PRODUCTIVITY ANALYSIS SPRING 2010 SYLLABUS

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Office Hours: Tues-Thurs 4:30-5:30 or by appointment

1. Course Materials

- Additional handouts will be posted on my website.

2. Course Description

The course applies microeconomic models of technology to the productivity analysis of engineering systems. Specifically, we will develop models to
- assess system inefficiencies;
- assess how well a system has improved its productivity and performance;
- assess how well a system has improved its economic performance; and
- explore how a firm’s productivity affects its strategic decisions on production levels, price and investments in R&D under different market conditions.

3. Course Organization

- Class time will be used to motivate, explain, and illustrate the concepts and techniques, and to go over homework problems.
- **Book material will not be covered verbatim.** Emphasis will be on computation and conceptual understanding of core ideas, not hard-core theory and proofs.
- If you miss class, then it is your responsibility to catch up (i.e. no private lectures during office hours).
- It is your responsibility to bring handouts posted on my website to class.
- On occasion you will be requested to read a handout or certain parts of the book and be prepared to discuss during class.
4. Grading

Your grade will be based on two quizzes (30% each), one group project (30%), and two group mini-projects (10%). Exam dates: Exam I, Thursday, Feb 25 and Exam II, Thursday, Apr 15.

Exam Grading Policy:
- **No regrading.**
- In case of an emergency, you must receive my prior permission to miss a quiz. In this case, at my discretion, either: (i) the quiz will be rescheduled, (ii) an alternative quiz will be scheduled, or (iii) your grade will be based on the other criteria.

5. Homework

Group mini-projects will be turned in for grading. Homework will not be graded and you are encouraged to work together. Doing the homework yourself is essential to learning this material.

6. Projected Topical Outline

*Microeconomic Foundations for Parametric Analysis*
- Production functions (Chapter 2)
- Cost functions (Chapter 5: Sections 1-4, 7)

*Productivity and Performance Measurement*
- Index numbers (Chapter 13)
- Productivity measurement (Chapter 14.1-14.3)
- Performance measurement (Chapter 15)
- Strategic analysis of firm productivity (Chapter 16)**

*Microeconomic Foundations for Nonparametric Analysis*
- Descriptions of technology (Chapter 3)
- Nonparametric input-output models (Chapter 4)
- Nonparametric estimation of cost function (Chapter 5.6)
- Distance function (Chapter 7)

*Efficiency Measurement*
- Efficiency analysis (Chapter 9)
- Projection algorithm (Chapter 10)
- Warehouse efficiency analysis (Chapter 12)**
- Multi-stage analysis (Chapter 11)
- Productivity measurement (Chapter 14.4)

*Strategic Rivalry with R&D Investment* (Handout)

** Group mini-project
Industry Productivity Analysis Spring 2010 Project Information

A. Description

- A comprehensive analysis of an industry within a private or public economic sector (e.g. manufacturing, warehousing and distribution, health care, education, retail, financial services).
- Analysis describes productivity measurement, R&D investment and strategy (past, present and future), financial conditions, market structure, and past and projected trends on production, marketing and technology.
- Final deliverables are a written report and in-class presentation.

B. Project Report Topics

- **Executive Summary**: Summarize your major findings and relevant information.
- **Description, History and Background Information**: Describe target industry. Identify historical trends on market structure, business strategies and internal or external technological advances that have affected any aspect of the industry. Describe the production and distribution internal processes in the industry.
- **Current Industrial Organization**: Define current market and organization. List industry weaknesses and strengths, any product substitutions.
- **Financial Analysis**: Present concrete financial analysis based on industry and firm data. Report financial ratios (e.g. debt/equity ratio, total assets/gross sales, etc.), market size, production levels, industry expenses on research and development activities (process and product innovations), administrative expenses, marketing efforts, salaries and wages (both production and R&D). Identify unique aspects to the industry.
- **Research and Technology**: Describe main R&D strategies and technological improvements. Report past and future trends. Identify main players and research strategies (e.g. dependency on government or university research programs, existence of joint ventures, government subsidies).
- **Productivity Analysis**: Describe and analyze metrics used to assess efficiency and productivity. Describe relevant literature. Suggest alternative metrics.
- **Appendices**: As needed.

