

NONWOVENS SCIENCE AND TECHNOLOGY

Fall Semester 2003

Course Number: TXMI 4150/6150

Credit: 3 hours

Location: 308 Dawson Hall

Course Time and Place: 1:25 - 2:15 p.m., MWF, 308 Dawson Hall

Instructor: Dr. Patricia Annis

Office: 309 Dawson Hall

Office Hours: 10:00 - 11:00 daily and by appointment

Office Phone: 542-4889

E-mail Address: pannis@fcs.uga.edu

Course Description: Manufacture and conversion of nonwoven webs with examination of interrelationships involving raw materials, bonding systems, manufacturing processes, product properties and end uses.

Prerequisite: TXMI 3500, 3500L (undergraduate) or TXMI 6100 (graduate) or permission of department

Course Objectives:

1. Recognize the structural components of nonwoven materials and describe how these components influence properties and performance.
2. Study and become familiar with the raw materials and processing technologies used to manufacture nonwovens.
3. Become familiar with and conduct test procedures used to characterize and evaluate nonwovens.
4. Recognize trade associations and organizations associated with nonwovens.
5. Become familiar with the technical and research literature associated with nonwovens.
6. Identify trends in the manufacture and use of nonwovens.

Textbook: Readings and references will be assigned.

References:

1. A.F. Introduction to Nonwoven Fabrics, TAPPI Press, Atlanta, GA, 1998.
2. Vaughn, E.A., Nonwoven Fabric Primer and Reference Sampler, INDA, Cary, NC, 1998.
3. The Nonwoven Fabrics Handbook, INDA, Cary, NC, 1999.
4. Nonwovens, EDANA, Brussels, Belgium, 1997.
5. Principles of Nonwovens, INDA, Cary, NC, 1992.
6. Nonwovens: An Advanced Tutorial, A.F. Turbak and T.L. Vigo, editors, TAPPI Press, Atlanta, GA, 1989.
7. Nonwovens Fabric Manufacturing Technology and Product Applications, E.A. Vaughn, editor, Clemson University, Clemson, SC, 1992.
8. Nonwovens Fundamentals, A.F. Turbak editor, TAPPI Press, Atlanta, GA, 1992.
9. Nonwoven Textiles, O. Jirsak and L.C. Wadsworth, Carolina Academic Press, Durham, NC, 1999.
10. Readings from the current scientific literature.

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Course Requirements and Evaluation:

Distribution of Points (approximate):

Grading Scale (approximate):

		<u>Percent</u>	<u>Points</u>
Exams	250 points (56%)	A = 90% or higher	445-400
Lab reports	100 points (22%)	B = 89% - 80%	399-356
Lab presentation	25 points (5%)	C = 79% - 70%	355-311
Assignments	50 points (16%)	D = 69% - 60%	310-267
ESTIMATED TOTAL	475 points	F = 59% or lower	264 or lower

Discussion of Grading System:

1. Exams. The exams will consist of questions based on material covered in class. Questions also will be from the textbooks, assigned readings, and plant tours. Exam questions will be in the form of true/false, multiple choice, short answer/essay, and fabric identification. The number of points for the exams will vary. The final exam will be comprehensive.
2. Summaries. Students will find, photocopy, and summarize current scientific and technical papers related to the topic being studied. Written summaries will be due at the end of each unit. Grading requirements will be discussed.
3. Laboratory experiments and student presentation. Each student will conduct physical tests commonly used to characterize and evaluate nonwovens. Lab reports will be graded and a summary of results presented to the class.
4. Plant Tours. Visitation to nearby nonwoven manufacturing facilities will be scheduled during the semester at a time mutually convenient for all students. Attendance is mandatory.

Course Policies:

1. Attendance. **Class attendance is expected and will be taken regularly.** You are responsible for what transpires in class, regardless of attendance. **Attendance is considered in border-line grading situations.**
2. Makeup Exams. Students are to be present on all testing days. If a previously scheduled and important event (e.g., the wedding of a brother or sister) coincides with an examination date, a written request to take a make-up exam will be considered. Such requests must be submitted **at the beginning of the semester**. Any request for make-ups based on illness or family emergency must be accompanied by written documentation that establishes the veracity of the excuse. All make-ups are administered at the professor's discretion.
3. Students with Disabilities. The University of Georgia is committed to full inclusion of all students. Students who, by nature of a documented disability, require academic accommodations should contact the instructor at the beginning of the semester.
4. Academic Honesty. All students are responsible for maintaining the highest standards of honesty and integrity in every phase of their academic careers. All students are assumed to know what is involved in cheating. The penalty for academic dishonesty is a grade of **F**. Each student is expected to complete each assignment and lab independently. Each student must do his/her own testing. **Lab reports and assignments that are identical in wording will be penalized.** See www.uga.edu/ovpi/academic_honesty.htm

