

CE 483

Foundation Engineering

1st Semester 1438/1439 H

INSTRUCTOR

Prof. Abdullah I. Almhaidib

أ.د. عبدالله بن إبراهيم المهيدب

Office: 2A-56

Office hours: As posted

Phone: 467-7033

email: muhaidib@ksu.edu.sa

Website: <http://fac.ksu.edu.sa/muhaidib>

TEXT BOOKS

- **Text Book:**

1. Das, B. M. *Principles of Foundation Engineering*, Latest edition

- **Supplementary References:**

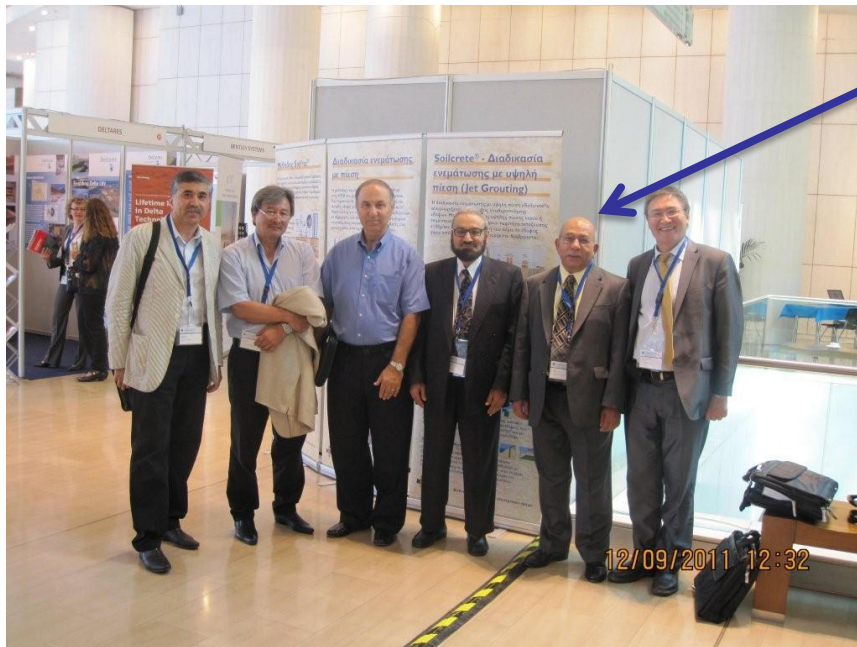
1. Bowles, J. *Foundation Analysis and Design*, Latest Edition.
2. *The Saudi Building Code*

TEXT BOOK

Text Book

“Principles of Foundation Engineering”

Braja M. Das



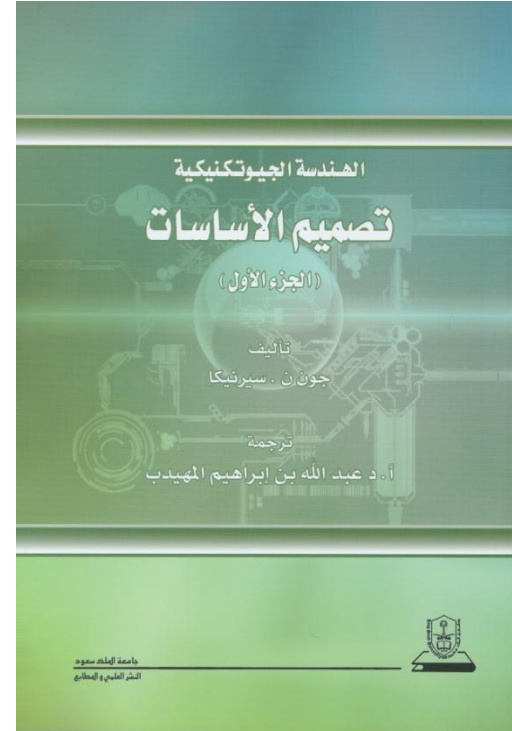
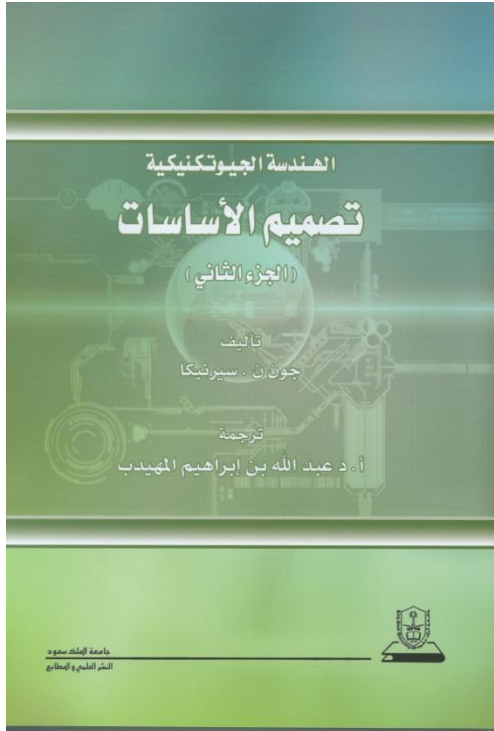
TRANSLATED BOOKS