C. Source Information

A special website <here> at the Georgia Tech Library and Information Center has been prepared by Ms. Crystal Renfro and me to assist you. **You should consult it immediately.** To help you select an industry go to the Reference section of 2nd floor East to look at the Standard and Poor’s Industry Surveys, Encyclopedia of Emerging Industries and the Encyclopedia of American Industries. There are many interesting economic subsectors, so give this some thought!

D. Organization

- Self-organize into project teams (4-6 members per team) with my assistance. **At my discretion I can assign or re-assign any student to any project team.**
- Deliver industry project proposal to me at beginning of class on **Thurs Jan 28**. E-mail me an electronic version by this same due date. This proposal provides group member resumes, identifies team contact, describes the target (4-digit SIC) industry, and identifies potential
industry contacts and possible site visits. *Written proposal, excluding resumes, must not exceed three pages.*

- Sign up for Kickoff Meeting with me during available slots (outside class time) **Tues Feb 2-Thus Feb 4.** Location to be determined.
- Sign up for Interim Progress Report Meeting with me during available slots **Tues Mar 9-Fri Mar 12.** Location to be determined.
- Deliver hard copies of final report and PowerPoint presentation to me at beginning of class on Thurs Apr 15. E-mail me electronic versions by this same due date. *Main body of final report not to exceed ~20 pages.*
- Deliver in-class presentation Tues Apr 27 or Thurs Apr 29 or during final exam period. Schedule will be determined by me. *Presentation (not counting questions) must not exceed 20 minutes.* **CLASS ATTENDANCE REQUIRED.**
- I will be available for consultation throughout the semester during office hours.

**E. Project Tips**

**Oral Presentation**
- Make it interesting.
- Address all relevant content areas.
- Present information in a logical, organized, and easy-to-follow sequence.
- Make sure figures and tables are accurate and enhance the presentation.
- Maintain professional look.
- Make sure there are no misspelled words or typos.
- Make text easily readable.
- Convey full knowledge of material and do not read slides.
- Answer questions effectively and concisely.

**Written Report**
- Avoid vague/fuzzy statements. Instead, make solid, accurate, verifiable statements, and refer to your sources.
- Use titles, subtitles, lists, appendices and appropriate formatting to make your report more structured and easier to understand.
- Present figures, tables, illustrations as necessary to communicate the information.
- Give a complete reference to your sources. The reference could be to a footnote on the same page or a list under “References” section. Appropriately reference information obtained from a book or an article. If you cite information obtained from an industry person, provide relevant contact information (title, e-mail, telephone, company). If you obtained information from a website, provide a URL of the specific web page from which you found the information. Make sure to number your references and refer to a specific numbered source.
- Make it visually appealing and easily navigated.
- Be concise. Choose words for their precise meaning.
- Include all necessary content.
- Make sure sentences are complete, grammatically correct and flow together easily.
- Make sure there are no misspelled words or typos.
- **DO NOT PLAGARIZE.**
F. Grading Policy

Written report, in-class presentation and professionalism all factor in. Ideally and in expectation, all team members should receive the same grade.

**WARNING:** Individual and team deductions from the overall grade will be assessed if you:

- do not contribute a fair and significant share to the team’s effort;
- violate project requirements (e.g. miss a due date);
- miss an in-class presentation (without prior approval or due to a real emergency);
- fail to respond in a timely manner to a request from me; or
- behave in an unprofessional manner.

Deductions can range from as little as a quarter letter-grade deduction to a full letter-grade deduction from your team’s overall assigned grade. Egregious cases may result in the assignment of a D, F or zero on the project. Team members can receive a higher or lower grade than the project grade.

If at any time I determine that an individual’s progress is unacceptable, then I will determine a remedy, which may include requiring special assignments for the individual or terminating the individual’s participation in the project.

You are expected to conduct yourself in accordance with Georgia Tech’s [student honor code](#).