State University of New York
COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY
Department of Paper and Bioprocess Engineering

PSE 468/ERE 679:
Papermaking Processes Spring 2010

Lecture: M/W/F 10:35 – 11:30 am, 211 Walters Hall
Laboratory: M/T/W/Th 12:45 – 4:45 pm, Walters Laboratories

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I Course Description:

"Study of the papermaking process, featuring operation of the pilot paper machine. Emphasis is on the fundamentals of stock preparation, paper machine operation, evaluation of the finished product and the collection and analysis of data to develop material and energy balance. Results of each paper machine run are evaluated in seminar-type discussions. "This course is a capstone course for the Paper Science and Engineering Curriculum. Students are expected to draw on the knowledge that they have gained both in their previous coursework and their work experiences. In addition to the technical lectures that are a part of this course, a major portion of the course deals with designing and producing certain paper grades on the pilot paper machines in Walters Hall. This work is done in a team environment. The minimum prerequisites for the (undergraduate) course are PSE 300, PSE 370, and PSE 465. Students without these prerequisites must petition to be able to take the course.

II Expected Background:

The prerequisites for this course are PSE 300, PSE 370, and PSE 465 (or its equivalent). Specifically, each student should have a passing knowledge in the areas listed below.

1. Paper properties:

(a) Properties of paper making fibers (chemical, mechanical, hardwood, softwood,...)
(b) Strength properties of paper
(c) Optical properties of paper
(d) Effect of fiber properties on paper properties
(e) Refining of pulp and the effect of refining on fiber and paper properties

2. Paper making:

(a) General operation of a paper machine
(b) Basic understanding of papermaking process
(c) Effect of paper machine operations on paper properties
(d) Effect of wet end chemicals on paper properties

3. Engineering

(a) Mass and energy balances
(b) Steam calculations (use of steam tables)
(c) Psychometric calculations

III Course Outcomes:

Every course that a student takes should further his knowledge, building on what was learned. By the end of this course, each student should be able:

1. To design a given grade of paper, research its properties, and determine the necessary raw materials needed to make the grade;
2. To design a process and determine the process conditions necessary to make the given grades of paper given the constraints of the equipment available;
3. To critically analyze and discuss the results of the handsheet studies and paper machine trials;
4. To create and manage a semester-long work plan and provide appropriate updates and reports.
5. To work in a team environment to accomplish the course's goals;
6. To critically evaluate performance of coworkers and supervisors.

Relation to Curriculum Outcomes (Paper Science and Engineering):

PSE 468 is a senior level course intended to be taken during your final year of college at ESF. The class is designed to help transition you from “class-type" assignments to “real-world"-type assignments. Therefore, the assignments will probably be completely different from what you have experienced in the past. Specifically, this class addresses the following published learning outcomes for Paper Science and Engineering:

1. a sound knowledge of science and engineering as applied to paper science and engineering;
2. the ability to conceptualize problems in terms of unifying principles, design and conduct experiments, and analyze and interpret data;
3. the ability to solve a real engineering problem in a team environment using appropriate design techniques;
5. well-developed written and oral communication skills;
7. understand the professional and ethical responsibility of an engineer.

IV Required Textbook:

Pulp and Paper Manufacture Volume 7 Paper Machine Operations edited by B.A. Thorp and M.J. Kocurek (Joint Textbook Committee of the Paper Industry, 1991). The text is available from national TAPPI or PAPTAC and should be ordered individually or through the Papyrus Club or Syracuse University bookstore well before the beginning of the semester. You will be responsible for all the material in chapters 1-16, although not all of this material will be covered in the class lectures. Although specific reading assignments may not be given, you should be reading the appropriate chapters as the semester proceeds. I expect to cover the following general topics:
Introduction/Papermaking Fibers, Approach Flow Systems, White Water Handling, Refining, Formation and Consolidation, Pressing, Drying, and Calendering.

