

**CE 462/662 – Designing with Geosynthetics – Spring 2003**

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Office Hour: Tuesday and Thursday (9:00 am – 10 am), Wednesday (10am-11am) Or by appointment

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Follow links to course page

**Required Text:** Designing with Geosynthetics, 4<sup>th</sup> ed. By Koerner

**References:** Principles of Foundation Engineering, 4<sup>th</sup> ed. By Das  
Principles of Geotechnical Engineering, 5<sup>th</sup> ed. By Das

References and links to additional information will be placed on the course web page. Check the web page at least once a week for new information.

**Course Outline:**

Date	Day	Topic	Homework Problems
15-Jan-03	Wednesday	Introduction	
20-Jan-03	Monday	<b>Holiday</b>	
22-Jan-03	Wednesday	Overview of Primary Functions/Applications	
27-Jan-03	Monday	Overview of Primary Functions/Applications	1.5, 1.6
29-Jan-03	Wednesday	Polymers & Geosynthetic Manufacturing	1.22, 1.25, 1.32
3-Feb-03	Monday	Geosynthetic Properties and Testing	3.12, 2.42
5-Feb-03	Wednesday	Reinforced Earth Walls	
10-Feb-03	Monday	Reinforced Earth Walls	Problems Assigned
12-Feb-03	Wednesday	Reinforced Earth Walls	
17-Feb-03	Monday	<b>Holiday</b>	
19-Feb-03	Wednesday	<b>Test#1</b>	
24-Feb-03	Monday	Reinforced Embankments	
26-Feb-03	Wednesday	Reinforced Embankments	Problems Assigned
3-Mar-03	Monday	Reinforced Embankments - on soft soils	
5-Mar-03	Wednesday	Computer Analysis	
10-Mar-03	Monday	Computer Analysis	
12-Mar-03	Wednesday	Subsurface Drainage and Filtration	
17-Mar-03	Monday	<b>SPRING BREAK</b>	

19-Mar-03	Wednesday	<b>SPRING BREAK</b>	
24-Mar-03	Monday	Subsurface Drainage and Filtration	2.83,2.84,2.86,2.89,4.13,4.16
26-Mar-03	Wednesday	Erosion Control	Problems Assigned
31-Mar-03	Monday	<b>Test # 2</b>	
2-Apr-03	Wednesday	Application to Roadways & Railways	
7-Apr-03	Monday	Application to Roadways & Railways	3.16,3.17
9-Apr-03	Wednesday	Liners - Geomembranes	
14-Apr-03	Monday	Liners - Geomembranes	5.14a,5.23,5.435.49
16-Apr-03	Wednesday	Geosynthetic Clay Liners	
21-Apr-03	Monday	<b>RECESS – NO Classes</b>	
23-Apr-03	Wednesday	Geosynthetic Clay Liners - Landfill Applications	6.11,6.12,6.16
28-Apr-03	Monday	Geopipes; Geocomposites	
30-Apr-03	Wednesday	Geofoam and other applications	
5-May-03	Monday	Recap	
7-May-03	Wednesday	<b>TEST # 3 (Comprehensive)</b>	

\*\* The sections indicated are required reading. Additional material may be covered during the lectures.

#### Grading:

Criteria	Undergraduate	Graduate
Test 1	25%	25%
Test 2	25%	25%
Test 3	25%	25%
Home work	10%	5%
Projects	15%	10%
Special topics report	0%	10%
Total	100%	100%

Grade Distribution:	89.5 –100	A
	79.5 –89.4	B
	69.5-79.4	C
	59.5-69.4	D
	<59.5	F

**Course Description:** This course introduces the student to the analysis and design with geosynthetics for a variety of civil engineering problems. The student will be introduced to the engineering functions of various types of geosynthetics including geotextiles, geogrids, geonets, geomembranes, geosynthetic clay liners, geocomposites etc. Various test methods used for testing of geosynthetics and selection of design parameters will be discussed. Analysis and design for erosion control, embankments on soft soil, reinforced soil slopes (RSS), mechanically stabilized earth walls (MSEW) and roadway reinforcement and separation will be taught. In addition, special consideration for designing with geosynthetic clay liners for application to land fill\ detention pond design will be presented.

**Course Objectives:** The students will learn

1. About various types of polymeric and other materials used in geosynthetics and the physical, mechanical, thermal and chemical properties of the polymers (A)
2. About types of geosynthetics and manufacturing methods used in their manufacture (A)
3. About properties of geosynthetics and laboratory tests required to evaluate these properties (A)
4. To design reinforced earth walls. (A)
5. To design reinforced earth slopes (A)
6. To design geosynthetics for drainage
7. To design geosynthetics for filtration
8. To design geosynthetics for erosion control
9. To design geosynthetics for use in roadways for separation and reinforcement
10. To design geosynthetic liners for containment applications
11. To design various components of landfills using geosynthetics
12. About geofoam, geocomposites and other products
13. Design project – eg. design a reinforced soil wall to allow a developer to modify grades on a project

(Alphabets in parentheses refer to CE program outcomes)

### **Policies and Procedures:**

There will be three tests which are open book. Only the text by Koerner and reference texts by Das will be allowed during the examination. Makeup exams will be given ONLY in the cases of: 1) a doctor certified medical excuse, or 2) prior instructor approval. Every effort should be made to contact the instructor in the event of medical or personal problems, as soon as possible.

Homework assignments (including projects) must be turned in by NOON on the day they are due. There will be no credit for late assignments. If you are unable to turn in the assignment on the due date for medical reasons, inform the instructor.

*Note: Any student with disabilities or other special needs, who needs special accommodations is invited to share these concerns or requests with the course instructor, as soon as possible.*

### **Approved Academic Honesty Statement:**

All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct.

( <http://www.ndsu.nodak.edu/policy/335.htm> )

### **Graduate Credit:**

If you are taking this course as CE696 (for graduate credit), the following additional course requirements apply.

- A separate meeting time of approximately 1-hour every week will be setup for graduate students, based on the schedules of the instructor and the graduate students.
- Graduate students are expected to complete a special topics report for specific course activities assigned by the instructor.
- Graduate students will be assigned additional individual homework assignments and a final group project and report.
- **At the conclusion of this course, graduate students must submit a brief report describing how the material covered in this course will contribute to 1) the overall graduate experience and 2) their graduate activities.**