CEE 681
Foundation Engineering I

Catalog data:	20-CEE-681. Foundation Engineering I. 3 ug./gr. cr. Subsurface exploration for foundations. Analysis of shallow footings, mats, retaining wall foundations, pile and pier foundations.
Prerequisites:	20-CEE-476 Principles of Soil Mechanics.
Textbook:	Braja M. Das, *Fundamentals of Geotechnical Engineering*, Brooks/Cole, Pacific Grove, CA, 2000.
Reference:	ASCE *Geotechnical and Geoenvironmental Journal*, Canadian Geotechnical Journal.
Coordinator:	Mark T. Bowers, PhD, PE, Associate Professor of Civil Engineering, 665 Baldwin Hall, 556-5425, Mark.Bowers@UC.Edu
Goals:	To advance the student's knowledge and experience concerning subsurface exploration for the determination of soil parameters, bearing capacity, shallow foundation sizing, lateral earth pressures, pile foundations, drilled pier foundations, and ground improvement. Various methods are used to meet these objectives including classroom lectures, homework including hand and computer solutions, and video presentations.
Lecture or lab topics:	1. Subsurface exploration. (3 classes) 2. Ultimate bearing capacity of shallow foundations. (3 classes) 3. Induced stresses, settlement, allowable bearing capacity charts. (3 classes) 4. Lateral earth pressures. (3 classes) 5. Gravity, cantilever, and mechanically stabilized retaining walls. (3 classes) 6. Anchored sheetpile walls, braced excavations. (3 classes) 7. Introduction to pile foundations. (3 classes) 8. Pullout resistance, lateral loading of piles; pile group action. (3 classes) 9. Drilled shafts. (3 classes) 10. Ground improvement. (1 class) 11. In class exams. (2 classes)
Computer usage:	As needed. Use licensed software for various design applications and demonstrations.
ABET criterion 3:	a, c, e, h, i, j, k
ABET criterion 8:	a, b, d
Date prepared:	February 4, 2004

Specific Examples of ABET Criterion 3

a	The course depends upon a solid background in earth science, engineering mechanics, fluid mechanics, soil mechanics, and mathematics. The student is required to solve 5 to 6 homework sets that incorporate all of these background components.
c	The homework sets involve practical problems, often from the professor's consulting experience. The focus is the design of components or entire systems to solve a foundation engineering problem (e.g., anchored sheetpile walls, sizing shallow foundations).
e	The class lecture and homework assist the student in the identification and the solution of a problem. It is recognized that there are several possible solutions, thus the homework sets are often open-ended in nature.
h	The class discussion points to the importance of understanding the impact of our foundation engineering solutions in a societal context. Aesthetics, cost, benefits, and problems are discussed.
i	The need for life-long learning is stressed. The class lectures discuss the history of growth in the foundation engineering field. Modern techniques are taught in light of that history. It is stressed that new approaches should be evaluated and that a responsibility exists to promulgate information on new approaches to inform the engineering community.
j	Contemporary issues are discussed as a new chapter or topic is introduced to whet the student's interest. Power Point presentations, videos, and field trips to construction sites on campus are often employed to discuss contemporary issues in foundation engineering.
k	The class requires the student to develop the ability to use basic tools (equations, design charts, licensed software) in the solution of problems. The honing of judgment through experience is greatly stressed.