V Course Structure:

The course will consist of lectures, discussions, student oral presentations, professional data collection and visualization, laboratory exercises, homework, and runs on the #1 and #2 Paper Machine. I reserve the right to give unannounced quizzes if the situation warrants. I expect to have three runs on the #1 Paper Machine and 4 runs on the #2 Paper Machine. In the early portion of this course, you will be developing a plan to manage the work for the entire semester including the scheduling of the paper machine runs and assigning roles of the students. With the exception of the paper machine runs, specific tasks during the laboratory times are not assigned, but up to your discretion. The afternoon laboratory times may also be used for guest lecturers or exams as announced. Assignments and reports are due at the ***beginning*** of the lecture on the due date; a late penalty will be assessed for those turned in later.

It is very important that you manage your schedule so that you participate in running the paper machine trials as scheduled below***. Laboratories are in general available from 6:00am to 6:00pm according to the PBE laboratory plan.***

Due to the amount of effort that goes into running the paper machines, there is no opportunity to make up this experience, which is a significant portion of the grade for the class. Missing the paper machine runs and oral defenses will severely affect your final grade in the course. Since these dates are scheduled well in advance, very few excuses will be accepted for missing them. For example: having a job interview is **not** an acceptable reason. Further information regarding the paper machine runs and the preparation work will be given in additional handouts.

ERE 679:

As part of the requirement for ERE 679, students enrolled in the graduate class will be required to submit an additional report and presentation on a subject related to papermaking. The details of the report will be given in the near future.

VI COURSE REQUIREMENTS:

1. Prerequisite Test:

The prerequisite test will account for 2% of your final grade and will cover general papermaking topics.

2. Mid Term Exam:

The mid term exam, held on March 12th from 10:30am to 11:30 am in 211 Walters Hall, will account for 10% for undergraduate and 15% for graduate students of your final grade and will cover all reading materials and class lectures from the beginning of the semester up to the midterm date. The exam will consist of multiple choice, true/false, and short essay questions. Graduate Students will receive a more demanding exam.

3. Quizzes:

Announced and unannounced quizzes account for 5% of your final grade and might cover topics such as seminar contents, reading assignments, and the week's lecture material.

4. Homework, Project Assignments, Staff Meetings, Pre-Reports, Reports, etc.:

Will cover the course lecture and or special lecture topics and or course assignments and will account for 30% for undergraduate and 20% for graduate students of your final grade. Assignments such as homework, project assignments, Team Meetings, Report , etc. are due at 8:00 am at the due day. **Late assignments will be not accepted.**

a. ERE 679 Article Review: (Graduate Students Only)

You are responsible for an Article Review, which will account for 5% of your final grade. Your review paper is expected to have 5 – 7 pages (see report requirements).You will receive a separate handout with specific instructions for that assignment. Your article review is due on April12th. **Late Papers will be not accepted.**

b. ERE 679 Project: (Graduate Students Only)

You are responsible for a Graduate Student Project, which will account for 10% of your final grade. Your review paper is expected to have at least 10 – 15 pages (see report requirements handout).You will receive a separate handout with specific instructions for that assignment. Your project report is due on April 19th. **Late Papers will be not accepted.**

5. Paper Machine Run:

The final paper machine runs will account for 40% for undergraduate students and 30% for graduate students of your final grade and will cover the final paper machine runs and the associated oral presentation and final paper machine and paper grade reports. Due to the amount of effort that goes into running the paper machines, there is no opportunity to make up this experience, which is a significant portion of the grade for the class. Missing the paper machine runs and oral defenses will severely affect your final grade in the course.

Your performance will be evaluated on a combination of the final reports, your performance during the trials, and your performance during the oral presentations. Peer evaluations will be included in your grade. The grade of the Tour Boss will be the average of those people in his/her area plus an offset. The Superintendents' grades will be the average of all people in the class plus a larger offset.