ترجمة كتاب "الهندسة الجيوتكنيكية : ميكانيكا التربة" لمؤلفه
(جون سيرنيكا) بعد موافقة مركز الترجمة بجامعة الملك
سعود ودعمه، إدارة النشر العلمي والمطابع، جامعة الملك
سعود، ١٤٢٦ هـ.

حصل هذا الكتاب على جائزة خادم الحرمين الشريفين عبدالله
بن عبدالعزيز العالمية للترجمة ١٤٢٨ هـ (٢٠٠٨ م).

TRANSLATED BOOKS

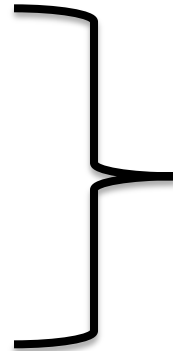


حصل هذا الكتاب على جائزة مؤسسة الكويت للتقدم العلمي (معرض الكويت الرابع والثلاثين للكتاب لعام ٢٠٠٩ م) عن أفضل كتاب مترجم إلى اللغة العربية في العلوم

Course Attendance

Lectures

Tutorial



25% !!!!

Book!!!

GEO-ENGINEERING AT KSU

CE 382 Geotechnical Engineering I

CE 380 Soil Mechanics Laboratory



CE 481 Geotechnical Engineering II



CE 483 Foundation Engineering



Elective Courses:

- CE 484 Deep Foundations
- CE 485 Introduction to Rock Mechanics
- CE 486 Improvement of Geotechnical Engineering Materials
- CE 487 Geotechnical Engineering in Arid Regions
- CE 488 Selective Topics in Geotechnical Engineering

Postgraduate

M.Sc. : CE 581 to CE 589

Ph.D. : CE 681 to CE 689

COURSE GRADE DISTRIBUTION

• Quizzes and Home works	Weekly – (Given by TA)	10%
• 1 st Midterm*	Wednesday 19/02/1439 (08/11/2017)	25%
• 2 nd Midterm*	Wednesday 02/04/1439 (20/12/2017)	25%
• Final Exam	Sunday 20/04/1439 (07/01/2018)	40%
• Total		100%
• 15 minutes after Maghreb Prayer		

CONTENTS

Topic	References
• Geotechnical Properties of Soil	Chapter 2
• Subsoil Exploration	Chapter 3
• Ultimate Bearing Capacity of Shallow Foundations	Chapters 4 & 5
• Settlement of Shallow Foundations	Chapter 7
• Mat Foundations	Chapter 8
• Lateral earth Pressure	Chapter 12
• Retaining walls	Chapter 13
• General overview of Saudi Building Code for soils and foundations	



