

# Principles of Technology

## ETES 5090/7090

The University of Georgia  
Workforce Education  
Fall 2007 Aug. 16 – Dec. 14  
Class Meeting: W 4:30 – 7:15 P.M.  
Room: 156 River's Crossing

Course Number: ETES 5090  
Professor: Dr. John Mativo  
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Office Hrs: By Appointment

### Course Syllabus

I. **Course Purpose:** To explore fundamental principles in a parallel way among four energy systems – mechanical, fluid, electrical, and thermal. To empower students with engineering basics through experiential learning through real life problem solving scenarios.

II. **Catalog Description:** *ETES 5090/7090 Principles of Technology 3 hours.*  
Technological literacy acquired through applied physics concepts and laws. Special emphasis on teaching the integration of mathematics, science, and technology scholarship.

III. **Prerequisites:** None

#### IV. General Course Objectives

Upon successful completion of this course, the student will:

1. Develop a systematic methodology of identifying and defining a technological problem
2. Synthesize knowledge and be able to formulate it into a report or use it in solving a defined problem
3. Record and log experimental or design data for use in the documentation of the engineering design process
4. Develop a schedule that will be used in the pursuit of the research and experimentation process to solve identified problems
5. Evaluate the experimentation solutions that have been used in the solution of technological problems
6. Research and develop experimental activities that can be used to convey to a concept to a learning community.

## V. Course Content

### Course Outline

Week	Date (Wednesday)	Class Activity	Assignments	
			Lab	Reading
1	Aug. 22	Introductions & Syllabus Class organization		
2	Aug. 29	Mechanical Forces & Spring Constants Voltage and Measuring Voltage	1.1 1.3	4-26 47-63
3	Sept. 5	Measuring Torque & Work (Wheel & Axle) Work Done in Lifting a Fluid	2.1 2.2	84-94 95-105
4	Sept. 12	Measuring Velocity & Acceleration in A Mechanical System Creating a Steady-State Flow Conditions	3.1 3.4	122-137 157-165
5	Sept. 19	Measuring Resistance to Fluid Flow in Tubes Resistance in Series and Parallel Circuits	4.2 4.3	184-199 200-215
6	Sept. 26	Using Energy in Compressed Air to Operate Air Motors Measuring Energy stored in a Compressed Spring	5.1 5.2	230-242 243-261
7	Oct. 3	Measuring Linear Mechanical Power Measuring Power Developed by Air Motor Mid-Term Exam Review	6.1 6.2	298-306 307-315
8	<b>Oct. 10</b>	<b>Mid-Term Exam</b>		
9	Oct. 17	Reflections of Light; Lens Experiments Lens Experiments	10.1 10.2	426-449 450-467
10	Oct. 24	Graduate Student Led Lab Experiment	Grad Student	TBA
11	Oct. 31	Graduate Student Led Lab Experiment	Grad Student	TBA
12	Nov. 7	Graduate Student Led Lab Experiment	Grad Student	TBA
13	Nov. 14	Graduate Student Led Lab Experiment	Grad Student	TBA
14	Nov. 21	Thanks Giving		
15	Nov. 28	Graduate Student led Lab Experiment	Grad Student	TBA
16	Dec. 5	Final Exam Review/Portfolio Due		
17	<b>Dec 12</b>	<b>Final Exam</b>		

## VI. Course Details

Please See course outline and Laboratory Manual plus:

### *Laboratory Activities*

Laboratory exercises will be assigned on the various topics covered throughout the course. These exercises will usually be based on an experiment from the *Physics in Context – Laboratory Manual*. All activities completed should be well documented and word processed with data recorded in your personal copy of the *Physics in Context – Student Journal (Do Not Write in the Original Student Journals)* so that data is available for required calculations.

### *Portfolio*

Each student will present their completed problems and laboratory assignments at the end of the term in an electronic portfolio. The portfolio should contain a summary of each chapter that we cover during the course as well as the various laboratory assignments that coincide with the chapter. The portfolio will be evaluated on how well it represented material covered, organization, documentation, and attractively layout.