6. Attendance:

Attendance is expected at all lectures, seminars, project meetings, and class meetings, etc. and will account for 5% of your final grade (see table below). A sing in sheet will be used to monitor participation. ***Please note that a negative point accumulation is possible for this part of the grade***. Please be aware that absences are not divided into excused and unexcused. Regardless of the reason, an absence from class is counted as an absence. Therefore, please be on time!

Absence and Late Arrival Chart:

Absence		**Late arrival or early departure**	
Number	Attendance Grade	Number	Points deducted from attendance grade
0	100	0	0
1	90	1	5
2	80	2	10
3	70	3	15
4	60	4	20
5	50	5	25
6 or more	An additional -20 points per absence	6 or more	An additional -10 points per incident

7. Class Participation & Enthusiasm:

Is expected at all lectures, seminars, meetings, etc. and will account for 3% of your final grade. The class participation & enthusiasm grade will be based on reading assignment questions, presentations, and involvement in class discussions. 10 Participation points will be deducted for opened laptops (except to take notes), cell phone use and text messaging during class per incident.

8. Final evaluation:

Will account for 5% of your final grade and will rate the overall course performance of the individual student during the semester.

9. Grading:

The tentative grading system of this course is based on a 100 point scale**, not a curve**, and will include a pre exam, midterm exam, final exam, quizzes, homework, article reviews, assignments, oral presentations, attendance and class participation. The final letter grade will be based on the following table:

Tentative 100 point grading scale:

Percent/Points	Undergraduate	Graduate
94-100	A (Excellent)	A (Excellent)
90-93	A-	A-
87-89	B+	B+
83-86	B (Good)	B (Satisfactory)
80-82	B-	B-
77-79	C+	C+
73-76	C (Passing)	C
70-72	C-	C- (Minimum Passing)
65-69	D (Minimum Passing)	F (Failure)
0-64	F (Failure)	

All material for grading submitted to the instructor will be not returned to the student. The student will receive a note with the grade achieved for each assignment, quiz and exam. However the student is welcome to discuss the assignment with the instructor.

Your final class grade will be calculated based on the following:

Requirement		PSE 468	ERE 679
Prerequisite test		2%	2%
Midterm exam		15%	15%
Quizzes		15%	15%
Homework, project assignments, and reports		20%	15%
Graduate Student Assignment	a) Article review		7%
	b) Project		7%
Paper machine runs		40%	30%
Attendance		5%	5%
Class participation and enthusiasm		2%	2%
Final evaluation		0%	2%
Total		**=100%**	**=100%**

10. Exams or Quizzes:

No make-up exams or quizzes will be given unless you have an acceptable reason (family emergency, illness, etc). If an emergency should arise, you must notify me prior to the exam and **not** after. Students missing a lecture are expected to get the missed material and notes from their classmates. Individual makeup lectures will not be given and lecture notes are not available from the instructor. Reading assignments and homework assignment due dates are given on a separate handout, posted on the course website, sent per e-mail or announced during class. Lectures begin at 10:35 unless otherwise announced. Students are expected to arrive to class on time.

11. Staff Meetings:

As part of the project management process for the paper machine runs, we will be having weekly staff meetings (approximately 1 hour long) one afternoon per week. Attendance at these staff meetings is mandatory and attendance will be noted. Excused absences in these meetings must be arranged well in advance.

12. Seminars:

Selected companies will be giving seminars on papermaking topics. The seminars consist of three 3-5 hour sessions held during the laboratory time. **A Quiz is given after each session**. Attendance at these seminars is mandatory.