Chapter 2

Geotechnical Properties of Soil

CE 382 Geotechnical Engineering I

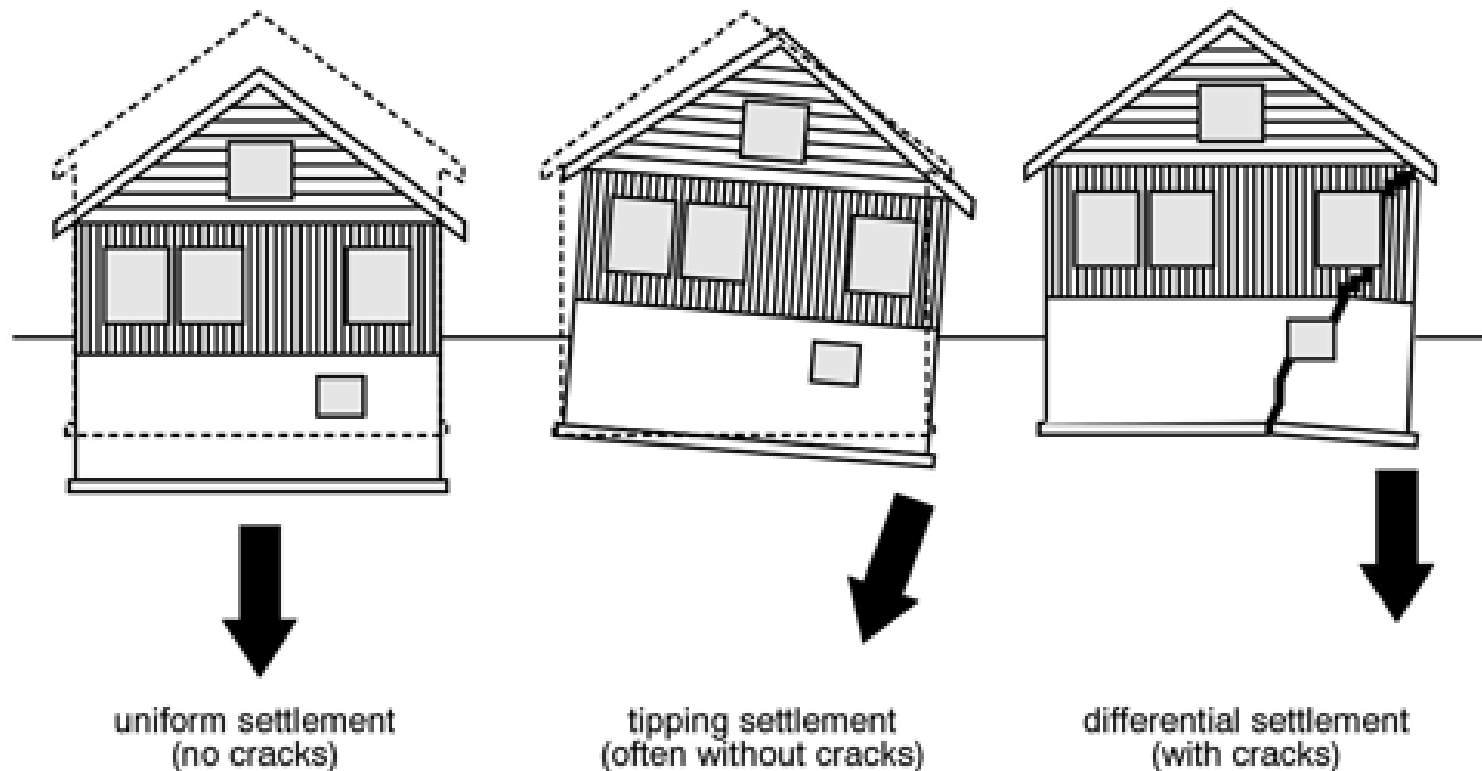
- **Soil minerals**
- **Types of rocks**
- **Weathering process**
- **Formation of soils**
- **Phase relations**
- **Consistency limits and indices**
- **Classification of soils**
- **Soil compaction**
- **Flow through soils (permeability and seepage)**
- **Principle of effective stress**
- **Stresses in soil masses**

