PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

SOIL MECHANICS W/LAB
CET 2112

Class Hours: 6.0 Credit Hours: 4.0
Laboratory Hours: 3.0 Revised: Fall 2015

Catalog Course Description:

This course covers basic soil mechanics including index properties of fine and coarse soil, soil classification, stress analysis, permeability, compaction, strength concepts, and settlement and compressibility. The laboratory covers standard ASTM soil tests. Word processing and spreadsheet software are used to prepare professional technical reports that include text, tables, data reduction and graphs. Spreadsheet templates are developed for use in data reduction.

Entry Level Standards:

Students should be capable of critical and analytical thinking and should have sufficient mathematical skills to formulate and solve algebraic equations. They should have the ability to perform laboratory tests, record data draw conclusions and prepare reports that meet prescribed technical and grammatical standards.

Pre requisites:

CET 1022

Textbook(s) and Other Course Materials:

Textbook:
Reference:
American Society for Testing and Materials
Laboratory Instructions
Instructor Handout

I. Week/Unit/Topic Basis:

<table>
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<tr>
<th>Week</th>
<th>Topic</th>
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| 1    | Lecture: Formation of Natural Soil Deposits  
      | Lab: Excel Spreadsheets |
| 2    | Lecture: Engineering Properties of Soils  
      | Lab: Water Content |
| 3    | Lecture: Engineering Properties of Soils  
      | Lab: Specific Gravity |
| 4    | Lecture: Soil Index Properties; Exam I |
Lab: Gradation Analysis (Mechanical)

5 Lecture: Soil Exploration  
Lab: Gradation Analysis (Hydrometer)

6 Lecture: Soil Compaction and Stabilization  
Lab: Compaction Test

7 Lecture: Water in Soil  
Lab: Atterberg Limits

8 Lecture: Water in Soil / Stress Distribution in Soil  
Lab: Permeability (Constant Head)

9 Lecture: Stress Distribution in Soil  
Lab: In Place Density Test

10 Lecture: Stress Distribution in Soil; Exam II  
Lab: Unconfined Compression

11 Lecture: Consolidation of Soil and Settlement of Structures  
Lab: TBA

12 Lecture: Shear Strength of Soil  
Lab: TBA

13 Lecture: Shear Strength of Soil / Shallow Foundations  
Lab: TBA

14 Lecture: Shallow Foundations  
Lab: Project presentation

15 FINAL EXAM

II. Engineering Technology General Outcomes (Educational objectives)

I. Apply basic engineering theories and concepts creatively to analyze and solve technical problems

II. Utilize with a high degree of knowledge and skill equipment, instruments, software, and technical reference materials currently used in industry.

III. Communicate effectively using developed writing, speaking, and graphics skills.

IV. Assimilate and practice the concepts and principles of working in a team environment.

V. Obtain employment within the discipline or matriculate to a four year program in engineering or industrial technology

III. Engineering Technology Concentration Competencies*

Students will:

A. Apply the knowledge, techniques, skills, and modern tools for the concentration of study to specifically defined engineering technology activities

B. Demonstrate the knowledge of mathematics, science, engineering and technology to
engineering technology problems using developed practical knowledge

C. Conduct and report the results of standard tests and measurements, and conduct, analyze and interpret experiment or project results

D. Function effectively as a member of a technical team

E. Identify, analyze and solve specifically defined engineering technology-based problems

F. Employ written, oral and visual communication in a technical environment

• At the program level all 6 competencies apply to roman numerals I – V of the Engineering Technology General Outcomes (Educational objectives) listed above.

IV. Course Goals*:

The course will

1. Guide students to understand the physical condition of a soil mass and the associated descriptive terms. (A, C, E, F)

2. Cover the basic tests on soils using standard procedures and prepare a professional report. (A, B, C, D, E, F)

3. Expand students understanding of the stresses created by water, the effect of buoyancy and the movement of water through soil. (A, B, C, E)

4. Cover the concept of strength in a soil mass. (A, B, C, D, E, F)

5. Enhance student knowledge on the concepts of soil settlement and compressibility. (A, B, E)

6. Require students to present oral reports. (A, B, C, D, E, F)

7. Help students demonstrate self-initiative by completing reports and assignments on time. (A, B, C, E, F)

*Capital letters after course goals reference the competencies of the Engineering Technology concentrations listed above.

V. Expected Student Learning Outcomes*:

Students will be able to:

a. Determine the different phases of a soil. 1

b. Determine the void ratio and porosity of a dry two-phase soil. 1

c. Determine the significance of unit weight, specific gravity and water content. 1,2

d. Determine the significance of the degree of saturation of a soil mass. 1,2

e. Describe the Interrelationship of soil mass properties. 1

f. Determine the importance of Grain Size Distribution. 1,2

g. Determine the importance of Liquid, Plastic and Shrinkage Limits. 1,2
h. Determine the importance of soil compaction. 1,2,5
i. Determine the importance of Permeability. 1,2
j. Determine the importance of Direct Shear. 1,3,4
k. Determine the engineering classification of soil by the major classification systems. 1,2,3
l. Calculate the total stress, effective stress and hydraulic stress. 1,3,4,5
m. Calculate the stresses on a soil mass using Mohr’s Circle. 1,3,4,6,7
n. Apply Coulomb’s Law. 1,3,4,6,7
o. Calculate the settlement due to loads on cohesive and cohesionless soils. 1,3,4,5
p. Prepare reports to meet professional standards. 6,7

*Numbers after Expected Student Learning Outcomes reference the course goals listed above.

VI. Evaluation:

A. Testing Procedures: 50% – 60%

Examinations will be given covering the lecture materials. These exams will be given as shown on the schedule above. The examinations may consist of problems and essay, short answer or multiple choice questions.

B. Laboratory Expectations: 30% - 35%

A number of laboratory tests are scheduled and at one or more field trips will be scheduled. The student will be graded on laboratory technique and the reports. Reports will be graded for technical content but they must meet acceptable grammar standards or they will be returned to the student to be redone. It is suggested that the student consult with an English tutor in the Learning Center regarding the preparation of reports. A short quiz will be given at the beginning of each laboratory period on the procedure for the test being conducted that day. The score on the quiz will be added to the grade of the report. The student must complete all laboratory assignments and submit an acceptable report to receive a passing grade in the course.

The final project will account for 5 percent of the laboratory grade.

C. Field Work:

N/A

D. Other Evaluation Methods: 10% - 15%

Quizzes and Homework. Homework will be assigned regularly.

E. Grading Scale:
Grades are based on the following:

- 90 - 100  A
- 86 - 89  B+
- 80 - 85  B
- 76 - 79  C+
- 70 - 75  C
- 60 - 69  D
- Below 59  F

VII. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services may be contacted by sending email to disabilityservices@pstec.edu, or by visiting Alexander 130. More information is available at http://www.pstcc.edu/sswd/.

D. Other Policies:
In the event that the college is closed for an extended period of time (a week or more) your instructor will communicate via college email *****@pstcc.edu or D2L.