibres for sustainable developments, ground improvement techniques, utilization of wastes in construction, earth pressure and slope stability, environmental, mining and pavement geotechnics, and soil-structure interaction.

He is an author/editor of 15 books, and more than 250 research papers, including over 150 refereed journal papers. His books titled ‘Core Principles of Soil Mechanics’ and ‘Core Concepts of Geotechnical Engineering’ published by ICE Publishing, London are popular textbooks in the core geotechnical engineering courses worldwide. Shukla’s generalized expression for active thrust (2015) and Shukla’s generalized expression for passive resistance (2013) are routinely used by practicing engineers worldwide for designing the retaining structures.

He has been honoured with several awards, including the most prestigious IGS Award 2018 by the International Geosynthetics Society (IGS), USA, in recognition of outstanding contribution to the development and use of geosynthetics during the 2014-2017 IGS award period.

He is a fellow of Engineers Australia, Institution of Engineers (India) and Indian Geotechnical Society, and a member of American Society of Civil Engineers, International Geosynthetics Society and several other professional bodies.

He is the Senior Editor of Cogent Engineering (Civil and Environmental Engineering) and serves on the editorial boards of more than 10 international journals, including ICE Ground Improvement, Soil Mechanics and Foundation Engineering, and Journal of Mountain Science.
Lecture Programme

Basic description, functions and selection of geosynthetics
Monday, 29 June 2020

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Geosynthetics, their types and basic characteristics</td>
<td>Prof. Sanjay Shukla</td>
</tr>
<tr>
<td>09:30 – 10:30</td>
<td>Raw materials and their manufacturing process</td>
<td>Prof. Sanjay Shukla</td>
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Tuesday, 30 June 2020

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Primary and secondary functions of geosynthetics</td>
<td>Prof. Sanjay Shukla</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Selection of geosynthetics and historical developments</td>
<td>Prof. Sanjay Shukla</td>
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Properties, application and design concepts
Wednesday, 1 July 2020

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<thead>
<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Physical and mechanical properties</td>
<td>Prof. Sanjay Shukla</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Hydraulic properties</td>
<td>Prof. Sanjay Shukla</td>
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Thursday, 2 July 2020

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<tr>
<td>08:30 – 09:30</td>
<td>Endurance and degradation properties, test and allowable properties</td>
<td>Prof. Sanjay Shukla</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Description and application of geosynthetics, design concepts</td>
<td>Prof. Sanjay Shukla</td>
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Geotechnical applications of geosynthetics

Friday, 3 July 2020

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Retaining walls: basic description, analysis and design</td>
<td>Prof. Sanjay Shukla</td>
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<td></td>
<td>concepts, application guidelines, case studies</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Embankments: basic description, analysis and design</td>
<td>Prof. Sanjay Shukla</td>
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<td>concepts, application guidelines, case studies</td>
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<tr>
<td>10:30 – 11:00</td>
<td>Break</td>
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<tr>
<td>11:00 – 13:00</td>
<td>Coastal Protection using Geosynthetics, Geosynthetics in</td>
<td>Gerard Dirks</td>
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<td>Harbour construction and Geosynthetic Dewatering systems</td>
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Monday, 6 July 2020

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<tr>
<td>08:30 – 09:30</td>
<td>Shallow foundations: basic description, analysis and design</td>
<td>Prof. Sanjay Shukla</td>
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<td>concepts, application guidelines, case studies</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Slopes – stabilization: basic description, analysis and</td>
<td>Prof. Sanjay Shukla</td>
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<td>design concepts, application guidelines, case studies</td>
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Hydraulic and geoenvironmental applications

Tuesday, 7 July 2020

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Filters and drains: basic description, analysis and design</td>
<td>Prof. Sanjay Shukla</td>
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<td></td>
<td>concepts, application guidelines</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Slopes – erosion control: basic description, analysis and</td>
<td>Prof. Sanjay Shukla</td>
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<td>design concepts, application guidelines, case studies</td>
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<tr>
<td>10:30 – 11:00</td>
<td>Break</td>
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<tr>
<td>11:00 – 12:00</td>
<td>National Norms and Standards and the use of geosynthetic</td>
<td>Mbewu Asandiso</td>
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<td>materials in waste containment facilities</td>
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Wednesday, 8 July 2020

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<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Landfills: basic description, analysis and design concepts,</td>
<td>Prof. Sanjay Shukla</td>
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<td>application guidelines, case studies</td>
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<tr>
<td>09:30 – 10:30</td>
<td>Earth dams: basic description, analysis and design concepts,</td>
<td>Prof. Sanjay Shukla</td>
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<td>application guidelines, case studies</td>
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</table>
Transportation applications, general application guidelines and installation survivability requirements

Thursday, 9 July 2020

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Unpaved roads: basic description, analysis and design concepts, application guidelines</td>
<td>Prof. Sanjay Shukla</td>
</tr>
<tr>
<td>09:30 – 10:30</td>
<td>Paved roads: basic description, analysis and design concepts, application guidelines, case studies</td>
<td>Prof. Sanjay Shukla</td>
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Friday, 10 July 2020

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>08:30 – 09:30</td>
<td>Railway tracks: basic description, analysis and design concepts, application guidelines, case studies</td>
<td>Prof. Sanjay Shukla</td>
</tr>
<tr>
<td>09:30 – 10:30</td>
<td>General application guidelines and installation survivability requirements</td>
<td>Prof. Sanjay Shukla</td>
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</tbody>
</table>
Registration

Registration and Cancellation

- **Register online**
- 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/cpd/applications](http://www.cpd.uct.ac.za/cpd/applications)

Certificates and CPD Points

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

According to guidelines set out by the Engineering Council of South Africa, attendance of this course will earn participants 2.5 points towards Category 1 (Developmental Activities). The ECSA validation number for this course is UCTGTEGSE20

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.

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

Contact details

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

<table>
<thead>
<tr>
<th><strong>Web:</strong></th>
<th><a href="http://www.cpd.uct.ac.za">http://www.cpd.uct.ac.za</a></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E-mail:</strong></td>
<td><a href="mailto:ebe-cpd@uct.ac.za">ebe-cpd@uct.ac.za</a></td>
</tr>
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<table>
<thead>
<tr>
<th><strong>Physical address</strong></th>
<th><strong>Postal address</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPD Programme</td>
<td>CPD Programme</td>
</tr>
<tr>
<td>Room 6.10, 6th Floor</td>
<td>EBE Faculty</td>
</tr>
<tr>
<td>New Engineering Building</td>
<td>University of Cape Town</td>
</tr>
<tr>
<td>Upper Campus</td>
<td>Private Bag X3</td>
</tr>
<tr>
<td>University of Cape Town</td>
<td>Rondebosch 7701</td>
</tr>
<tr>
<td>South Africa</td>
<td>South Africa</td>
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<table>
<thead>
<tr>
<th><strong>Programme administrators</strong></th>
<th><strong>Geotechnical Engineering Programme Convenor</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gillian Williams: +27 (0)21 650 7239</td>
<td>Denis Kalumba: +27 (0)21 650 2590</td>
</tr>
<tr>
<td>Sandra Jemaar: +27 (0)21 650 5793</td>
<td><a href="mailto:Denis.kalumba@uct.ac.za">Denis.kalumba@uct.ac.za</a></td>
</tr>
<tr>
<td>Heidi Tait: +27 (0)21 650 4922</td>
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