The tentative schedule of the seminars is as follow:

Feb. 3rd	Filler Materials	Tate & Lyle	2:00 to 4:00 pm
Feb. 11th	Forming	Albany	2:00 to 5:00 pm
Feb. 17th	PM Clothing	Albany	2:00 to 5:00 pm
Feb. 24th	Dryer Fabric	Albany	1:00 to 3:00 pm

Feb. 24th	Maintenance	Albany	3:00 to 5:00 pm
Mar. 9th	Drying I	Kadant	2:00 to 5:00 pm
Mar. 10th	Drying II	Kadant	2:00 to 5:00 pm

(approximate 3 hour with open question session)

Other seminars are periodically offered by the Faculty of Paper and Bioprocess Engineering throughout the semester. These seminars can be given by industry and research people, graduate students, and faculty. The information given in these lectures can help you understand the latest industrial and research trends in the industry. As part of the course, I expect you to attend these offered lectures. An excess of unexcused absences could result in your course grade being reduced by two full grades.

13. Final PM Project Reports:
Your final project reports are due on **Mai 1st, 2010 at 8:00 am** as a hard copy and electronic file. **Late Report submission will be not accepted.**

VII CLASS POLICIES

1. Time Management:

Please see procedure for lab activities

2. Computers, Disks, and Viruses:

Computer and disk failures are a fact of life in the computer world. You should make multiple copies of all your work so that if there is a failure, your work is not lost. *The failure of a disk, a computer, or other storage media is not an acceptable excuse for late or missing assignments or late take-home exams.*

Computer viruses are also a fact of life in the computer world. It is the students' responsibility to keep their assignments and diskettes virus-free. You should regularly scan your diskettes (and your computer if you own one) with up-to-date virus software. All college computers have virus software installed. Assignments handed in or brought in for consultation on infected diskettes or other media will be given a score of 0 for that assignment. Students submitting infected diskettes multiple times will have their *course* grade reduce by one full grade per incident.

3. Cell phones:

The use of cell phones is not allowed during lectures and other class activities. Cell phones must be turned off or left at home so as not to disturb the other students in the class. The consequences of using a cell phone or a cell phone ringing during class can include one or both of the following:

- The owner of the cell phone will be immediately asked to leave the classroom and may not return during that class period.
- The entire class will be given a quiz.

4. Quizzes:

The instructor reserves the right to give both announced and unannounced quizzes, if necessary to encourage preparation for class. There will be *no* makeup quizzes. Quiz scores become part of the homework portion of the course grade.

5. Help on Assignments:

The instructor and teaching assistants are very willing to help with the various assignments in the class. However, Students must demonstrate that they have made a good-faith effort at solving the problem before consulting with the instructor or teaching assistant. When asking questions, be prepared to demonstrate the efforts that you have made in solving the problem and be prepared to discuss your plan of attack. Statements such as: I don't understand the problem, please show me how to do it" will probably not be answered. You will be asked about what you do understand about the problem. Questions should be brought to the instructor or teaching assistant well before the due date: Neither the instructor nor the teaching assistant are obligated to make extensive homework consulting time available the day before the due date.

6. Collaboration:

You are encouraged to discuss the homework assignments amongst your classmates. However, each student is expected to hand in their own work. Students handing in substantially similar assignments will have the single grade divided among the students. For computer solutions, simply changing the variable names, prompt strings, and comments does not make programs substantially different.

7. Email Accounts and the Course Listserver:

I expect to use a listserver to communicate with the class and to facilitate communication amongst the students. This listserver can use the email address that you have on file with the ESF Registrar. If you do not regularly use this email account, you should check it regularly or have the email from that account forwarded to an account that you do use. Most web-based email services can POP the SU mail server. If you have trouble accessing your account or have difficulty with using the email system, help is available in 116 Hinds Hall on the SU campus. SU's Computing and Media Services produces a packet of handouts for using their Unix system, including the mail system. You may register other email accounts with the listserver.

8. Academic Expectations:

Students are expected to conduct themselves in a professional manner at all times. This expectation extends to all course related activities including the use of email and the course listserver. Email communications should be professionally written. The course listserver is to be used for course related communications only. Misuse of email and the course listserver could result in your access to these services being curtailed.