

## Book Description:

Provide a valuable overview of soil properties and mechanics together with coverage of field practices and basic engineering procedures with Das and Sobhan, Principles of Geotechnical Engineering, 9E. This market-leading introduction to geotechnical engineering is ideal for the foundational course taken by most civil engineering students. This book provides the important background knowledge students need to support study in later design-oriented courses and in professional practice. The authors ensure a practical and application-oriented approach to the subject by incorporating a wealth of comprehensive discussions and detailed explanations. Find more figures and worked-out problems than any other book for the course to help ensure student understanding.

## Key Features:

Challenging critical thinking problems encourage deeper analyses. Critical thinking problems as well as exercises drive students to extend their understanding of the subjects covered within each chapter.

- A 16-Page Color Insert Features Distinctive Photographs of Rocks and Rock-Forming Minerals. These fully colored images help fully capture the unique coloring that helps geotechnical engineers distinguish one mineral or rock from the other.
- This edition offers more figures and worked-out problems than any other similar text. This book is well known for offering more actual examples and practice than any other of its kind in the market to keep students' learning application-oriented.
- Chapter Introductions and summaries clarify concepts. These helpful learning features clearly preview and reinforce content to guide students and assist them in retaining key concepts.
- Comprehensive Discussion Address Weathering of rocks. Students learn about both weathering and the formation of sedimentary and metamorphic rocks in this thorough presentation.
- Detailed explanation focuses on the variation of the maximum and minimum void ratios of granular soils. Students examine variations due to grain size, shape and non-plastic fine contents.
- This edition discusses the Kozeny-Carman Equation in detail. Students gain a thorough understanding of this equation for laminar flow as they also review modifications to estimate hydraulic conductivity of granular soils.
- Numerous new and updated example problems. This edition includes many new example problems as well as revised existing problems. This edition now offers more than 185 example problems to ensure understanding. The authors have also added and updated the book's end-of-chapter problems throughout.
- New summaries clarify content within chapter 14 on "Lateral Earth Pressure: Curved Failure Surface." This chapter now provides an overview of the passive earth pressure coefficient obtained based on the solution by the lower bound theorem of plasticity and the solution by method of characteristics. In addition, the authors have expanded content on passive force walls with earthquake forces.
- Additional material within chapter 15 addresses slope stability. The parameters required for location of the critical failure circle based on Spencer's analysis have been added to the chapter.
- New chapter 18 now introduces Geosynthetics. Built upon the expertise of author Dr. Das, this chapter examines current developments and challenges within this robust and rapidly expanding area of civil engineering.

- Chapter 2 contains more details on sieve sizes. Chapter 2 on “Origin of Soil and Grain Size” contains a more detailed discussion on U.S. sieve sizes. The chapter now includes descriptions of British and Australian standard sieve sizes.
- Expanded discussion in chapter 3 offers more information about weight and volume relationships. The chapter now highlights helpful information about angularity and the maximum and minimum void ratios of granular soils.
- The fall cone test description has been expanded. Students now learn more about the fall cone test used to determine the liquid limit in Chapter 4 which covers “Plasticity and Structure of Soil.”
- Chapter 7 now provides more information on permeability. Additional sections in this chapter examine permeability tests in auger holes, hydraulic conductivity of compacted clay soils and moisture content-unit weight criteria for clay liner construction.
- New content covers Pavlovsky's solutions for seepage through an earth dam. This addition appears within Chapter 8 on “Seepage.”
- New vertical stress content has been added to chapter 10, “Stresses in a Soil Mass,” reviews vertical stress caused by a horizontal strip load, Westergaard’s solution for vertical stress due to a point load and stress distribution for Westergaard material.
- An improved relationship for elastic settlement estimation added to chapter 11. “Compressibility of Soil.” also provides a new section on construction time correction (for ramp loading) of consolidation settlement.
- Chapter 12 on “Shear Strength of Soil” Reviews recently published developments. The authors have incorporated recently-published correlations between drained angle of friction and plasticity index of clayey soil into the chapter discussion. Additional content reviews the relationship between undrained shear strength of remolded clay with liquidity index.
- Includes Mind Tap which is an interactive, customizable and complete learning solution. It includes a Mind Tap Reader and a library of learning apps (e.g., CNOW, Aplia, Read Speaker, Merriam-Webster dictionary, My Content, RSS Feed, Kaltura, Progress app, etc.).