Tentative Class Schedule

<u>Date</u>	<u>Topic</u>	<u>Activity/Assignment</u>
Week 1		
8/17	Introduction Nonwovens defined	Syllabus Assignment #1 Bring a nonwoven from home or office to next class
8/19	History and development Products and applications	Assignment #1 DUE INDA video Nonwovens! What are they?
8/21	Global production/consumption Classification	
Week 2		
8/25	Industry structure Manufacturing systems	
8/27	Nonwovens versus traditional fibrous materials	
8/29	Library resources Trade organizations Nonwovens standard writing organizations Centers of excellence	
Week 3		
9/1	No Class – Labor Day Holiday	
9/3	Fibers and other input materials	Assignment #2 Copy and summarize an article on new/novel fibers used in nonwovens
9/5	Fibers and other input materials	
Week 4		
9/8	Fibers and other input materials Fiber structure/property relationships	Assignment #2 DUE
9/10	No class – AATCC, Greenville, SC	
9/12	Plant Tour – Tietex International Limited? Spartanburg, SC	Tour Tietex on way back from AATCC? Details will be provided
Week 5		
9/15	Fiber structure/property relationships	
9/17	Dry laid web formation	Assignment #3: Copy and summarize an article on web formation
9/19	Dry laid web formation	
Week 6		
9/22	Dry laid web formation	
9/24	Dry laid web formation	
9/26	Wet laid web formation	
Week 7		
9/29	Wet laid web formation	Purchase/acquire test fabric for labs
10/1	Polymer laid web formation	
10/3	Polymer laid web formation	
Week 8		
10/6	Polymer laid web formation	Assignment #3 DUE
10/8	Test #1, Midpoint of Semester	

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<u>Date</u>	<u>Topic</u>	<u>Activity/Assignment</u>
10/10	Characterization and testing	Test fabric DUE Test methods and methodology
Week 9		
10/13	Thermal bonding	Assignment #4: Copy and summarize an article on web consolidation
10/15	Thermal bonding	
10/17	Characterization and testing	Lab #1
Week 10		
10/20	Dr. Annis at ASTM – Tampa, FL	Nonwovens identification lab
10/22	“ “ “	Work on lab report Set 1
10/24	Characterization and testing	Lab #2
Week 11		
10/27	Mechanical bonding	
10/29	Mechanical bonding	
10/31	No Class - Fall Break!!	Plant tours, Thursday, 10/30/03?
Week 12		
11/3	Mechanical bonding	Assignment #4 DUE Assignment #5 Copy and summarize an article on finishing nonwovens
11/5	Characterization and testing	Lab #3
11/7	Characterization and testing	Lab #4 Lab Reports (Set 1) Due
Week 13		
11/17	Chemical bonding	
11/19	Characterization and testing	Lab #5
11/21	Characterization and testing	Lab #6
Week 14		
11/24	Finishing – Mechanical	
11/26	No Class - Thanksgiving Holiday!!	
11/28	“ “ “	
Week 15		
12/1	Finishing – Chemical	
12/3	Conversion Trends and Innovations	Assignment #5 DUE
12/5	Lab Presentations	Lab #7
Week 16		
12/8	Lab Presentations	Lab #8
	Last Day of classes	
12/9	Reading Day	
12/15	Final comprehensive exam, Monday, 12:00-3:00 p.m.	Lab Reports (Set 2) DUE

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Revision on 11/7/03

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Week 12		
11/3	Lecture	
11/5	Lecture	
11/7	Test 2	Distribute lab manual
	Characterization and testing	Introduction to testing
Week 13		
11/10	Lecture	2 summary worksheets DUE
11/12	Lab--Set 1	Cut specimens DUE
		Experiments 5,7,8,9,10,24,25
		Web consolidation summary DUE
11/14	Lecture	
Week 14		
11/17	No Lecture – CRI visiting	Lab Set 1 DUE end of day
	Lab--Set 2	Experiments 11,12,13,14,16,17
11/19	Lecture	
11/21	Lecture	
Week 15		
11/24	Lecture	Lab Set 2 DUE
11/26	No Class - Thanksgiving Holiday!!	
11/28	“ “ “	
Week 16		
12/1	Lab--Set 3	Experiments 18,19,20,21,22
12/3	Lecture	
12/5	Lecture – Plant Tour?	
Week 17		
12/8 (M)	Lecture	
	Last Day of classes	
12/9 (T)	Reading Day	
12/10 (W)		Lab Set 3, Summary & Notebook DUE
		Pick up take home lab
12/11 (TH)	Finals Week	
12/12 (F)	Finals Week	Pick up Lab Set 3 & Notebook
Week 18		
12/15 (M)	Final comprehensive exam, Monday, 12:00-3:00 p.m.	Take home lab DUE