### *Examinations*

There will be two (2) examinations during the term, a Mid-Term (covering material from the first class meeting to the date of the exam) and a Final (a comprehensive exam related to any/all material covered during the term).

### *Class Participation*

Punctuality and attendance are important to successful completion of requirements for this course. For that reason, attendance will be taken at each class meeting. The class participation portion of the course evaluation will be based on punctual attendance to all class meetings, participation in class discussions, and appropriate care of equipment.

### *Graduate Students*

Each graduate student will select a class date in which they will review the course content and assign a laboratory experiment/class reading. The graduate student will be responsible for leading the class through the experiment and teaching the important points of the chapter.

## VII. Course Evaluation Methods

Evaluation will be based on written and practical exam, laboratory work and assigned projects. Grades will be distributed as follows:

Assigned problems .....	25%
Exercises, Laboratory Activities & Attendance .....	20%
Mid-Term examination .....	25%
Final Examination .....	25%
Electronic Portfolio .....	5%
Graduate Student .....	15%

Grades:

Letter grades will be earned as follows:

A .....	94 – 100	C+ .....	77 - 79
A - .....	90 – 93	C .....	74 – 76
B+ .....	87 – 89	C- .....	70 - 73
B .....	84 – 86	D .....	60 - 69
B- .....	80 – 83	F .....	0 – 59

**Laboratory Sessions:**

Laboratory reports are due a week after each experiment/activity. Each student/student group is responsible for accomplishing these experiments/activities during open lab times. Make sure you keep up with your laboratory work.

**Attendance/Participation:**

Attendance is crucial especially considering the density of facts, concepts, principles, and procedures covered in each class. Missing even one class could set you seriously behind. Realize that if you are absent, even for valid reasons, you are responsible for the material and assignments discussed in each and every class. In addition, I expect each participant to take an active role by contributing and sharing thoughts and ideas, taking initiative, and seeking to help other members of the class. Each participant is expected to remain open to new ideas and different points of view.

Attendance records will be recorded at the beginning and at the conclusion of each class meeting. *Your grade in this class will be dropped 3% points for two (2) unexcused absence and you will be removed from the class role after three (3) unexcused absences. In addition, tardiness will result in a 3% point reduction in grade if more than three (3) unexcused tardy attendances occur.*

**Late Assignments:**

I expect assignments to be completed on time. My standard policy regarding assignments is 10% penalty for late assignments turned in within 1 week of the due date and 50% penalty for assignments turned in thereafter until the end of the course (defined as the last regular class session). I use this system even in the event of "excusables," such as minor sicknesses or other unforeseen conflicts. However, any exceptions to this policy are made at my discretion.

**Honesty:**

Cheating on class assignments, examinations, or other serious forms of academic activities will result in a grade of an "F" (and a required report to University officials). Persons "borrowing" someone else's work on an assignment will receive a zero on that assignment if it is the first offense. A second offense will be considered a serious form of academic dishonesty. (Borrowee is equally subject to penalties.) Refer to UGA's *A Culture of Honesty: Policies and procedures on academic honesty.*

**Withdrawal/Drop Policy:**

Drop policy is as described in the university's undergraduate bulletin, page 45.

**VIII. Course Materials**

Required Instructional Materials:

**Text:**

Crawford, M. et al. (2001). *Physics in Context: An Integrated Approach*, CORD Communications, ©2001, ISBN: 1-57837-275-5

**Reference Textbooks:**

<http://www.learningincontext.com/PiC-Web/index.html>

Serway, R. A., and Jewitt, J. W.(2003). *Physics for Scientists and Engineers* 6<sup>th</sup> Edition. Brooks/Cole Pub Co. ISBN: 0534409636

**Equipment and Materials:**

1. Safety glasses
2. Lab coat or other suitable protection for clothing

**IX. Ways to Contact Professor**

Please refer to office hours and e-mail or phone instructor to make other arrangements.

[http://news.uns.purdue.edu/mov/2007/Rube\\_07\\_Package.mov](http://news.uns.purdue.edu/mov/2007/Rube_07_Package.mov)