## **Table of Contents:**

<b>Preface to the SI Edition</b>	<b>Vi</b>
<b>Preface</b>	<b>Vii</b>
<b>MindTap online Course</b>	<b>Xi</b>
<b>About the Authors</b>	<b>Xiii</b>
<b>1. Geotechnical Engineering-A Historical Perspective</b>	<b>01</b>
<b>2. Origin of Soil and Grain Size</b>	<b>16</b>
<b>3. Weight-Volume Relationships</b>	<b>64</b>

<b>4. Plasticity and Structure of Soil</b>	<b>95</b>
<b>5. Classification of Soil</b>	<b>129</b>
<b>6. Soil Compaction</b>	<b>156</b>
<b>7. Permeability</b>	<b>212</b>
<b>8. Seepage</b>	<b>261</b>
<b>9. In Situ Stresses</b>	<b>295</b>
<b>10. Stresses in a Soil Mass</b>	<b>331</b>
<b>11. Compressibility of Soil</b>	<b>390</b>
<b>12. Shear Strength of Soil</b>	<b>469</b>
<b>13. Lateral Earth Pressure: At-Rest, Rankine, and Coulomb</b>	<b>535</b>
<b>14. Lateral Earth Pressure: Curved Surface</b>	<b>606</b>
<b>15. Slope Stability</b>	<b>638</b>
<b>16. Soil Bearing Capacity for Shallow Foundations</b>	<b>710</b>
<b>17. Subsoil Exploration</b>	<b>748</b>
<b>18. An Introduction to Geosynthetics</b>	<b>783</b>
<b>Answers to Selected Problems</b>	<b>805</b>
<b>Index</b>	<b>815</b>

## **Author:**

**Braja M. Das**, California State University, Sacramento

Dr. Braja Das is Dean Emeritus of the College of Engineering and Computer Science at California State University, Sacramento. He received his M.S. in Civil Engineering from the University of Iowa and his Ph.D. in Geotechnical Engineering from the University of Wisconsin. He is the author of a number of geotechnical engineering texts and reference books and more than 250 technical papers in the area of geotechnical engineering. His primary areas of research include shallow foundations, earth anchors and geosynthetics. Dr. Das is a Fellow and Life Member of the American Society of Civil Engineers, Life Member of the American Society for Engineering Education and an Emeritus Member of the Chemical and Mechanical Stabilization Committee of the Transportation Research Board of the National Research Council (Washington D.C.). He has received numerous awards for teaching excellence, including the AMOCO Foundation Award, the AT and T Award for Teaching Excellence from the American Society for Engineering Education, the Ralph Teetor Award from the Society of Automotive Engineers and the Distinguished Achievement Award for Teaching Excellence from the University of Texas at El Paso.

**Khaled Sobhan**, Florida Atlantic University

Dr. Khaled Sobhan is a Professor of Civil, Environmental and Geomatics Engineering at Florida Atlantic University. He received his M.S. degree from The Johns Hopkins University and his Ph.D. from Northwestern University, both in the area of Geotechnical Engineering. His primary research areas include ground improvement, geotechnology of soft soils, experimental soil mechanics and geotechnical aspects of pavement engineering. Dr. Sobhan served as the Chair of the Chemical and Mechanical Stabilization committee (AFS90) of the Transportation Research Board (2005-2011) and co-authored the TRB Circular titled Evaluation of Chemical Stabilizers: State-of-the-Practice Report (EC086). He is currently serving as an Associate Editor of ASCE Journal of Materials in Civil Engineering and on the editorial boards of the ASTM Geotechnical Testing Journal, Geotechnical and Geological Engineering (Springer, The Netherlands) and International Journal of Geotechnical Engineering. Dr. Sobhan is a recipient of the distinguished Award for Excellence and Innovation in Undergraduate Teaching (2006) and the Excellence in Graduate Mentoring Award (2009) from Florida Atlantic University. He has authored/co-authored more than 100 technical articles and reports in the area of geotechnical engineering.