CE 481 Geotechnical Engineering II

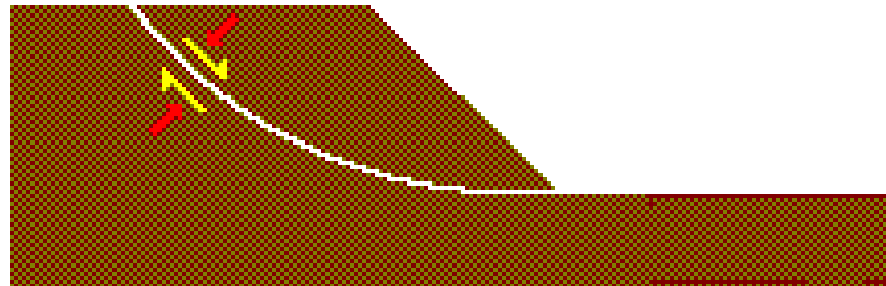
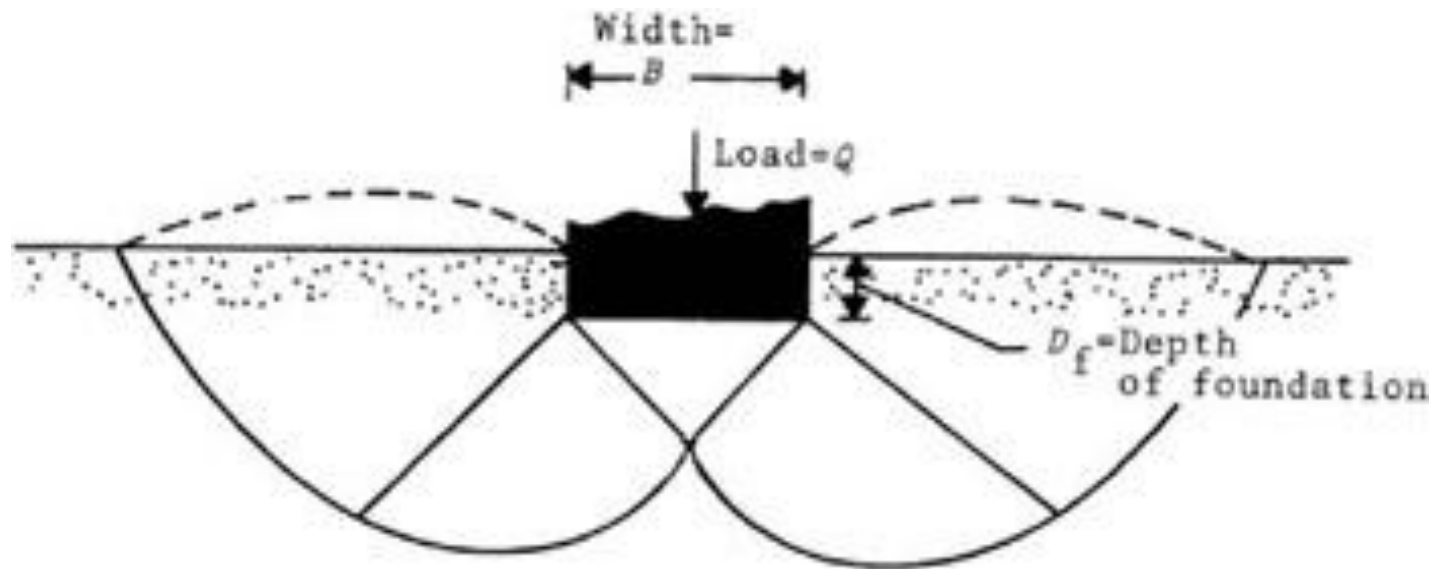
- **Compressibility and Consolidation of Soil**
- **Shear Strength**
- **Slope Stability**
- **Lateral Earth Pressure**
- **Retaining Structures**

