Syllabus for CEE 647
Earth and Earth Retention Structures
South Dakota School of Mines and Technology
Fall 2009

Catalog Data:  CEE 647 Earth and Earth Retention Structures (3-0) 3 credits.

Class Hours:   11:00 – 11:50 PM, MWF, CB 206E

Coordinator:  Lance A. Roberts, Ph.D., P.E.
   Office: CM 311 (Hours posted on door)
   Phone: 394-5172
   Email: Lance.Roberts@sdsmt.edu

Course Description:
   Application of principles of geotechnical engineering to the design of earth
   retention structures. Areas covered are lateral earth pressure theories, rigid and
   flexible earth retention systems, anchored systems, earthquake induced earth
   pressures, and braced excavations. Stabilization of slopes and reinforced earth
   applications are also treated, along with instrumentation observations.

Textbook:     Any introductory soil mechanics and/or foundation engineering textbook.

Supplemental References (f:\Dept\CEE\CEE647\Manuals):

1. FHWA. (2002). Geotechnical Engineering Circular No. 5 – Evaluation of Soil and Rock
   Properties. FHWA-IF-02-034. U.S. Department of Transportation – Federal Highway
   Administration, Washington, D.C.


3. FHWA. (1999). Geotechnical Engineering Circular No. 4 – Ground Anchors and
   Anchored Systems. Publication No. FHWA-IF-99-015. U.S. Department of Transporta-
   tion – Federal Highway Administration, Washington, D.C.

   130. U.S. Department of Transportation – Federal Highway Administration, Washington, D.C.


   Florida.
Attendance Policy: Refer to the SDSM&T 2009-2010 Catalog.

Cheating Policy: Refer to the SDSM&T 2009-2010 Catalog.

Goals: This course is designed to give students a thorough understanding of the design and analysis of earth retention systems for both permanent and temporary support applications. Emphasis will be placed on the behavior of various types of earth structures to allow effective determination of the best application for a design.

Content: Science: 33%
Design: 67%

Grading: Homework…………………………………………….……….40%
2 Exams……………………………………………..60%

Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90-100</td>
<td>A</td>
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<tr>
<td>81-89</td>
<td>B</td>
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<tr>
<td>72-80</td>
<td>C</td>
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<td>65-71</td>
<td>D</td>
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<td>&lt;65</td>
<td>F</td>
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In addition to an average passing grade on the exams, a minimum average score of 70% on the homework is required to pass the course.

Late Homework Policy:
Homework will be due by 5:00 pm on the agreed upon date. Late homework will be assessed a 10% per day penalty.

ADA Statement:
Students with special needs or requiring special accommodations should contact the instructor, Lance Roberts at 394-5172 and/or the campus ADA coordinator, Jolie McCoy, at 394-1924 at the earliest opportunity.

Freedom in Learning Statement:
**Freedom in learning.** Under Board of Regents and University policy, student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the dean of the college which offers the class to initiate a review of the evaluation.
TOPICS

1. Review of earth stresses and shear strength of soil

2. Soil improvement techniques
   - Stone columns
   - Vibro-concrete columns
   - Grouting systems

3. Earth pressure theories
   - Rankine and Coulomb theories
   - Earth pressures from surcharges
   - Limit equilibrium methods
   - Earthquake induced earth pressures
   - Apparent earth pressures

4. Earth retention systems
   - Sheet pile walls
   - Soldier pile and lagging walls
   - Secant and tangent pile walls
   - Slurry walls
   - Wale and strut design
   - Anchor design

5. Earth system instrumentation and monitoring

6. Reliability-based design for earth retention