HTS 1081 Spring 2007 MWF, 1:05-1:55 Army Office 2 Professor S. W. Usselman D. M. Smith 315; 4-8718 <u>steve.usselman@hts.gatech.edu</u> Office Hours: MWF, 11-12

#### **ENGINEERING IN HISTORY:**

## ELECTRICAL ENGINEERING IN AMERICA

This course is intended to provide perspective on the ways engineers function, including how they interact with the broader society in which they operate. It uses history as a window. By studying engineers of the past, we seek to gain insights that will help us find our way in our own time, either as practicing engineers or as informed citizens.

The history of engineering stretches back to the earliest human societies and extends across a wide range of activities. No single semester course can hope to cover more than a fraction of the rich history of engineers and their work. We must be selective. This term, we will concentrate on engineering activities connected with one discipline (electricity) and conducted in one place (the United States). This choice in part reflects the continuing vibrancy of electrical engineering in contemporary affairs. But it also derives from the rich opportunities within the history of electrical technology in America to study engineering in its full context. Much of what we learn from the field of electrical technology pertains to engineers in other fields as well.

Even within our circumscribed area of inquiry, our studies will go back nearly two centuries and encompass quite a variety of engineering problems and technologies. We will consider settings ranging from family farms to suburban internet subscribers, from Henry Ford's factories to Wall Street offices, from Edison's workbench to Bell Laboratories and Silicon Valley. Some of these might seem far removed from our own world. Yet in all of them we can find parallels, analogies, and roots that help us comprehend the technologies and technologists of our day, both in electrical engineering and in other areas.

### Requirements and Grading

This course involves lectures, regular readings, discussions, a group project, and three essay exams. All are essential components of the course. Readings and lectures supplement one another. Do not expect to have material presented in one venue repeated in the other. Discussion is essential to the study of history, where the most important lessons always contain elements of indeterminacy and uncertainty. We need to explore issues collectively, with input from colleagues as well as from the instructor and from the various authors we read. Only by engaging materials in this way can students hope to make sense of the material and do well on the quizzes. Each quiz counts 20% toward your final grade.

The group project, described more fully in a separate handout, is intended to give students a

chance to apply the perspectives gained from their study of history to a contemporary problem involving electrical engineering. The project should attempt to comprehend the current problem in all its dimensions, including the social, economic, and ethical as well as the more narrowly technical. In addressing the contemporary topic, the group should seek to draw analogies to past episodes from the history of electrical engineering. The project counts 40% toward your final grade.

# Readings

All assigned readings for this course should be available electronically, either through the course website or through electronic reserves. Readings in history are like problem sets or other regular homework assignments in engineering courses. Students should come to class having done the reading listed for that day and prepared to talk about it. (I have listed the readings for each topic; generally, there is one reading per day, and it is best to proceed through them in the order listed.) It is also a good idea to take notes on readings for study purposes.

# Attendance, Participation, and Honor

Students bear responsibility for participating fully and equitably in the course. This means attending regularly and attentively, participating in class discussions, and following the letter and spirit of the Georgia Tech Honor Code. Class participation can make a significant difference in cases of borderline grades

#### **SCHEDULE**

Week	<u>Topic</u>	Readings	
M 1/8	Organization and Introduction		
	Part I. Electromechanical Systems: Communications and Power		
W 1/10- F 1/12	Designers and Devices: Telegraph and Telephone	Klein, "Morse" Hounshell, "Bell and Gray"	
M 1/15	NO CLASS – King Holiday		
W 1/17- M 1/22	Norms and Networks: Ma Bell to Con Ed	"Rural Phones" packet Wohleber, "Tesla" Penrose, "Electric Chair"	
W 1/24- M 1/29	Motoring: Trollies to Automobiles	Hilton, "The Wrong Track" Sprague, "Multiple Unit System" Volti, "Why Internal Combustion?"	
W 1/31-	Power:	Steinmetz materials	

M 2/5	Promise and Politics	Hughes, "Industrial Rev. that Never Came"	
W 2/7 F 2/9	Review First Quiz – in class portion		
Part II. Electronic Entertainments: Sound and Pictures			
M 2/12- F 2/16	Audiophilia: Phonographs and Synthesizers	Thompson, "Is It Real?" Nicholl, "Good Vibrations" Lander, "Technology Makes Music"	
M 2/19- F 2/23	Radio Age: Wireless to Broadcasting	Douglas, "Amateur Operators" "Lee deForest" Tom Lewis, "Radio Revolutionary"	
M 2/26- F 3/2	Talking Pictures: Movies and Television	Wohleber, "How Movies Learned to Talk" Fisher and Fisher, "The Color War" Mannes, "The Birth of Cable TV" Wolpin, "The Race to Video"	
M 3/5- W 3/7 F 3/9	Review Second Quiz – in class portion		
Part III. Digital Devices: Silicon, Computing, and the New Networks			
M 3/12- F 3/16	Early Computing: Math, Physics, and the Military	Heppenhimer, "Von Neumann" Tomayko, "Airplane as Peripheral" Heppenheimer, "What Made Bell Labs" Burbank, "Making a Microchip"	
M 3/19- F 3/24	SPRING BREAK		
M 3/26-F 3/30	New Devices: ICs and Lasers	Wolfe, "Noyce" Bromberg, "Amazing Light" Seideman, "Bar Codes Sweep the World" Hecht, "Fiber Optics"	
M 4/2- F 4/6	New Networks: The Internet and Beyond	Abbate excerpt Silicon Valley packet	
M 4/9- W 4/11 F 4/14	Review Third Quiz – in class portion		

M 4/16-

F 4/20 Group Presentations

M 12/5- Group Presentations

F 12/9

TH 5/3, Group Presentations

2:50-5:40

NB: This schedule, including assigned readings, may be altered during the course.