COMPRESSIBILITY OF SOILS

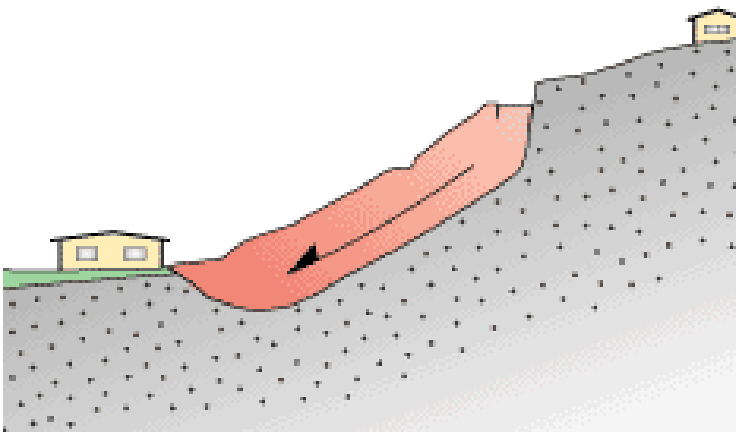
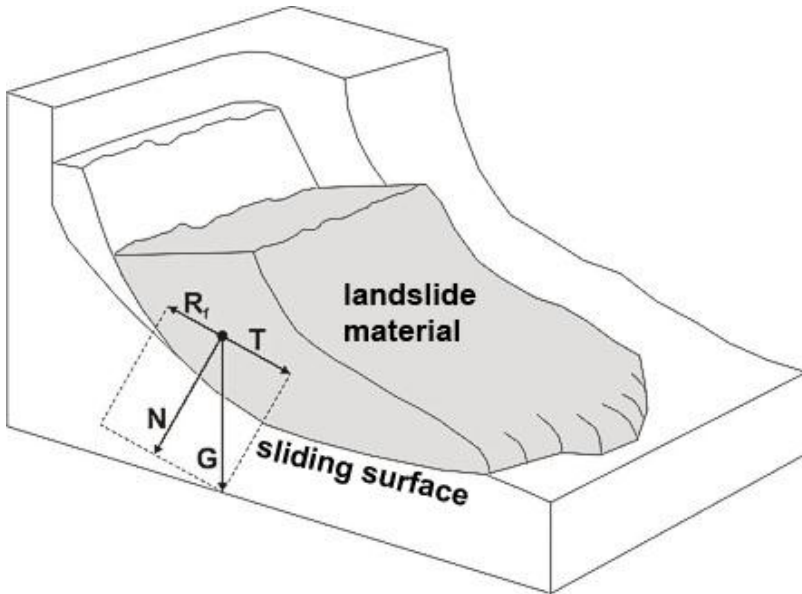
Types of settlement



SHEAR STRENGTH OF SOIL



SLOPE STABILITY



Lateral earth pressure and Retaining Structures



FOUNDATION ENGINEERING

- ❑ In a broad sense, foundation engineering is a art of selecting, designing and constructing the elements that transfer the weight of structure to the underlying soil or rock.
- ❑ The role of engineer is to select the type of foundation, its design and supervision of construction.
- ❑ Before the engineer can design a foundation intelligently, he must have a reasonably accurate conception of the physical properties and the arrangement of the underlying materials. This requires detailed subsurface exploration.

FOUNDATION ENGINEER

The foundation engineer should possess the following information:

- Knowledge of soil mechanics and background of theoretical analysis
- Composition of actual soil strata in the field.
- Necessary experience-precedents-what designs have worked well under what designs have worked well under what conditions-economic aspects
- Engineering JUDGMENT to find solutions to the problems.

