Ohio Articulation Number (OAN)
Course Submission Form
2005-2006

College/University  The University of Toledo

Course(s) Submitted (Title & Course #)  CET 2220 Soil Mechanics  for
Ohio Articulation Number  OET017

Date  November 7, 2006  Course  1 of a  1 Course OAN mapping.

Name and title of individual submitting on behalf of the college/university

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Credit Hours  3 qtr  2 sem  x
Lecture Hours  2
Laboratory Hours  1 (if applicable)
Pre-Requisites(s)  Course work (if applicable)
ENGT 1050 Computers for ET and CET 1200 Engr. Mechanics

Placement Score (if applicable)
(Name of test)
(Domain)  (Score)

Catalog/Course Description (Includes Course Title and Course #)

CET 2220 Soil Mechanics. Theory and application of soil properties as related to foundation design, including pressure distribution, bearing capacity, compressibility, consolidation, shear and stress analysis. Laboratory will cover quality control tests.
Course Objectives and/or Plan of Work

In this course students are expected to:
1. Obtain the ability to identify soil types using standard nomenclature and identify soils related characteristics and problems at a construction site.
2. Gain an understanding of and an ability to determine soil grain size distributions and Atterberg Limits.
3. Gain an understanding of the compaction of soils, including the theory and application of Proctor tests and California Bearing Ratios.
4. Gain an understanding of soils compressibility, consolidation and the ability to calculate settlement and load analysis/pressure distribution in a soils mass.
5. Obtain the ability to estimate appropriate bearing pressures for soil and groundwater conditions.
6. Obtain the ability to estimate total and differential settlements for soil and groundwater conditions.
7. Obtain the ability to analyze designs for appropriate factors of safety.
8. Gain an understanding of groundwater aquifer types, flow mechanics with the ability to calculate associated seepage rates and flow nets.
9. Obtain the ability to perform and apply unconfined compression tests and calculate allowable foundation bearing loads.

Description of Assessment and/or Evaluation of Student Learning

Related Program Outcomes:

ABET/Program Outcomes
a. an appropriate mastery of the knowledge, techniques, skills and modern tools associated with construction engineering technology;
c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes concerning construction engineering technology;
e. an ability to function as part of a team;

Program Criteria
2. A development of mathematical skills sufficient to solve and analyze technical problems associated with construction projects including building, highway and heavy construction.
4. The ability to demonstrate a thorough knowledge of common construction materials- both their proper usage and proper testing procedures.
8. An understanding of codes and specifications in the implementation of building and highway projects. CET-2220 Soil Mechanics Page 1

Evidence of the success of these outcomes is provided by the collection and analysis of: Proctor and Soil Compaction Lab Reports, Unconfined Soils Compression Lab Reports, and Differential Settlement Calculation Problems
Course Title: Soil Mechanics
Course Code & Number: CET-2220
Credit Hour Total: 3
Weekly Contact Hours Lecture: 2
Lab Hours: 2
Prerequisite(s): ENGT-1050, CET-1200
Text:

Software: None

A. Course Description (Approved catalog description.)

Theory and application of soil properties as related to foundation design, including pressure distribution, bearing capacity, compressibility, consolidation, shear and stress analysis. Laboratory will cover quality control tests.

B. Related Program Outcomes:

Upon successful completion of the Construction Engineering Technology program, graduates will have:

ABET/Program Outcomes

a. an appropriate mastery of the knowledge, techniques, skills and modern tools associated with construction engineering technology;

b. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes concerning construction engineering technology;

e. an ability to function as part of a team;

Program Criteria

2. A development of mathematical skills sufficient to solve and analyze technical problems associated with construction projects including building, highway and heavy construction.

4. The ability to demonstrate a thorough knowledge of common construction materials- both their proper usage and proper testing procedures.

8. An understanding of codes and specifications in the implementation of building and highway projects.

Evidence of the success of these outcomes is provided by the collection and
C. **Course Objectives:**

Upon completion of the course the student will:

1. Obtain the ability to identify soil types using standard nomenclature and identify soils related characteristics and problems at a construction site.
2. Gain an understanding of and an ability to determine soil grain size distributions and Atterberg Limits.
3. Gain an understanding of the compaction of soils, including the theory and application of Proctor tests and California Bearing Ratios.
4. Gain an understanding of soils compressibility, consolidation and the ability to calculate settlement and load analysis/pressure distribution in a soils mass.
5. Obtain the ability to estimate appropriate bearing pressures for soil and groundwater conditions.
6. Obtain the ability to estimate total and differential settlements for soil and groundwater conditions.
7. Obtain the ability to analyze designs for appropriate factors of safety.
8. Gain an understanding of groundwater aquifer types, flow mechanics with the ability to calculate associated seepage rates and flow nets.
9. Obtain the ability to perform and apply unconfined compression tests and calculate allowable foundation bearing loads.

D. **Course Outline – Major Content Areas**

1. Formation of Natural Soil Deposits
2. Engineering Properties of Soils
3. Soil Compaction and Stabilization
4. Stress Distribution In Soil
5. Water in Soil
6. Consolidation and Settlement
7. Shear Strength in Soil
8. Shallow Foundations
9. Soil Exploration

E. **Suggested Laboratory Tests**
1. Soil Particle Size by Sieve Analysis  
2. Soil Particle Size by Hydrometer Analysis  
3. Standard Proctor Compaction Analysis  
4. Modified Proctor Compaction Analysis  
5. California Bearing Ratio Analysis  
6. Soil Consolidation Analysis  
7. Triaxial Shear Analysis  
8. Direct Soil Shear Analysis  
9. Relative Density of Cohesionless Soils Analysis  
10. Harvard Mold Samples  
12. Soil Permeability Analysis using Constant Head Devices  
13. Soil Permeability Analysis using Falling Head Devices  
14. Lime Stabilization of Soils  
15. Aquifer Permeability Measurements

**Additional Documentation**

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