TYPES OF FOUNDATIONS

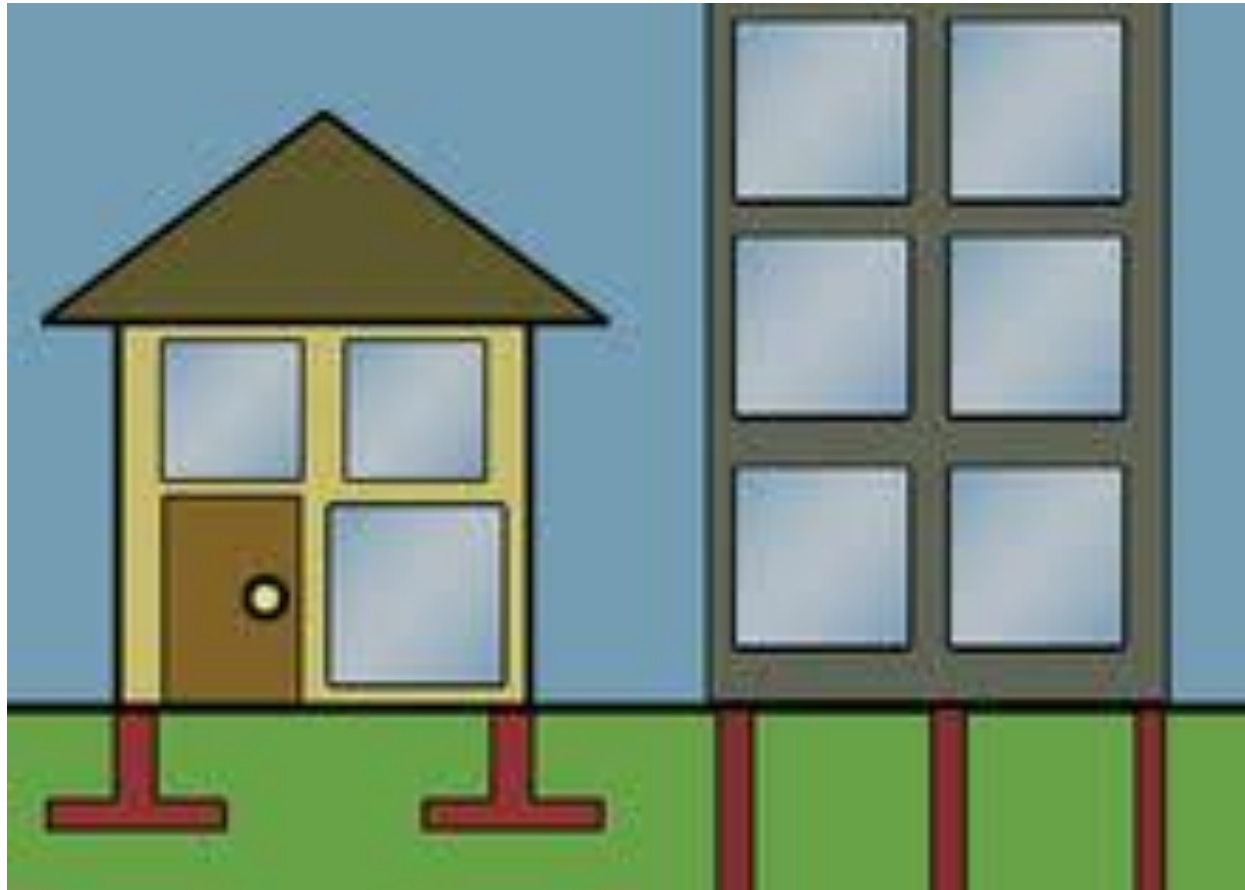
Foundations can be categorized into basically two types:

Shallow Foundations:

These types of foundations are placed at a shallow depth (relative to their dimensions) beneath the soil surface. Their depth may range from the top soil surface to about 3 times their breadth (about 6 meters). They include footings (spread and combined), and soil retaining structures (retaining walls, sheet piles, etc) - CE 483 Foundation Engineering.

Deep Foundations:

The most common of these types of foundations are piles. They are embedded very deep (relative to their dimensions) into the soil. Their depths may run over several 10s of meters. They are usually used when the top soil layer have low bearing capacity (CE 484 Deep Foundations).



CE 483 FOUNDATION ENGINEERING

Students completing this course successfully will be able to :

- Understand the methods of site investigations and determine the site characteristics.
- Understand the types of foundations and retaining structures.
- Understand the types of loads to be applied to foundations and retaining structures.
- Understand suitability, feasibility, and desirability of each type of foundations and retaining structure.
- Select the proper type of foundation and retaining structure according to the site and structure characteristics.
- Evaluate the settlement of the selected foundations.
- Understand and apply specification requirements.
- Use computer software to design foundations and retaining structures.
- Improve the communication skills, including reading, writing, oral presentations.